Effect of foot reflexology on pain reduction in older Thai people

Jeranut Somchock M.Sc, M.N.S, Dip. Science (Nurs)

Volume 1

A thesis submitted in total fulfilment of the requirements for the

Doctor of Philosophy

School of Nursing and Midwifery

Flinders University

Adelaide, Australia

December 2012

Table of Contents

List of Tables, Figures, Pictures and Graphs

Tables

Figures, pictures and graphs

Abstract

This quasi-experimental, pre- and post-test design study addresses concerns about the increasing older age population worldwide and in Thailand in particular, and the increased pain, co-morbidities and risk of adverse effects from medication incompatibility that accompany ageing. Whilst anecdotal evidence exists about the role of foot reflexology as a form of non-pharmacotherapeutic pain management, there is little scientific evidence of its benefits. This study has sought to fill this gap in the research by investigating the effects of foot reflexology on reducing pain in the older Thai population and assessing the effect of foot reflexology on the quality of life scores of the older Thai population who experience pain.

The study was conducted over a six-week period with 160 older Thai people with pain who attended the Primary Health Care Centre of Lamsompung district, Saraburi, a rural area of Thailand. Criteria for participation included having *Pain right now* when the researcher conducted the first interviews for participants. Exclusion criteria included vascular disease, foot infections/ulcers and recent surgery. Participants were randomly allocated to one of three groups: a foot reflexology intervention group (n=80); an alternative intervention group with home-based talking about pain (n=40); and one group with no intervention (n=40). Measures of pain and quality of life were taken from all participants before the four-week intervention period (on day 1), at the end of the intervention period (week 4) and again after a two-week follow-up period (week 6). Data were collected using demographic data questions, The Brief Pain Inventory [BPI], Thai version, questionnaire, and the SF-36, Thai version quality of life questionnaire. In week seven, after all measurements had been taken, all participants in the alternative intervention and no intervention groups were offered

the same foot reflexology sessions as given to participants in the intervention group.

Demographic data were analysed in terms of frequency and percentage. Differences in baseline results between the three groups were analysed in terms of mean and standard error of mean. Differences in outcome measures between the three groups post-intervention were explored using Analysis of Variance (ANOVA). Analysis of Co-variance (ANCOVA) was used to assess differences post-intervention, adjusting for baseline levels. Data analysis aimed to prove primary and secondary hypotheses:

1. Primary hypothesis: there is either no (null hypothesis) or some difference (alternative hypothesis) in mean pain scores between the intervention group (foot reflexology) and the alternative intervention group (home-based interview talking about pain), or between the intervention group and no intervention group at the end of the intervention (week 4) and at the end of the follow-up period (week 6).
2. Secondary hypothesis: there is either no (null hypothesis) or some difference (alternative hypothesis) in mean quality of life scores between the intervention group (foot reflexology) and the alternative intervention group (home-based interview talking about pain), or between the intervention group and no intervention group at the end of the intervention (week 4) and at the end of the follow-up period (week 6).

Results indicate that for the older Thai people in this study:

- males have a higher quality of life than females;
- foot reflexology plays a role in temporary pain relief; and
- foot reflexology improves quality of life.

Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed:

Jeranut Somchock

Date: 15 December 2012

Acknowledgements

The achievement of this thesis has been supported by many special people I would like to thank:

The Thai government for supporting me financially and giving me the opportunity to study abroad.

Dr Lidia Mayner, Associate Professor, my principal supervisor, who has been a wonderful teacher and mentor, and who has supported me in gaining knowledge and maintaining my wellbeing.

Professor Paul Arbon, my co-supervisor, for advice and encouragement.

My co–researchers and masseurs in Thailand, and officers at the Lamsompung Primary Health Care Centre, for giving me assistance and friendship.

Ms Margaret Bowden for her patience in editing my work.

Finally, my mum and dad, my big family in Thailand, my daughter and also Allen David White for being by my side always.

1 Introduction and Context

1.1 Background

The increasing number of older people around the world is causing concern. Over the next decade, the older age population (aged 65 and over) in the United States of America (USA) will increase to 24.6 percent of the total American population of 341,387,000 by 2020 (U.S. Census Bureau 2008). In Australia, people in the older age group (aged 65 and over) will represent 17.2 percent of the total Australian population of 23.3 million in 2020 (Australian Bureau of Statistics 2006). In the United Kingdom (UK), the older age group (65 and over) will comprise approximately 36.1 percent of the total population of 67.8 million in 2023 (Office for National Statistics 2009). The percentage of the older age population shows a similar trend in Thailand. In 2000 and 2005, the percentage of this population group was 8.7 and 10.1 respectively. This group is expected to be 15.2 percent of the total population in 2020 (Kunsathitporn 2006; Sasat 2006).

1.1.1 The link between older age and incidence of pain

Related to the increasing numbers of older people is the increased incidence of pain in this population. Pain occurs twice as often in American older adults (aged 65 years and older) as in younger persons (Pitkala, Standberg & Tilvis 2002). It is estimated that over 75 percent of American older people suffer from pain (Weiner 2007), while between 33 and 50 percent of British people over 65 years of age experience pain (Mann & Carr 2006). Chronic pain in particular has a greater impact on American older adults than on any other age group (Weiner 2007). In Asia, 65 percent of Taiwanese older people have pain (Tsai *et al.* 2004). A study by Brattberg, Parker

and Thorslund (1996) found that the prevalence of pain among the oldest people (85 years and over) in Sweden is comparable to the prevalence among middle range older persons (75-84 years), but is higher than the prevalence among the younger range of older persons (65-74 years).

Older people are very prone to illnesses or co-morbidities such as osteoarthritis and hypertension, which cause pain. Gagliese and Melzack (2006) indicate that joint pain, lower back pain, and migraine or tension headaches often occur in older people in the United States. In the older Thai population, co-morbidities such as osteoporosis and osteoarthritis are common causes of pain, including acute and chronic joint pain (Kunsathitporn 2006). Plianbumroong (1997) reports that 40.2 percent of older Thai people's health issues, including knee pain and back pain, are from musculoskeletal problems (Tuanwong 1997; Wivatvanit 2002). Teewanda *et al.* (2002) report a similar finding in that joint pain from arthritis is the most common form of pain in older Thai people.

1.1.2 Pain management methods

Analgesic treatment is a common strategy for pain management in older adults (Nikolaus & Zeyfang 2004; The American Geriatrics Society Panel 2002). Self-medication is common among Thai people (Chaisangmongkol 1992; Inty 1994). Painkillers such as paracetamol, aspirin powder, Non-Steroidal Inflammatory Drugs (NSAIDs) and a drug package for pain relief are easy to get from the groceries near people's houses (Auabandit *et al.* 2001; Chaisangmongkol 1992; Inty 1994). In older people, however, physiological changes influence the effect of analgesic drugs (Bruckenthal, Reid & Reisner 2009; Morrow, Saxton & Rodriguez 2002), resulting in a reduced or prolonged absorption of the drugs (Drago 2007). Moreover, old

people dealing with many co-morbidities may take medications besides analgesics; a practice that encourages drug interactions and side effects from drug combinations (McCleane 2006). Furthermore, changes in the perception of pain, a lesser willingness or ability to report pain, and the presence of cognitive impairments in older adults (Closs 1996; International Association for the Study of Pain 2008) make it more difficult to manage pain effectively in this population (Robinson 2007).

Inadequate pain relief is common in older people (D'Arcy 2008). It is not only caused by the reasons just mentioned, but also by health care professionals' lack of knowledge about assessing and managing pain in older people, and physicians' fear of prescribing opioids due to possible addiction, respiratory depression and other side effects (Chaudakshetrin 1993; Gloth 2004; Robinson 2007). A study of pain management in aged groups with cancer in Thailand showed that inadequate pain relief is caused by health care professionals' and patients' lack of education about it, as well as difficulties obtaining pain relieving medicines such as opioids due to strict national drug legislation (Chaudakshetrin 1993). Research by Spencer (2003) found similar reasons for inadequate pain relief in Thai patients with HIV and AIDS.

1.1.3 Pain and quality of life

A number of studies indicate that pain affects quality of life in older people. Skevington (1998) found that pain intensely affected physical well-being (discomfort, energy and fatigue, sexual activity and sleep); psychological well-being (decrease in positive feelings, cognitive activities, and self-esteem); level of independence (mobility, activities of daily life and dependence on medications); and environmental health and services (physical safety and security, availability of social care and work satisfaction) in British older adults. Reyes-Gibby, Aday and Cleeland

(2002) interviewed 8,222 American older people about the impact of pain on self-rated health. Researchers found that pain impacted functional limitations and depression in this population. Blomqvist and Edberg (2002) applied a qualitative approach to explore the impact of pain on quality of life in Swedish older adults (aged 75 years and over) and found that pain impacted on older people's mobility, sleeping and social activities including visiting friends and travelling. Jakobsson, Hallberg and Westergren (2007) explored pain and quality of life among 526 Swedish older people (aged 75 and over) and found that pain impacted on their lives by causing walking problems (60%), fatigue (33%), sleeping problems (23%) and depressed mood (16%). Jakobsson *et al.* (2007) conclude that mobility problems, sleeping problems, and depressed mood are associated with low quality of life in this age group.

The above studies indicate that although pain impacts on older people's quality of life, inadequate pain relief is common due to the problems associated with self-medication and doctors' reluctance to prescribe opioids. Therefore, there is a need to look at combined interventions to increase successful pain management and reduce disability (Won *et al*. 1999), including analgesics and non-pharmacological strategies (D'Arcy 2008; Mann & Carr 2006). The common interventions used for pain management in older people include medication, rest, mobility, distraction activities, talking about pain, heat, support devices, acupuncture, aromatherapy, relaxation, Transcutaneous Electrical Nerve Stimulator (TENS) and massage (Blomqvist & Edberg 2002). Foot reflexology is a type of massage and one of the non-pharmacological interventions claimed to relieve pain (Dougans 2002; Stephenson, Dalton & Carlson 2003).

1.1.4 Foot reflexology: principles and possibilities

Foot reflexology, the pressure technique applied on specific areas of the feet, is believed to induce a state of relaxation and improve blood circulation, resulting in cells receiving more nutrients and oxygen (Dougans 2002; Kunz & Kunz 1999). It works according to several principles/theories (Slade 2010):

1. The meridian theory – the Chinese energy flow lines located throughout the body (Dougans 2002; Slade 2010).

2. The 'U-Bend Theory' (Slade 2010).

3. The endorphin release principle (Dougans 2002; Mackereth & Tiran 2002; Slade 2010).

4. The 'Gate Control' theory (Mackereth & Tiran 2002; Slade 2010; Wallace 1992).

5. The relaxation effect (Byers 2001; Dougans 2002; Kunz & Kunz 1999; Mackereth & Tiran 2002).

6. The placebo effect (Sauro & Greenberg 2005; Slade 2010).

These principles and theories that form the basis of foot reflexology are discussed in detail in the next chapter. They are mentioned here to provide background information for the research.

1.2 A gap in the field of study

To date, there is no strong scientific evidence to support the claim that foot reflexology can reduce pain. Although a number of researchers have investigated the

benefits of foot reflexology on pain reduction, as identified above, none has rigorously examined the benefit of foot reflexology on pain reduction in the older Thai population. The research study reported in this thesis seeks to fill this gap.

Only five studies of reflexology from the USA, UK and Denmark have focused on pain management (Evans *et al*. 1998; Launso, Brendstrup & Arnberg 1999; Stephenson, Dalton & Carlson 2003; Stephenson, Weinrich & Tavakoli 2000; Tovey 2002). Panyim (2000) and Pongpiyapiboon (2005) carried out two studies of reflexology on pain reduction in Thailand, however foot reflex zone therapy was used in these studies. There are different procedures in foot reflex zone therapy and foot reflexology (Ingham method). According to the Thai Traditional Medicine Institution, Ministry of Public Health, Thai foot reflex zone therapy uses oil or cream, a stick and the masseur's knuckles, and the massage is applied up to the client's lower legs; it is not restricted to only the client's feet. All of the mentioned studies are detailed in the next chapter (Literature Review), which identifies their strengths and weaknesses. Overall, the results from these studies neither strongly support nor oppose the effect of foot reflexology on pain reduction. Most studies were carried out on a small number of participants and did not target the older population. Some lacked control groups or non-intervention groups for comparison. Thus, to date there has been little agreement about the effects of foot reflexology on pain reduction. Therefore, the study reported here aims to provide statistically significant evidence of the effect of foot reflexology (intervention) on pain reduction in a large number of older people using a quasi-experimental method.

1.3 Research questions

This study aims to address the following research questions:

1. Can foot reflexology reduce pain in older Thai people with pain?
2. Can foot reflexology improve the quality of life in older Thai people with pain?

1.4 Objectives

The objectives of this study are (1) to investigate the effect of foot reflexology on reducing pain in older Thai people with pain; and (2) to assess the effect of foot reflexology on the quality of life scores of older Thai people with pain.

1.5 Key terms

The following terms are used throughout this paper to designate meaning as below:

- *Older Thai people* refers to Thai people aged 60 years or over (Ministry of Social Development and Human Security 2004).
- *Reflexology* is defined as:

  > ... a science that deals with the principle that there are reflex areas in the feet and hands that correspond to all of the glands, organs and parts of the body…it is a unique method of using the thumb and fingers on these reflex areas (Byers 2001: pp. 8-9).

  I chose this definition because I used Byers' book and his methods of foot reflexology while studying at the Australian College of Tactile Therapies, Adelaide, South Australia. Moreover, the foot reflexology procedures (Ingham method) applied as an intervention in this study follow those in Byers' book.

- *Pain* refers to 'a highly individualised, unpleasant experience involving all aspects of the person, amenable to intervention yet, when left unattended,

resulting in decreased overall quality of life' (Hicks 2000, p. 394). I chose this definition instead of Melzack's definition because pain described by Hicks is presented as the subjective perception of individuals and their quality of life impacted by pain, whereas Melzack's view is about the physiological perspective. It presents pain as 'a multidimensional experience produced by characteristic neurosignature patterns of nerve impulses generated by a widely distributed neural network—the body-self neuromatrix—in the brain' (Melzack 2005).

1.6 Personal motivation, experience, values and interests

I became interested in foot reflexology during my time waiting for study abroad. After attending a short course of Thai foot massage in Thailand and reading some non-scientific articles about it, I was inspired to find out more using a scientific approach to ascertain whether this procedure can really heal the human body as it claims it can. I had an opportunity to undertake a foot reflexology course from the Australian College of Tactile Therapies, Adelaide, South Australia. My knowledge grew from my studies as I learnt in more detail about how foot reflexology works and began to recognise the many differences between Thai foot massage and Western foot reflexology. With this knowledge, and keeping in mind that the older Thai population is predicted to be the biggest group in the overall Thai population pyramid in the future (U.S. Census Bureau, International Data Base 2008), I proposed to investigate the effect of foot reflexology on pain and quality of life in older Thai people. It is important to know whether foot reflexology can be a beneficial treatment for pain in this population.

1.7 Thesis outline

This thesis has been divided into five chapters. This first chapter contains background to the research, identification of a gap in the research, research questions, objectives of the study, key terms, and the personal motivation, experience, values and interests that led me to carry out this study.

Chapter 2 explores the literature about current knowledge of pain in the senior population in general and the Thai population in particular. It discusses pharmacotherapeutic and non-pharmacotherapeutic pain management in older people, reflexology and the known effects of foot reflexology in particular, the quality of life in older people, and demographic factors associated with changing their quality of life including age, gender, education, occupation, income, social support, social activities and co-morbidities.

Chapter 3 describes the study aims, hypotheses, the research design, methods, data collection instruments and data analysis.

Chapter 4 presents the results from the study in four sections. The first presents results according to participant demographics. The second presents results for participants' experience of pain according to the Brief Pain Inventory. The third presents results for participants' perceptions of changes to their quality of life over the duration of the study, in line with the Short Form-36 quality of life questionnaire. The fourth section presents baseline results and outcomes of data analyses for pain scores and quality of life.

Chapter 5 discusses the results presented in Chapter 4, and the benefits and limitations of the methods and study design.

The final chapter (Chapter 6) gives a concluding summary, makes recommendations for the use of foot reflexology as a treatment for pain in older people and suggests directions for future research.

2 Literature Review

This chapter examines the literature related to older people in general, and specifically older people in Thailand; the issue of pain and pain management in these populations; pharmacotherapeutic and non-pharmacotherapeutic treatments for pain management; the impact of pain on older people's quality of life; and knowledge about foot reflexology. The electronic databases Medline/OVID, Journals@OVID, PubMed, CINHAL and ProQuest 5000 were searched to find relevant literature published in the English language. In addition, articles and books were sought using the reference lists from those research papers that related to this literature review. Key search terms included "pain", "pain management", "pain medication", "foot reflexology", "foot massage" and "complementary alternative medicine", all "+ older people". Most of the identified literature was published in Western countries, with limited literature published in Thailand. There were no year boundaries on the search.

2.1 Older people

As stated in the previous chapter, there is evidence that the number of older people around the world will increase over the next decade. The trends in developing countries such as Thailand are similar to those identified in the USA, UK and Australia. The older population tends to be the biggest group in the population pyramids for Thailand. A recent official report stated that in Thailand in 2020 there will be about 10.8 million people aged 60 and over from a total population of 70.5 million, and that 54.3 percent of the older population will be women (Commission of National Economic and Social Development 2010), indicating a trend that women are living longer than men (Sasat 2006).

The majority of the older people in Thailand live in rural areas (Jitapunkul 2004). Most of the older men live with their wives, whereas 60 percent of the older women live without husbands (Jitapunkul 2004; Sasat 2006). The explanation for this is that men have shorter life expectancies than women (Jitapunkul 2004; Sasat 2006), and that it is more acceptable for Thai men to get married after their wives pass away (Jitapunkul 2004) than for Thai women to remarry. The statistics in rural areas are grim. They show that one third of the elderly have no education and nearly 66 percent have low incomes (Jitapunkul 2004), with 61.6 percent not having enough money to meet their daily living needs. This forces most of the elderly to work (Jitapunkul 2004; Teewanda *et al.* 2002). The situation in Thailand is typical of what happens among the older people in other developing Asian countries such as Malaysia (Selvaratnam & Tin 2007), where most of the older people have no caregivers. Evolution from an agricultural society to an industrialised society has caused children to move to work in the big cities rather than staying at home and taking care of their parents (Sasat 2006).

The impact of physical changes in old age results in many co-morbidities, especially chronic disorders (Morrow, Saxton & Rodriguez 2002; Sasat 2006). This exacerbates the issue of older people needing care. Jitapunkul (2004) and Gulsatitporn (2006) report that illnesses including hypertension, diabetes mellitus, coronary heart disease, cerebrovascular disease, hypercholesterolemia, dementia, osteoarthritis, incontinence, depression and conditions due to falls in older Thai people are similar to those in older people in developed countries. Some chronic illnesses can cause pain, particularly arthritis (joint pain), peripheral arterial disease (claudication or rest pain), and diabetes mellitus (neuropathic pain) (Morrow, Saxton & Rodriguez 2002). Chuprapawan (2000, cited in Sasat 2006, p. 96) reports that 70.8 percent of older

Thai people have joint and back pain.

2.2 Pain

Pain is one of the most significant health issues today. It is a pervasive and expensive health care problem that impacts on one's quality of life (International Association for the Study of Pain 2007; Thomas, Dunn & Jinks 2007). Pain is described as a private internal sensation and subjective experience (Mann & Carr 2006; McDowell 2006). Hicks (2000, p. 394) describes it as 'a highly individualised, unpleasant experience involving all aspects of the person, amenable to intervention, yet, when left unattended, resulting in decreased overall quality of life'. Many factors influence pain; biological (tissue damage, underlying disease processes), social (family or work environment, sociocultural setting, upbringing, gender and age) and psychological (thoughts, beliefs, feelings and personality) (Thomas & Rose 1991; Keefe & France 1999; McDowell 2006). These factors also influence a person's response to pain (McDowell 2006). Pain itself produces biological, psychological and social changes that can affect future responses to it (Keefe & France 1999). In older people, many factors may lead to their experience of pain. Such factors include a long history of various pain experiences, multiple chronic health problems and family support (Chopra & Smith 2006).

2.2.1 The incidence and causes of pain in older people

The likelihood of living with pain increases as one gets older (Robinson 2007; Thomas, Dunn & Jinks 2007). As identified in the previous chapter, living with pain is more prevalent in, and has a greater impact on, persons older than 65 years than in younger persons (Ferrell 1991; Mann & Carr 2006; Pitkala, Standberg and Tilvis 2002; Tsai *et al.* 2004; Weiner 2007). The highest prevalence of pain is in the 85

years and over age group (Brattberg, Parker and Thorslund 1996).

Several studies have identified that the prevalence of pain is higher in older women than in men of comparable age (Brattberg *et al*. 1996; Helme & Gibson 2001; Thomas *et al.* 2004). This is because common conditions related to pain such as rheumatoid arthritis, osteoarthritis (Dellasega & Keiser 1997; Helme & Gibson 2001), fibromyalgia, (Helme & Gibson 2001) and headaches occur more often in women (Celentano, Linet & Stewart 1990; Helme & Gibson 2001). Brattberg *et al*. (1996), Kempen *et al.* (1999) and Perrot (2006) found that older people suffer most from musculoskeletal problems, while Helme and Gibson (2001) found that degenerative joint disease related to advancing age increases amongst most American older people. Brattberg *et al*. (1996) support research showing that joint pain is the predominant type of pain that increases with age. Typically, joint pain is spread over a number of areas in the body (Farrell, Farrell & Rivera 1995; Jakobsson 2004). Pain in the back, knee, foot or ankle, shoulder and neck is most common in older people (Blomqvist & Edberg 2002; Federman, Litke & Morrison 2006; Jakobsson 2004; Thomas *et al.* 2004; Tsai 2004). Myofascial pain, generalised osteoarthritis, chronic low back pain, fibromyalgia and peripheral neuropathy are common causes of pain in older adults (Weiner 2007), and high co-morbidity induces more pain in older people (Casten *et al.* 1995).

Older Thai people suffer most from musculoskeletal problems (Plianbumroong 1997; Tuanwong 1997). Khumpheng (1997) found that 77.5 percent of older people have muscular pain. Jitapunkul's (2004) study shows that 43.6 percent of older Thai women in rural areas report joint pain. Teewanda *et al.* (2002) report a similar finding. They found that joint pain from arthritis is most common in older Thai

people, particularly in the knees and back (Tuanwong 1997; Wivatvanit 2002). It has been reported that 69.2 percent of the elderly surveyed stated they suffered with back pain, which has been related to poor posture from work (Rungchucheun 2006; Visetkamin 2002).

Apart from physiological changes, psychological factors contribute to the cause of pain in older adults. Anxiety (Parmelee *et al.* 1991; Casten *et al.* 1995) and depression (Casten *et al.* 1995) have been found to induce more pain in older people. A qualitative research study (Tang *et al.* 2009) supports the thinking that pain or fear of pain are important factors in maintaining pain in healthy, anxious patients. Tang *et al.* found that patients with chronic pain who have a high level score for 'keep thinking about pain' or 'fear of having pain' (named as 'health anxious pain patients') tended to report their pain using overstated words such as 'terrifying', 'horrible' and 'unbearable' rather than more neutral terms such as 'severe', 'sharp' or 'constant'. These patients also showed a sense of mistrust or uncertainty and applied more proactive coping strategies to escape from pain, such as going to sleep, or using pain killers or sleeping pills to help them not worry about the pain. 'Health anxious pain patients' tended to employ 'safety-seeking behaviours', which involved setting restrictive rules on what activities they should or should not do to prevent pain. They were more likely to have anxiety, depression, frustration and anger. Moreover, they exhibited feelings of loss of control, had thoughts of self-harm and had even considered taking a drug overdose.

2.2.2 How pain occurs

As described in the previous section, many factors produce and influence pain. These factors include biological factors, psychological factors and social factors, which, in

turn, influence a person's response to pain.

2.2.2.1 Biological mechanisms

When tissue is injured and inflamed (hyperalgesia), nociceptors (pain receptors), including A-delta fibres and C-fibres, transmit pain impulses from the periphery of the body to the dorsal horn in the spinal cord and through the spinothalamic tracts to the brain (Mitchell & Condon 2005). A-delta fibres usually transmit sharp, localised pain, such as a pinprick or incisional pain, from the periphery to the thalamus and cortex, through the neospinothalamic tract. The C-fibres usually transmit dull aching pain, such as from a bruise or distension of an organ, at a slower rate from the periphery to the thalamus and cortex through the paleospinothalamic tract (Mitchell & Condon 2005). Injury results in the release of chemical mediators such as bradykinin, prostaglandins, substance P, acetylcholine, serotonin, prostaglandins, and histamine that enhance and facilitate the transmission of pain impulses (neurotransmitters) (Meyer *et al.* 2006; Mitchell & Condon 2005). Activations and interactions of multiple brain regions create the experience of pain. For example, the sensation of pain occurs in the thalamus; perceptions of location, intensity, duration, and meaning of pain occur from the interconnections between the thalamus, cerebellum, and the somatosensory cortex; and the emotional experience of pain arises from the limbic cortex, which is responsible for mood changes and self-focusing effects of pain (Bushnell & Apkarian 2006; Mitchell & Condon 2005).

The transmission and modulation of pain can be explained by the 'Gate Control Theory', which proposes that pain impulses from peripheral nerve C-fibres (small fibres) open the 'gate' in the spinal ganglia of the dorsal horn, the spinothalamic tract and limbic system (Mitchell & Condon 2005). If the large cutaneous sensory fibres

(A-beta fibres) have been activated in some way, such as by rubbing or massage during processing of the transmission of pain, the inhibitory control system that descends from the brain will close the gates (Mitchell & Condon 2005). Neuromodulators also affect the transmission of pain. These naturally occurring opiates such as endorphins, enkephalins, dynorphins and endomorphins block transmission of pain impulses (Fields, Basbaum & Heinricher 2006; Mitchell & Condon 2005).

2.2.2.2 Psychological mechanisms

When pain persists over months and years it can influence one's coping efforts, beliefs about pain and self-efficacy to control pain (Keefe & France 1999; Rudy, Hanlon & Markham 2002). A number of studies have proven a consistent association between belief about pain, self-efficacy to control pain and coping with pain. Turk, Swanson and Tunks (2008) showed that successful pain control combined psychological approaches such as relaxation techniques, a guided imagery technique and hypnosis with traditional medical interventions. They found that a person's beliefs about pain could affect their mood, body and social living aspects, and vice versa (Turk, Swanson & Tunks 2008). People with persistent pain who had maladaptive beliefs about their pain (catastrophising) were more likely to have pain-related fear, encouraging physical disability, anxiety and fear-avoidance beliefs related to future pain and function loss (Vlaeyen & Linton 2000). In addition, Turner, Jenson and Romano (2000) found that a catastrophising individual tends to have depression.

Self-control and self-management to encourage positive thinking, feelings and behaviour are needed to deal with persistent pain (Turk, Swanson & Tunks 2008).

Treatments aimed at teaching pain-coping skills can restore a sense of control and a willingness to persist, despite pain, which can lead to significant improvements in mood and quality of life (Keefe & France 1999). Changes in pain-coping skills and beliefs might also produce changes in behavioural processes (e.g. increased exercise, better compliance with medication) and social processes (e.g. improved marital and social interactions) which, in turn, can modify pain (Keefe & France 1999).

2.2.2.3 Social mechanisms

Although pain is a private experience, it can influence, and be influenced by, the people around the individual who has it (Keefe & France 1999). Living with someone who has pain can be stressful, and spouses of persons with persistent pain often have problems with emotional distress (Keefe & France 1999). A supportive spouse can help a partner having persistent pain cope more adaptively (Keefe & France 1999). An overly solicitous spouse, however, may unwittingly increase a person's attention to, and experience of pain (Keefe & France 1999). A recent study in the USA by Cano *et al.* (2009) supported this concept. Researchers found that higher levels of family member concern about, and responsibility for, providing pain-related support in persons with pain correlated positively with pain catastrophising, perceptions of lower spousal support, solicitous spouse responses and less supportive spousal behaviours during an interaction about pain.

2.2.3 Pain management in older people

Management of pain in older persons is complicated due to age-related cognitive impairment and physiological changes (Bruckenthal, Reid & Reisner 2009; Morrow, Saxton & Rodriguez 2002). Utilising pain medications is more complex for seniors than for younger people (Guay, Lackner & Hanlon 2002). Older people frequently

take multiple medications and are prone to adverse drug reactions (Guay, Lackner & Hanlon 2002) due to physical changes including integumentary and musculoskeletal changes, cardiovascular changes, hepatic changes, renal changes and changes in sensitivity to the drugs (Drago 2007).

Physiological changes in older adults, such as a decrease in muscle mass or the loss of skin elasticity due to less blood flow, result in a reduced or prolonged absorption via injection and transdermal drug administration. Other changes that effect absorption include changes in gut pH levels, which lessen according to stomach acidity levels, resulting in a decrease in gut motility and absorption. Hardening of the arteries of the heart may also impact the distribution of drugs, as it results in a decrease in liver enzymes leading to drug metabolism reduction. HFat-soluble drugs such as diazepam, alcohol, opiate analgesics and anaesthetics will remain in the body for longer than the recognised half-life because of the reduced speed of biotransformation and the fall in basal metabolic rate in conjunction with changes in lean tissue to fat ratio. Renal function will also deteriorate, resulting in renal drug elimination decrease and drug accumulation, thus creating a prolonged effect of the drugs (Drago 2007).

Treatment of pain in older people is more difficult than in younger people for reasons other than the physiological changes that influence the effect of analgesic drugs. Fear of side effects or addiction, changes in the perception of pain, cognitive impairment and a lesser willingness or ability to report pain all impact on effective treatment (Closs 2007). For example, Thomas, Dunn and Jinks (2007) found that only a fifth to a third of older people who suffered from pain reported their pain to health professionals, and inadequate pain relief was reported in older people with pain who

received pain medications (Hitchcock, Ferrell & McCaffery 1994). This resulted in a request for increased medication strength, which was against the beliefs of the doctor who did not recommend long-term use of medications. Physicians concerned about adverse side effects related to the medications were reluctant to prescribe opioids to older patients (Gloth 2004; Hitchcock, Ferrell & McCaffery 1994). In some cases, the physician did not believe the patient was reporting pain and thought they should be able to handle severe pain without using any medication (Gloth 2004; Hitchcock, Ferrell & McCaffery 1994). Sheffield *et al.* (2000) found that racial differences influenced pain perception. The study showed that whites rated the thermal stimuli as less unpleasant and less intense than did African Americans.

The research also identifies evidence of poor pain management. Older adults have been reported as having disproportionately low rates of adequate pain control (Federman, Litke & Morrison 2006; Gagliese & Melzack 1997, 2006; Honari *et al.* 1997; Lovheim *et al.* 2006; Morrison & Siu 2000; Rudy, Hanlon & Markham 2002; Somogyi-Zalud *et al.* 2000). Three significant factors may contribute to inadequate pain control: lack of proper pain assessment or under-diagnosis (Gagliese & Melzack 1997; Lovheim *et al.* 2006; Rudy, Hanlon & Markham 2002); potential risks of pharmacotherapy in older people (Gagliese & Melzack 1997); and misconceptions regarding both the efficacy of non-pharmacological pain management strategies and attitudes of older people towards such treatments (Gagliese & Melzack 1997). Nevertheless, differences in race, including genetic constitution and differences in culture, such as eating a different diet, have been shown to contribute to different medication absorption or metabolism, communication styles or acceptance of treatment (Sakauye 2004).

The goal of pain management is to increase the patient's quality of life. This is measured by improved overall functional status (the ability to perform daily activities), achieved by minimising the adverse effects of analgesics while reducing negative emotions related to pain such as anxiety, confusion and depression (Ahmad and Goucke 2002; Becker *et al*. 1997; Dellasega & Keiser 1997; Gibson 2007; Gloth 2004; Rummans *et al*. 1998; The American Geriatrics Society Panel 2002). The International Association for the Study of Pain (2008) stated that pain relief is an important health concern and should be a human right. To achieve this goal, pain management should be directed toward the care of the condition rather than the cure (Mikes *et al*. 2003). Intervention should be provided in the form of a multidisciplinary pain management program (Haines, Blair & Osborn 1999; Lordon, Cope & Fine 2002), not just pharmacologically (Drago 2007). It is argued that no one particular treatment has been proven to be better than another (Lordon, Cope & Fine 2002), therefore treatment planning should move away from single modality treatments (Sorkin *et al.* 1990). Pharmacological and non-pharmacological pain management modalities should be utilised to achieve an optimal response, especially in older persons (International Association for the Study of Pain 2008).

2.2.4 Pharmacotherapy for pain management

The most common strategy to manage pain is to use analgesic drugs (Nikolaus & Zeyfang 2004; The American Geriatrics Society Panel 2002). However, older people are more likely to experience the side effects of analgesic medications (Ferrell 1995; The American Geriatrics Society Panel 2002). The changing physiology that occurs with aging, including drug metabolism changes, can complicate pain management in older people (Robinson 2007). As stated in the previous chapter, the fact that older people are more prone to co-morbidities means they will have to take other

medications as well as pain relief, which encourages the risk of drug interactions and side effects from drug combinations (McCleane 2006). Drugs tend to produce greater and more prolonged effects in the older adult body (Mangoni & Jackson 2003), therefore a combination of two or more drugs may afford greater relief with less toxicity than would higher doses of a single agent (Dellasega & Keiser 1997). Pharmacotherapeutic drugs often used in pain management include Acetaminophen agents and non-steroidal anti-inflammatory drugs (NSAIDs), which are effective for mild to moderate pain in older people (Gordon 1999), and opioid agents for severe pain (Gordon 1999).

2.2.4.1 Acetaminophen

Acetaminophen and nonsteroidal anti-inflammatory drugs are first line drug therapy for mild to moderate pain (Guay, Lackner & Hanlon 2002). Acetaminophen is the analgesic most often prescribed for older people (Gregorio *et al.* 2007) because it is safe in most cases (Ferrell, Ferrell & Osterweil 1990). However, it can cause accumulative dose-dependent increase in the risk for end-stage renal disease (Perneger, Whelton & Klag 1994). Gregorio *et al.* (2007) report that older people with pain who were given Acetaminophen were not very satisfied. When maximum safe doses of Acetaminophen do not adequately control pain, NSAID therapy may be beneficial (The American Geriatrics Society Panel 2002).

2.2.4.2 Nonsteroidal anti-inflammatory drugs (NSAIDs)

NSAIDs, especially COX-2 inhibitors, are prescribed to older patients more often than to younger patients (Federman, Litke & Morrison 2006). This may be because NSAIDs often work well for bone pain and inflammatory conditions (Perneger, Whelton & Klag 1994), especially for the treatment of osteoarthritis (Murray & Brater 1990; Zhao et al. 1999). Oxaprozin use resulted in a significant increase in the

quality of life scores measured by the Short-Form 36 in physical functioning, bodily pain, role-physical, vitality, social functioning, physical component summary scores and mental component summary scores in patients with osteoarthritis (Zhao *et al*. 1999). However, NSAIDs have been associated with various adverse effects including peptic ulcer and renal insufficiency (Guay, Lackner & Hanlon 2002; Perneger, Whelton & Klag 1994; Silverstein *et al.* 2000). Perrot (2006) suggests use of these drugs, including COX-2 inhibitors, should be avoided for older people.

2.2.4.3 Opiate drugs

Opioid analgesics are powerful medications. They must be used with caution (Bennett & Carr 2002). Opioids are often the most effective treatment for persons with moderate to severe chronic pain (Bennett & Carr 2002; Bruckenthal, Reid & Reisner 2009; Guay, Lackner & Hanlon 2002), and for people experiencing pain that results in functional impairment or low quality of life (Bruckenthal, Reid & Reisner 2009). Whilst it is known that opiate drugs such as morphine relieve all types of pain, it is also known that long-term use has many side effects including pulmonary oedema, constipation, nausea and vomiting, sedation, confusion, insomnia, decreased sexual function, sweating and cognitive impairment (Guay, Lackner & Hanlon 2002; Portenoy 1996; Walsh 1990). It must be noted that central nervous system sensitivity to opioids and their toxicity increases with age (Fine 2001; Guay, Lackner & Hanlon 2002). Therefore, older adults taking opioids may be at greater risk for experiencing sedation, nausea, vomiting, constipation, urinary intention, respiratory depression, falls/fractures and cognitive impairment (Guay, Lackner & Hanlon 2002). More recently, literature has emerged that offers contradictory findings about opioid sensitivity increasing with age. Mercadante *et al.* (2006) investigated opioid side effects in 100 consecutive patients with cancer pain requiring further opioid dose

refinement. The study was undertaken in Italy and patients were divided into three age groups (aged 18-64, 65-74, and 75 years and over). Fifty-eight were in the first age group, twenty-seven in the second group and ten in the third group. The study found that opioid side effects did not significantly impact patients with an increasing age.

The American Geriatrics Society Panel (2002) recommended opioids over NSAIDs for pain management in the older population to enhance older people's quality of life. Research by Federman, Litke and Morrison (2006) found that opioid prescriptions for seniors had decreased while NSAIDs prescriptions increased. This finding may be attributed to widespread fears and misunderstandings about the risks of opioid analgesics among both physicians and lay people (Bennett & Carr 2002; Lordon, Cope & Fine 2002), and government regulation that resulted in a significant number of patients with untreated pain (Lordon, Cope & Fine 2002).

A failure to use opioid drugs due to overestimation of the risks (Opiophobia) results in under-treatment of pain (Bennett & Carr 2002) and an increase in people suffering unrelieved pain, which is a major public health concern and more prevalent in non-malignant pain (Bennett & Carr 2002). Uncontrolled pain has been shown to cause considerable psychological distress and impair the quality of life (Bennett & Carr 2002) as well as causing stress among family members and caregivers (Bennett & Carr 2002). It seems that pharmacologic-only approaches are not able to decrease pain in older people, and analgesics may cause mood changes and poor quality of life (Ahmedzai 1995). Thus, it is important to consider other approaches to help older people get better pain relief. It has been shown that non-pharmacologic approaches in which clients believe may help control their pain (Dellasega & Keiser 1997;

Nikolaus & Zeyfang 2004). Non-pharmacologic pain relief is discussed in sections 2.2.6 to 2.3.6.

2.2.5 Pharmacotherapy for pain management in older Thai people

It is quite difficult for Thai people to get access to adequate treatment and management of pain, including opioid prescription, and to health care professionals (Spencer 2003). Most Thai people in rural areas have a low income and cannot afford the cost of private health care, including indirect costs such as transportation to and from health care centres. As a group, they make so little money that missing a day's work has a profound effect on all aspects of their lives. Also, the nature of their work is physically demanding (mostly labourers and farmers), so they have a greater reliance on pain killers to help relieve pain fast, allowing them to continue working (Chaisangmongkol 1992). Self-medication is common among Thais (Chaisangmongkol 1992; Inty 1994) and other Asian older people (Najm, Reinsch, Hoehler & Tobis 2003). Thai people use their experiences, their learning, and their evaluation of illnesses and treatments, especially with mild physical conditions, to self-medicate (Chaisangmongkol 1992; Inty 1994). The Thai rural population buy cheap pain relief medications from their local grocery store (Chaisangmongkol 1992; Inty 1994) because it is the cheapest, fastest and most convenient way for Thais to treat themselves (Chaisangmongkol 1992). Thai people will go to the health care centre, clinic or hospital only if they have severe conditions or their symptoms persist after self-medication. They feel it is too time consuming to get access to, or treatment from, these sectors for less serious conditions.

Pain killers, such as Aspirin powder, available from local grocery stores, are well known among Thais as 'Tam Jai', 'Buad Hai' and 'Pra Sa Nor Rad'. Thai people

take these drugs not only for curing their pain but also for preventing fatigue and pain. Drugs containing caffeine make the people feel full of energy and ready to work (Chaisangmongkol 1992; Inty 1994). Some people become addicted to these drugs later in life because of long-term use during their working years (Chaisangmongkol 1992; Inty 1994). Paracetamol and a drug package (polypharmacy) for pain relief (Chaisangmongkol 1992; Auabandit *et al.* 2001) are also available from grocery stores. The drug package for pain relief is a group of drugs containing Aspirin, NSAIDs such as Dipyrone, Indomethacin or Phenylbutazone, and steroids such as Prednisolone or Dexamethasone. Both NSAIDs and steroids contained in a drug package for pain relief are quite dangerous for one's health, especially steroids, which need to be dispensed on prescription by a pharmacist (Auabandit *et al.* 2001; Plianbangchang, Junpratat & Thongpheom 2001; Uthidsamphankul *et al.* 1995; Yu-prasert 2000). Although the Thai government has banned local grocery stores from selling these drugs, and has introduced penalties for both seller and buyer acting against the law, Thai people still sell and buy the drugs (Yu-prasert 2000). Consumers continue using a drug package for pain relief even though they are aware of its dangerous side effects. They see it as an effective form of pain relief that costs little and is easy to acquire (Inty 1994; Yu-prasert 2000). Unfortunately, there is a minimal knowledge of pain relief in Thailand, particularly about conventional medicine for pain management.

Inadequate pain relief has been identified as a major issue in Thailand. Spencer (2003) studied pain relief in the southeast of Thailand and found that Thai patients mostly had inadequate pain relief, especially when they accessed health care centres, which had no physicians to prescribe strong pain medications such as morphine. In addition, Thai medical doctors are reluctant to prescribe opioids due to the strict

guidelines of the national drug legislation (Chaudakshetrin 1993; Spencer 2003), implemented due to fears of opioid addiction and its side effects (Chaudakshetrin 1993; Spencer 2003). With the difficulties in getting adequate pain relief from standard treatment, non-pharmacological interventions are necessary (Spencer 2003).

2.2.6 Non-pharmacotherapy for pain management

Although most older adults require analgesics to treat pain, serious consideration should be given to non-pharmacological interventions whenever possible (Gloth 2004). Pain management is one of the most common reasons for people to use Complementary and Alternative Medicine (CAM) (Gerdner, Nisly & Glick 2002; Williamson, Fletcher & Dawson 2003). The term 'complementary' means the therapy is used in conjunction with medical treatments, whereas the term 'alternative' means therapy used to replace medical treatments (Snyder & Lindquist 2006). The National Centre for Complementary and Alternative Medicine (2007, p. 1) in Maryland, USA defined CAM as 'a group of diverse medical and health care systems, practices, and products that are not generally considered to be part of conventional medicine'. Reasons for using CAM are general health improvement; dissatisfaction with conventional medicine (Gerdner, Nisly & Glick 2002; Kelner & Wellman 1997; McGregor & Peay 1996; Vincent 1996); fear of drug side effects (Gerdner, Nisly & Glick 2002); congruence of values, beliefs, and philosophical orientation (Astin 1998); disease prevention; and improved quality of life (Williamson, Fletcher & Dawson 2003). Shreffler-Grant *et al.* (2005) reported back or neck pain as the most common chronic problems for which older people used complementary therapies.

People of all ages in many western countries such as USA and UK now use more

complementary therapies than previously (Cooke 2007). Females and younger people with chronic health problems who have higher incomes and more education appear to use such therapies most often (Astin 1998; Astin *et al.* 2000; Cherniack, Senzel & Pan 2001; Eisenberg *et al.* 1998; Najm, Reinsch, Hoehler & Tobis 2003; Zhang *et al.* 2007). Barnes *et al.* (2004) found that urban adults were more likely than rural adults to use alternative medicines, including complementary therapy to treat pain (Vallerand *et al.* 2003). Other literature indicates that people who are newly senior, more educated and have health problems such as back problems, chronic pain and arthritis are more likely to use complementary therapies (Astin, Pelletier, Marie & Haskell 2000; Cherniack, Senzel & Pan 2001). Pain also has been found to be a common reason for use of complementary therapies in older Asian people (Najm, Reinsch, Hoehler & Tobis 2003). The most common therapies used in Asia were herbs, chiropractic, massage and acupuncture (Astin, Pelletier, Marie & Haskell 2000; Williamson, Fletcher & Dawson 2003; Zhang *et al.* 2007). Najm, Reinsch, Hoehler and Tobis (2003) found that Asian older people preferred using acupuncture and Oriental medicine; Hispanics used dietary supplements and home remedies; and white non-Hispanics chose chiropractic, massage, vitamins, diet and psycho-spiritual modalities.

Some psychological interventions such as biofeedback, relaxation and hypnosis may be effective in controlling pain (Ferrell 1995). Many non-pharmacotherapy treatments for pain management have been proven to be effective, especially when used in combination with drug strategies (Ferrell 1995). Such treatments include heat and cold (Rhiner *et al.* 1993); rest and distraction (Jakobsson 2004); herbs (Shreffler-Grant *et al.* 2005); acupressure and tai chi (Schofield 2007); acupuncture (Schofield 2007; Shreffler-Grant *et al.* 2005); chiropractic (Shreffler-Grant *et al.* 2005);

transcutaneous electrical nerve stimulation (TENS) (Erdogan *et al.* 2005; Lang *et al.* 2007; Meyler, de Jongste & Rolf 1994); massage (Rhiner *et al.* 1993; Schofield 2007; Shreffler-Grant *et al.* 2005); and reflexology (Schofield 2007). Some older people cope with their pain by spending time with friends and family, reading and watching television, rest and favourite old folk remedies (Cooke 2007).

Shreffler-Grant *et al.* (2005) found that older people spent more money on CAM than on hospitalisation, and that these people believed complementary therapies were quite helpful with their health problems. Astin, Pelletier, Marie and Haskell (2000) reported that 80 percent of the older people who used complementary therapies felt their symptoms improved. The use of CAM provided the opportunity for clients to restore hope and the sense of control their illness had stolen (Gerdner, Nisly & Glick 2002). It is less dangerous and provides a holistic approach and quality of life for clients (Schofield 2007). Using CAM in combination with conventional therapy helped reduce side effects and increased the effectiveness of the conventional therapy (Jakobsson 2004).

This chapter now focuses on three CAM therapies commonly used by older Thai people, then provides an in-depth exploration of reflexology and its role in pain management generally and in the older Thai population specifically.

2.2.7 Non-pharmacotherapy for pain management in older Thai people

Thai people also use alternative methods to manage pain caused by physical activity. Methods include hot packs, massage and rest (Inty 1994). The following studies report non-pharmacotherapy treatment for pain for Thai people.

2.2.7.1 Thai massage

Rungchucheun (2006) investigated the benefit of Thai massage as a complementary

and alternative medicine. Thai masseurs applied an hour of traditional Thai massage (whole body) three times a day on alternate days to reduce back pain in 60 patients (30 in the experimental group, 30 in the control group) in Rungchucheun's pre- and post-test, control group designed study. She found that pain intensity and pain distress in the experimental patients were reduced significantly after treatment. Also, pain intensity and pain distress levels in the experimental participants were significantly lower than those in the control group. Rungchucheun explained that massage helped patients relax physically and mentally, and improved blood circulation. Massage also encouraged production of natural morphine-like substances such as endorphins and enkaphalins. Distraction and relaxation helped inhibit the pain signal to brain.

Puthumrugsa (2005) also studied the effects of massage. In this study, Thai traditional neck massage was applied to 30 clients with neck pain (one group, pre- and post-test). Results showed that pain level was significantly lower after treatment and massage significantly reduced the level of neck disabilities.

Booddee (2002) applied Thai massage to 30 patients who had undergone knee arthroplasty. This study was a crossover design that placed 30 participants alternately in either the experimental group or the control group. Massage was given on day 5 or 6 post-operation, which is the period patients need to do the rehabilitation by moving the knee joint through a range of motion that can cause pain. The finding showed that pain intensity was significantly lower after treatment, which encouraged patients to exercise their joints.

Thai massage was also applied to 10 patients who had undergone an abdominal operation (Pongchareon 2001). A thirty-minute Thai massage was applied five times

on patients' shoulders, neck, back, lower legs and feet during the first three days after operation (one group, pre- and post-test). The results showed that massage helped reduce pain levels in patients and it was more effective on day three after operation than on the first two days. The explanation for this was that tissue injury released lesser amounts of substances encouraging pain on day 3 post-operation than on the first two days.

2.2.7.2 Aromatic oil massage

Aromatic oil massage is one of the many complementary therapies for pain management. Chaisittivong (2006) studied the effect of an aromatic oil massage on reducing pain in 30 patients who had undergone abdominal surgery. The study was a crossover design. Participants received either a conventional back massage (15 participants) or the aromatic oil back massage (15 participants) for twenty minutes on the first day after operation. The second day, participants who had received a conventional back massage would receive the aromatic oil back massage, and participants who had received the aromatic oil back massage would receive a conventional back massage. Pain level was measured before treatment on day one after operation when participants were conscious. Participants who had more than three scores of pain level were recruited to the study. Pain level also was measured immediately after treatment, and at 20 and 40 minutes after treatment respectively. Results showed that both conventional back massage and aromatic oil back massage effectively relieved pain level in the participants immediately after intervention, and at 20 and 40 minutes after intervention ($P < 0.05$). However, the aromatic oil back massage achieved better pain relief compared to the conventional back massage. The mean pain level in the participants who had the aromatic oil back massage was lower than that of the conventional back massage at all three measurement periods -

immediately, and 20 and 40 minutes after treatment ($P < 0.05$).

2.2.7.3 Music therapy

A number of studies applied music as a complementary therapy for pain management. Music was chosen from clients' preferences. The type of music applied as a complementary therapy included instrumental Thai music and modern Thai music. Duangkosum (1998) studied the benefit of music on pain management in 30 patients who had undergone extracorporeal shock wave lithotripsy. The study was a post-test only design. Participants were divided equally into two groups. The experimental group was given 40-60 minutes preferred music during extracorporeal shock wave lithotripsy while the control group received the routine procedure. The findings showed that the pain intensity level was lowered significantly in the experimental group participants compared to participants in the control group ($P = 0.01$). All participants in the experimental group reported that music distracted them and helped them temporarily forget about pain. In the experimental group, 66.66 percent of participants said music helped them relax and decreased their anxiety, and 53.33 percent of those reported that music helped them have more pain tolerance.

Adulpokathorn (2000) applied music therapy with 30 patients who had undergone abdominal surgery. The aim of this therapy was to reduce their pain. The study was a pre-test–post-test design with non-equivalent groups. Participants were equally assigned into one of the two groups. The 30-minute preferred music treatment was given to participants in the experimental group three times a day at two-hourly intervals within 48 hours after operation. Participants in the control group received the standard treatment. Patients' pain levels were measured before surgery and when patients were conscious following surgery. The study found significant decreases in

the experimental participants' pain levels compared with levels in the control group on days one and two post-surgery ($P < 0.01$). This is significant because pain medication intake for the two groups was the same in the two days after operation.

Payaksiri (2001) also investigated the effect of preferred music on reducing pain in 10 patients during open wound dressing. The study was a repeat experimental design. Subjects were randomly assigned to one of two groups. Five participants in group one received preferred music during wound dressing on day one and routine treatment without music on the next day. Five participants in group two received routine treatment without music on the first day and preferred music during wound dressing on the second day. The experiment was repeated twice; each participant received two wound dressings with preferred music and two without. Pain level was measured before, during and after wound dressing at 30, 60, 90 and 120 minutes. The findings revealed that pain level during wound dressing was lowered significantly in the participants receiving music therapy compared to those receiving no music therapy. Unfortunately, music did not appear to help reduce pain after the wound dressing at 30, 60, 90 and 120 minutes, as no significant difference in pain level was recorded between both groups at these times ($P > 0.05$). Thus, the study showed that music helped patients *temporarily* forget their pain.

Another study investigated the effects of Thai North-eastern traditional music on reduction of pain and anxiety in 30 patients who had undergone an open reduction and internal fixation (Sanitchone 2002). The participants were divided randomly into two groups. The 20-minute music intervention was given to participants in the treatment group three times daily, whereas participants in the control group received routine procedures after their operation. Pain level, anxiety level and frequency of

analgesic drug use were measured on days one and two following surgery. The findings revealed that Thai North-eastern traditional music significantly decreased pain levels, anxiety levels and the frequency of analgesics used in the experimental participants on both days one and two post-surgery ($P < 0.01$).

Ochum (2006) conducted a pre-test–post-test, control group designed study with 40 patients after abdominal surgery. The first 20 participants formed the control group receiving routine care. Data were collected from this group. The investigator then recruited the next 20 participants for the experimental group using matched pairs in terms of sex, age and type of surgery. This group received Thai music treatment twice a day for two days. Results show that pain level before music treatment for the experimental participants was lowered significantly after treatment ($P < 0.05$). In addition, pain level in the experimental participants after receiving music therapy was significantly lower than that for the control group after routine care ($P < 0.05$).

One study did not find any significant difference in pain level between a group that had music therapy and a group that did not (Nakpach 2007). This post-test only, control group designed study investigated the effects of music on pain and sleep quality in 40 patients who had undergone internal leg fixation. Data collection was completed for 20 participants for the control group who received routine care, and then the investigator selected 20 participants for the experimental group using matched pair design to have similar subjects for both groups of the study. Factors considered by the investigator to have matched pairs were gender, age and areas of participants' leg operation such as femur or tibia. Music was applied for pain relief in the 20 experimental group patients for 30 minutes every four hours or at least three times daily for three days post-operation. Pain level was measured immediately after

patients were conscious following surgery and at 6, 12, 24 and 48 hours. Sleep pattern was measured at 72 hours post-operation. The findings revealed that although pain level in the experimental group was lower than that of the control group, there was no significant difference in pain level between the two groups. In regard to the effect of music on sleep quality in the experimental group, music effectively improved sleep quality ($P = 0.05$).

2.3 Reflexology

2.3.1 Definition and the development of reflexology

Reflexology is defined by the International Institute of Reflexology, Florida, USA as a manual technique based on the theory that there are reflex areas in the feet, hands and ears that correspond to all glands, organs and parts of the body (Byers 2001) (see Appendix 1, Diagrams 2, 3 and 4). Reflexology is believed to have been used for more than 4,500 years in Egypt. Pictograph evidence to suggest this was found in the tomb of an Egyptian physician. Some claim reflexology originated in India (Mackereth & Tiran 2002). Others believe it came from China about 5,000 years ago. However, there is no evidence to prove these claims (Dougans 2002). Current reflexology practice is based on the theories of William Fitzgerald (1902), an American ear, nose and throat specialist who found that pressing on a specific part of the body could reduce pain in another part of a patients' body when that patient was receiving minor maxillofacial surgery (Byers 2001; Dougans 2002). Fitzgerald used this discovery to create a Zone Therapy Theory comprising ten zones on the longitudinal part of the body running from the head to the toes (Byers 2001; Dougans 2002; Mackereth & Tiran 2002) (see Appendix 1, Diagram 1).

Fitzgerald tested the Zone Theory, but despite favourable newspaper reports about

the outcomes, other medical professionals neither accepted nor applied it (Dougans 2002). Only one medical doctor, Dr. Joseph Shelby Rily, applied Fitzgerald's method and refined its techniques. Rily also helped Fitzgerald create reflex point diagrams (Dougans 2002). The development of modern reflexology came to fruition when Rily's assistant, Eunice Ingham, who became known as the 'mother of modern reflexology', developed a foot map from her own experiences of using zone therapy with her clients. Ingham's foot mapping shows the link between the feet and glands or organs of the body (Byers 2001), as shown in Figure 2.2 below. One of Ingham's patients was her nephew, Dwight Byers, who suffered from asthma at a young age (Byers 2001; Dougans 2002). Byers adopted Inghams' work and ran the International Institute of Reflexology in St. Petersburg, Florida (Byers 2001; Dougans 2002).

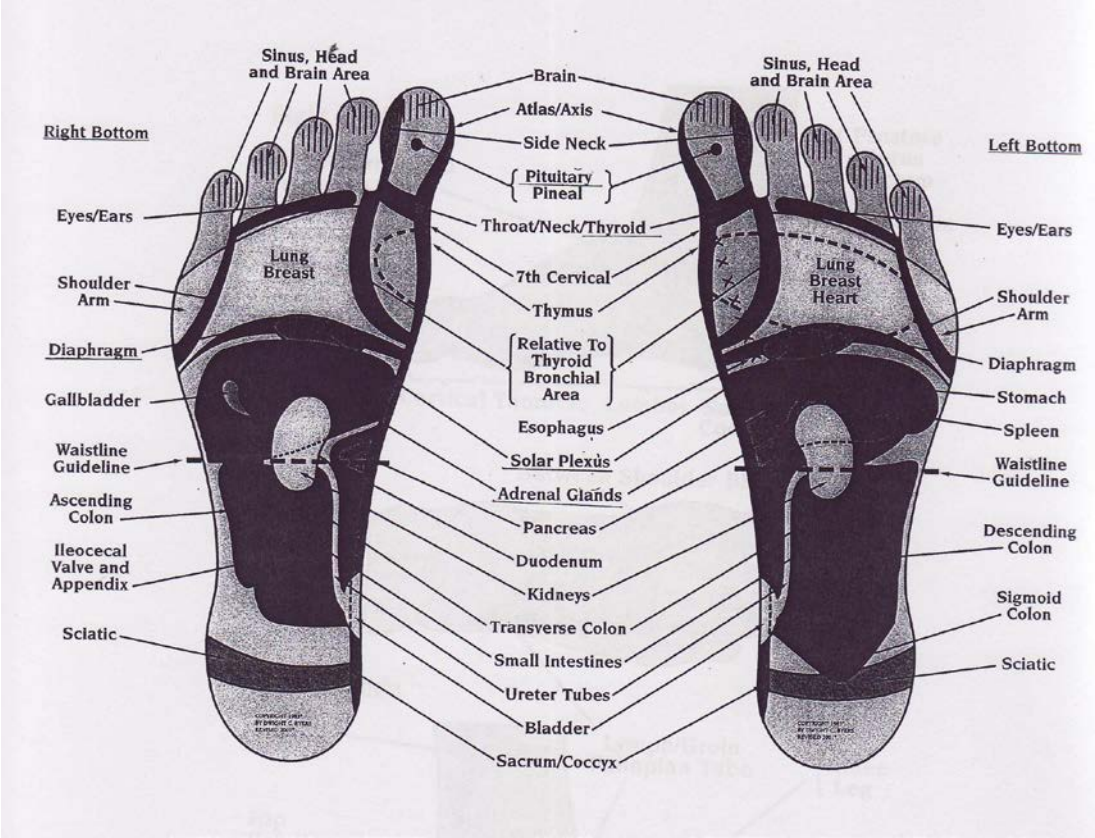


Figure 2.2 Feet mapping (Byers 2001)

2.3.2 How does reflexology work?

2.3.2.1 The meridians (Chinese energy flow)

From the reflexologist's point of view, reflexology works with the combination of many possible principles (Slade 2010). Firstly, reflexology is related to the meridians, which are the Chinese energy flow lines located throughout the body (Dougans 2002; Slade 2010). This was not written in Byers' work because at that period the Eastern concept of the meridian system was unknown in the West (Dougans 2002). Twelve main meridians situated on each side of the body relate to the lungs, kidneys, liver, gall bladder, stomach and other organs. Each meridian line is believed to affect the parts of the body through which it passes (Dougans 2002). If something is blocked along the meridians, the energy flow is also blocked (Dougans 2002). It is claimed that a block of energy flow can cause ailments (Dougans 2002; Slade 2010) such as upper toothache caused by an obstructed stomach meridian passing through the upper gums, or constipation combined with shoulder pain, asthma or cough related to blocking of the lung meridian that is believed to be a partner of the large intestine (Dougans 2002).

2.3.2.2 The U-bend Theory

Another theory on how reflexology works is the 'U-Bend Theory', which is based on the idea that feet are the lowest part of the body and therefore calcium and uric acid accumulate there, thus blocking blood and lymph flow, resulting in an impeded energy flow (Slade 2010). Pressure techniques applied on specific areas of the feet might eliminate and break up blocker substances accumulating in nerve endings that block the energy flow (Dougans 2002; Kowalak, Chohan & Follin 2003). These pressure techniques also improve blood flow, which may help the body function at its peak (Byers 2001). Hormones secreted by the pituitary gland, which is controlled

by the hypothalamus, keep organs and tissues healthy (Byers 2001). If these glands or organs malfunction, people will undergo physio-psychological changes that can cause an imbalance or change in their immune system and glucose levels. Such changes also affect a person's thoughts, emotions and personality leading to signs and symptoms such as infection, depression and diabetes mellitus (Dougans 2002).

2.3.2.3 The Endorphin Release Theory

Reflexology claims to encourage the pituitary gland to produce endorphins (the body's painkillers) (Dougans 2002; Mackereth & Tiran 2002; Slade 2010) and enkephalins (the mood enhancers) (Mackereth & Tiran 2002), which are of benefit for pain and stress relief (Hoare 2004; Thoren *et al.* 1990). β-endorphins and enkephalins are the best known of the endogenous opiates. β-endorphin cell bodies are located in the hypothalamus, while enkephalins are found widely throughout the central nervous system (Wallace 1992).

2.3.2.4 Gate Control Theory

Another theory behind how reflexology helps relieve pain can be explained as using 'gate control' (Mackereth & Tiran 2002; Slade 2010). This theory proposes that the touch or contact from reflexology can deviate brain perceptions away from pain (Mackereth & Tiran 2002). Pressure techniques from reflexology can activate the Aβ fibres (large fibre) at peripheral afferents. These fibres can inhibit noxious stimuli at the dorsal horn, resulting in decreasing noxious input to the brain (Wallace 1992).

2.3.2.5 The relaxation effect

It is claimed that reflexology relieves stress and tension by inducing relaxation (Byers 2001; Farnsworth 1995; Slade 2010). The relaxation state encourages vasodilatation, lower blood pressure, improved blood flow and provision of oxygen-

rich nutrients to cells (Byers 2001; Kuhn 1999; Rankin-Box 2001). Stress causes physiological changes to the body by increasing blood pressure, heart rate, ventilation rate, serum glucose, free fatty acid mobilisation, blood coagulation, muscular strength and perspiration (Morris, Raphael & Bordujenko 1999; Healey 2002; Seaward 1999). Stress also decreases clotting time, gastric movement and abdominal blood flow (Morris, Raphael & Bordujenko 1999; Healey 2002; Seaward 1999). In addition, stress contributes to adrenal cortex enlargement; release of stress hormones (corticosteroids); lymphatic gland atrophy including the thymus gland, spleen and lymph nodes; a decrease in the white blood cell count; peptic ulcers and even death (Morris, Raphael & Bordujenko 1999; Seaward 1999).

Physical changes from stress cause many diseases and illnesses such as hypertension, migraine, headaches, common cold, ulcers and coronary heart disease (Byers 2001; Seaward 1999). Reflexology is believed to induce a state of relaxation and so improve blood circulation, increase the flow of nutrients and oxygen to cells (Kunz & Kunz 1999; Dougans 2002), and induce glands and organs of the body to achieve a state of equilibrium or homeostasis (Byers 2001; Dougans 2002; Mackereth & Tiran 2002). A survey of 223 complementary/alternative medicine organisations (Long, Huntley & Ernst 2001) about the benefits of complementary therapies, including reflexology and massage, showed that both reflexology and massage were suitable treatments for relieving stress or anxiety, headaches or migraines, and back pain. The survey had a 34 percent response rate.

2.3.2.6 The placebo effect

Some authors suggest that reflexology works as a placebo. A placebo is generally inactive, however a client may have a positive or negative experience from it

(Cahana 2007). Positive experiences from placebos for pain relief come not only from trust in the therapist (Slade 2010) but also from the expectation of a benefit of the (placebo) treatment (Sauro & Greenberg 2005). It was concluded that placebo treatment was mediated by an endogenous opiate-related mechanism and decreased brain-mediating pain (Sauro & Greenberg 2005).

2.3.3 Side effects of reflexology

Although reflexology is considered a non-invasive therapy, reflexologists recommend monitoring patients for side effects after treatment. Side effects are believed to be caused by the body's efforts to eliminate toxic substances. Most symptoms are mild and short-term, rapidly reversing following therapy. However, they have the potential to cause distress to patients and require recognition by both therapists and clients. Symptoms include fever; rash; diaphoresis; light diarrhoea from more frequent bowel movements; flatulence; increase in urination with a darker and stronger smell; increase of mucous in the nose, mouth and bronchioles; disturbed sleep; increase in vaginal discharge; tiredness; headaches; and depression (Dougans 2002; Kowalak, Chohan & Follin 2003).

2.3.4 Foot reflexology

Foot reflexology is a kind of massage working on the feet. It is related to glands or organs of the body and helps the body achieve homeostasis (Byers 2001; Dougans 2002). It can be argued that foot reflexology is more feasible than reflexology of the hands and ears, as there is enough surface area to apply reflexology techniques effectively. In addition, feet are more sensitive than hands, which are exposed all the time (Byers 2001). However, in some circumstances, such as where feet are injured, it may be more practicable to apply pressure techniques on hands and ears (Byers

2001).

Appendix 2 demonstrates how foot reflexology techniques are applied. Although foot reflexology is widely used, systematic research is needed to examine its effectiveness. Nurses are in a position to do this research and thus make decisions about foot reflexology's clinical effectiveness (Stephenson, Dalton & Carlson 2003). A number of studies have focused on foot reflexology's benefits for pain relief and improved quality of life. In discussing these studies, it is necessary to provide brief definitions of terms used therein. Terms include 'foot reflexology', 'placebo foot reflexology' 'foot massage' and 'light foot massage'. *Foot reflexology* is defined as '…a specific pressure technique that works on precise reflex points on the feet, based on the premise that reflex areas on the feet correspond with all body parts' (Dougans 2002, p. 10). *Placebo foot reflexology* refers to foot reflexology procedures without pressing the particular reflex points on the feet. *Foot massage* is defined as a manipulation of the soft tissue of the feet, which mostly includes stretching and stroking the feet, and pulling the toes. *Light foot massage* is foot massage without pressure on specific reflex points on the feet.

2.3.4.1 Effects on blood pressure, cholesterol level, triglycerides level, baroreceptor reflex, and life satisfaction

The effects of foot reflexology on blood pressure, serum lipid level and life satisfaction were studied by Park and Cho (2004). The study was a non-equivalent control group, pre- and post-test design. Thirty-four Korean patients with essential hypertension participated in the study, with 18 participants in the treatment group and 16 in the control group (no treatment). For the treatment group, foot reflexology was provided twice a week for six weeks, and participants in this group also self-administered foot reflexology twice a week for four weeks. At the end of the study,

systolic blood pressure in the treatment group was significantly decreased by comparison with that in the control group. However, there was no significant decrease in diastolic blood pressure between the experimental and control groups. The total cholesterol level, high density lipoprotein (HDL) and low density lipoprotein (LDL) cholesterol were not significantly decreased for either group, but the triglycerides level was significantly decreased in the treatment group. Life satisfaction, defined as 'people's subjective assessment of their circumstances compared to external standards or to their own aspirations' (McDowell 2006), improved significantly in the treatment group. A life satisfaction questionnaire aims to measure general feelings of well-being among people (McDowell 2006). It is unclear which life satisfaction measurement tool Park and Cho (2004) used in their study due to issues with language in translating the document. It is important to note, however, that the small sample size and lack of blinding in their study may minimise accuracy of the results of foot reflexology in reducing blood pressure, serum lipids and improving of one's life satisfaction.

Frankel (1997) used a single-blind trial with 24 participants to study the effects of 45-minute reflexology and foot massage sessions on baroreceptor reflex sensitivity, blood pressure and sinus arrhythmia. Ten participants were in the reflexology group, 10 in the foot massage group and four in the control group (no intervention). His aim was to identify whether reflexology and foot massage affect the body's physiology. Baroreceptor reflex sensitivity was measured using phase IV of the Valsalva manoeuvre, a period in the manoeuvre during which blood pressure is raised substantially above the baseline blood pressure and sinus arrhythmia (The American Heritage Stedman's Medical Dictionary 2002). Frankel found no significant difference between the groups in resting blood pressure after intervention. However,

there were significantly greater reductions in baroreceptor reflex sensitivity in the intervention groups (foot reflexology and foot massage) than in the control group, but no difference between reflexology and foot massage.

A randomised controlled trial explored the effects of foot reflexology on reducing blood pressure, LDL cholesterol and triglyceride, and on improving the quality of life in 128 Thai patients with hypertension (Somchock 2006). Sixty-four participants were in the foot reflexology group, which received a 50-minute foot reflexology treatment twice a week for four weeks. The other 64 participants were in the control group and received a light foot massage twice a week for four weeks. Blood pressure was measured before and after each intervention session, while LDL cholesterol, triglyceride levels and quality of life scores were measured on the day before the treatment started and the day after the last treatment session. The findings revealed no significant difference in blood pressure, LDL cholesterol level, triglyceride level and quality of life scores between the two groups.

There are similarities and differences between Frankel's (1997) and Somchock's (2006) studies. Both, used the Ingham reflexology method for 45 to 50 minutes per session all over the feet, and foot massage was provided for the comparison groups. However, in Frankel's study the participants did not have hypertension, foot reflexology was performed only twice on each subject in the foot reflexology treatment group, and the sample size was much smaller. Therefore, the results from Frankel's (1997) study, particularly when compared with the results of Somchock's (2006) study, cannot be seen as fully representative of whether or not foot reflexology can reduce blood pressure in patients with hypertension.

2.3.4.2 Effects on anxiety

A qualitative, non-randomised trial study of foot reflexology was performed on 34 cancer patients in a palliative care unit in the north of England to investigate patients' perceptions of treatment (Gambles, Crooke & Wilkinson 2002). Foot reflexology was provided for four to six sessions. At the end of the study, participants were asked to complete a questionnaire consisting of both yes/no questions and open-ended questions to gather data on participants' perceptions of their treatment. Thematic data analysis was used because of the small sample size and study design. Results showed that foot reflexology induced relaxation by relieving tension and anxiety. The treatment was also found to promote comfort and well-being (Gambles, Crooke & Wilkinson 2002).

However, Ross *et al* (2002) found different results in their study of foot reflexology and its effects on anxiety and symptoms in 26 British patients with advanced cancer. The investigators divided the group into two – 14 participants in the foot reflexology group and 12 participants in the foot massage group, using a randomised controlled trial study design. All subjects received either foot reflexology or light foot massage once a week for six weeks from three trained reflexologists. The Hospital Anxiety and Depression Scale (HADS) (Le Fevre *et al* 1999) was used to measure their anxiety levels and a 10-point rating score of the severity of ten common symptoms was used to measure symptoms. These scales were administered to participants by blinded interviewers at the start of the study and within 24 hours of each session. At the end of the study, seven participants had passed away due to their illness, one had dropped out and one did not have a baseline record. Therefore, only 17 participants remained, consisting of seven in the foot reflexology group and 12 in the foot massage group. The results showed no significant difference in the Hospital Anxiety

and Depression score between the two groups, but the symptom score showed a significant improvement in appetite and mobility for the foot massage group. Generalisability of these findings to other patient populations must be treated with caution, however, due to the study being limited to a small sample of patients with advanced cancer.

2.3.4.3 Effects on symptom management for patients with cancer

Yang (2005) conducted a non-equivalent pre- and post-test design study of the effects of 40-minute sessions of foot reflexology on nausea, vomiting and fatigue in 34 Korean patients with breast cancer who were undergoing chemotherapy. There were 18 participants in the foot reflexology group and 16 in the control group (who received no intervention). After four sessions of treatment, there was a statistically significant decrease in nausea, vomiting and fatigue in the treatment group compared to the control group (Yang 2005).

In another study of cancer patients (Kohara *et al* 2004), foot reflexology was applied to reduce fatigue in 20 patients with terminal cancer in the Palliative Care Unit, National Sanyo Hospital, Japan. A combination of complementary therapies was used including aromatherapy, foot baths and foot reflexology. Participants first had three minutes of aromatherapy and foot baths in warm water with lavender oil, and then received foot reflexology with jojoba oil and lavender oil for ten minutes. The Cancer Fatigue Scale (Okuyama *et al* 2000) was used to measure fatigue before treatment, and at one and four hours after treatment. The combination of complementary therapies was shown to result in a significant decrease in fatigue (Kohara *et al* 2004).

2.3.4.4 Effects on premenstrual syndrome and menopausal syndrome

In the USA, a randomised controlled study was carried out on 35 American women who suffered premenstrual syndrome (Oleson & Flocco 1993). They received a 30-minute session of ear, hand and foot reflexology once a week for eight weeks. The study was divided into 18 participants in the foot reflexology group and 17 participants in the placebo reflexology group. The placebo group received foot reflexology procedures without pressing the specific areas related to the organs that contribute to premenstrual syndrome. All participants received a daily diary, including a seven-day symptom score, to complete every day for seven days before menstruation. This score comprised a four-point rating scale (0-3) to measure 38 premenstrual symptoms. Participants completed the diary before treatment for two months, during treatment for two months and after treatment for two months. Results from the study indicated a significantly greater decrease in premenstrual syndrome in the foot reflexology group than in the placebo group;. This decrease included both somatic and psychological symptoms such as breast tenderness, abdominal bloating, menstrual cramps, anxiety, depression and irritation (Oleson & Flocco 1993).

In contrast, Williamson *et al* (2002) found no significant difference in the improvement of psychological symptoms, including anxiety and depression, and physiological symptoms such as flushes, night sweats and sleep problems in 76 British menopausal women treated with either foot reflexology or non-specific foot massage. Thirty-nine participants received nine 45-minute foot reflexology sessions and 37 participants received nine 45-minute sessions of non-specific foot massage. Both groups received their treatment once a week for six weeks followed by once a month for three months. The Women's Health Questionnaire (Hunter 1992) was used to measure anxiety and depression, and a visual analogue scale (McDowell & Newell

1996) was used to measure the severity and frequency of flushes and night sweats (Williamson *et al* 2002).

2.3.4.5 Effects on encopresis and constipation

Bishop *et al.* (2003) studied 48 children with encopresis (faecal incontinence) or chronic constipation in the UK. Participants aged three to fourteen years received 30 minutes of foot reflexology once a week for six weeks. A questionnaire to monitor bowel movements and soiling patterns was completed for a seven-day period before, during and after the intervention. Parents completed a questionnaire on their attitudes towards foot reflexology before and after the intervention. The results found that the number of bowel movements in children with constipation increased significantly while the incidence of soiling in the children with encopresis decreased significantly. In addition, 72 percent of parents felt satisfied with the treatment their children had received.

2.3.4.6 Effects on multiple sclerosis

Foot reflexology may contribute to the balance of the central nervous system in patients with multiple sclerosis. One Israeli study looked at 53 patients with multiple sclerosis (Siev-Ner *et al.* 2003). Patients were allocated to two groups; 27 were in the foot reflexology group and 26 in the foot massage group. Patients received either 45 minutes of foot reflexology or foot massage (without pressing the specific areas on the feet) once a week for 11 weeks at the multiple sclerosis centre in Israel. The intensity of paresthesias (numbness and the tingling feeling like pins and needles), urinary symptoms, muscle strength and spasticity was measured at the start of the study, after six weeks of treatment, at the end of the study and at a three-month follow-up. The Visual Analogue Scale (McDowell & Newell 1996) was used to measure the intensity of paresthesias and the American Urological Association

Symptom Score (Bdesha *et al* 1994) was used to measure urinary symptoms. Spasticity was assessed using the Ashworth Score and muscle strength was measured using the British Medical Research Council Scale (Smith *et al* 1994). The results showed a significant improvement in paresthesias, urinary symptoms and spasticity in the foot reflexology group. In particular, the intensity of paresthesias was significantly improved even at the three-month follow-up stage. However, there was no significant difference in muscle strength between the groups (Siev-Ner *et al.* 2003).

2.3.4.7 Effects on asthma

The idea that reflexology can help reduce the symptoms associated with asthma was not supported by a randomised, double-blind controlled study at an allergy unit in Copenhagen (Brygge *et al* 2001). Forty outpatients with bronchial asthma participated in the ten-week study. Twenty participants received 45 minutes of reflexology and 20 participants received placebo reflexology (in which the specific reflexology areas were not pressed) once a week over the ten-week study period.. Patients self-monitored peak flows immediately after getting up in the morning and in the evening during the two weeks before treatment, ten weeks of treatment and two weeks after treatment. No changes in peak flows were shown between the two groups. Lung function was measured as forced expiratory volume in one second and forced vital capacity at the first, fifth and tenth visit. There was no significant difference in improvement of lung function between the groups. Bronchial sensitivity to histamine was measured for one week both before the start of treatment and at the end of the study. An improvement in bronchial sensitivity was detected in both groups but was not significant. The quality of life was measured before and after treatment using SF-36 (a multi-purpose, short-form health survey with only 36

questions) (Ware & Sherbourne 1992). As with the other measures, there was no significant difference in quality of life between the two groups (Brygge *et al* 2001).

2.3.5 Foot reflexology for pain management

Other than the benefits of foot reflexology described above, it has been shown as beneficial in pain management. Stephenson, Weinrich and Tavakoli (2000) scientifically explored foot reflexology's role in pain management in a pre-post crossover trial in the USA to measure levels of anxiety and pain in 23 in-patients with breast or lung cancer (13 with breast cancer and 10 with lung cancer). A Visual Analogue Scale (Cline *et al* 1992; McGuire 1988) was used to measure anxiety levels during the participant selection process; if potential subjects were in an anxious state, they were included in the study. Participants were randomised into two groups; a treatment group and a control group. Thirty-minute foot reflexology sessions were carried out using the Ingham method, with 15 minutes spent on specific areas related to pain and cancer sites. The Visual Analogue Scale (Cline *et al* 1992; McGuire 1988) was used again to measure anxiety level, and also pain intensity. The Short Form McGill Pain Questionnaire (Melzack 1987) was used to measure pain level on its own. In the control group, anxiety and pain were measured before and at the end of the control time (a 30-minute period during a day). In the treatment group, anxiety and pain were measured before and immediately after treatment. The study showed that foot reflexology significantly lowered anxiety levels in patients with breast or lung cancer, and significantly decreased pain in patients with breast cancer. It was not possible to calculate a valid result for pain with the lung cancer patients because only two of these patients had reported pain (Stephenson, Weinrich & Tavakoli 2000).

A similar study by Stephenson, Dalton and Carlson (2003) explored the effects of foot reflexology on pain in patients with metastasised cancer in USA. Thirty-six inpatients participated in the pre-post crossover trial. There were 19 participants in the foot reflexology group and 17 in the control group (who received no intervention) on day one. On the second day, the treatment was given to the other group. Before the treatment all participants reported a pain score of 2 or higher on the 0 to 10 self-report pain scale of the Joint Commission on the Accreditation of Healthcare Organizations (Joint Commission on the Accreditation of Healthcare Organizations 2001). A 30-minute foot reflexology session using the Ingham method was applied once in each treatment participant. The pain score was recorded immediately after treatment, three hours after treatment and 24 hours after treatment. The results showed that foot reflexology significantly decreased the pain score immediately after treatment in the treatment group. There was no significant decrease in pain at three and 24 hours after treatment.

Another study exploring foot reflexology as a pain reduction treatment was carried out with knee replacement surgery patients in the UK (Evans *et al* 1998). Twenty-nine patients participated in the randomised controlled trial study. A control group of nine participants received no intervention, a foot reflexology group of seven participants made up the treatment group, and 13 participants were in a placebo group who received foot reflexology but without pressing the areas affecting healing of the knee. A trained reflexologist performed reflexology within 24 hours of surgery and three times a week until discharge. Pain level, length of hospital stay and time taken to reach 70-degree knee flexion were measured. Analgesic consumption and a Visual Analogue Scale (McDowell & Newell 1996) were used to assess pain level. Results showed no significant difference among the three groups in length of stay or

rate of recovery of knee flexion. Morphine consumption in the control group was significantly more than in the treatment and placebo groups, but there was no difference between the treatment group and the placebo group (Evans *et al* 1998). Using a placebo reflexology may provide potential effects of pressure on surrounding areas that may enhance the immune system or improve related organs pain controlling activity. Use of light foot massage may have been more appropriate in controlling for potential effects of massage and/or touch in contrast with reflexology pressure points.

In an attempt to evaluate the role of foot reflexology in pain reduction among patients with irritable bowel syndrome in England, Tovey (2002) used a single-blind trial design with 34 patients. Nineteen participants received a 30-minute foot reflexology session and 15 participants received foot massage without pressing specific areas on the feet. Both groups received either foot reflexology or foot massage once a week for four weeks and then once a fortnight for two sessions. Three symptoms – abdominal pain, constipation or diarrhoea, and abdominal distention – were measured using a Health Assessment Sheet (Whorwell 1984) before the first intervention, during the intervention, after the intervention and at a three-month follow-up. Results showed no significant differences between the two groups in improvement of any of the symptoms measured.

A Danish study (Launso, Brendstrup & Arnberg 1999) used foot reflexology for six months on 220 patients with migraine and/or tension headache. Patients recorded a headache diary for one month before treatment, during treatment sessions, at final treatment and three months after the final session. Qualitative interviews were undertaken with 10 participants at the end of the study to ask about who tended to

seek reflexology and why; what outcomes the clients experienced from reflexology treatment; what factors influenced ‘cure’ or ‘not cure’ by reflexology; and what medications clients took during reflexology treatment. The results showed that foot reflexology helped decrease headaches in 78 percent of patients at the final treatment, including 23 percent of participants who were cured by reflexology and 55 percent who experienced pain relief. At the end of the three-month follow-up period, 16 percent of participants reported they had been cured by reflexology, 65 percent had experienced pain relief and 19 percent no longer took medication. However, these results must be viewed with caution as the study did not show how long each reflexology treatment session took (Launso, Brendstrup & Arnberg 1999).

2.3.6 Foot reflexology for pain management in Thailand

The word ‘foot reflexology’ has been used in many places in Thailand such as massage shops, hotels, health clubs, magazines and complementary and alternative books. The words ‘foot reflex zone therapy’ are also used in these places. Although different terms are used, the principles of foot reflexology and foot reflex zone therapy are similar. However, the procedure for Thai foot reflex zone therapy differs from that of foot reflexology (Eunice Ingham method) in that it uses oil or cream, a stick and the masseur’s knuckles, and the massage will be applied up to the client’s lower legs; it is not restricted to their feet.

According to the Thai Traditional Medicine Institution, Ministry of Public Health, there are few studies of foot reflex zone therapy in Thailand. The following two studies relate specifically to foot reflex zone therapy in Thai patients.

2.3.6.1 Foot reflex zone therapy

Panyim (2000) used a quasi-experimental design to investigate the benefit of foot

reflex zone therapy for pain, distress and analgesic consumption in 60 patients who had undergone vertical line abdominal hysterectomy (30 in the experimental group and 30 in the control group). The pain rating scale developed by Johnson (1973) was used to measure pain and distress levels. The 30-minute foot reflex zone therapy was applied to the experimental group once daily in the first three days post-operation , while routine care was applied to the control group. The findings revealed that the levels of pain and distress in the experimental group participants after treatment were significantly lower on days one, two and three than before treatment. In addition, the level of pain in these participants was significantly lower than for the control group participants on days one and two, but not for day three. This can be explained by a decrease in pain-encouraging substances secreted from the operation wound for both groups on day three. However, the mean score of pain in the experimental group was lower than that of the control group, and the level of distress in the experimental group participants was significantly lower than that of the control group participants on all three days.

Pongpiyapiboon (2005) investigated the benefit of a 40-minute foot reflex zone therapy on 40 older male Thais who had undergone prostatectomy. In this pre- and post-test control group designed study (20 men in a control group and 20 in an experimental/treatment group), the investigator collected data in the 20 control group participants first and then started data collection in the 20 experimental group participants. Participants in the experimental group were equally matched pairs with those in the control group in terms of their ages and surgery experiences. The pain rating scale developed by Johnson (1973) was used to measure pain and distress levels. The findings showed that pain levels after treatment in the experimental group were significantly lower than before treatment, and were also significantly lower

than levels in the control group after the routine care. Furthermore, the frequency of pain medication consumption within three days post-surgery in the experimental group was significantly lower than in the control group. The main limitation of this study is that the foot reflex zone therapy was applied only once to participants in the experimental group, which was in the first 24 hours after the operation.

2.3.7 Summary of foot reflexology for pain management

In summary, most studies of the effect of foot reflexology on pain relief have been carried out with small sample sizes, limited justification for duration or type of intervention, very specific patient groups and/or untested outcome measures, as shown in Table 2.1. Only two studies have been found that investigate the effect of foot reflexology on enhancing quality of life, as shown in Table 2.2. It can be seen from this Table that one was carried out with a small sample size and both involved very specific patient groups. Further, the comparison placebo reflexology or light foot massage might have encouraged placebo effect or even the same effect in improving quality of life as that claimed for foot reflexology. Therefore, there is still insufficient data to prove scientifically the effects of foot reflexology on reducing pain and improving quality of life in older people.

Table 2.1 Summary of scientific evidence of foot reflexology for pain management

Authors	Year/ country	Number of participants			Research design	Medical conditions	Pain tools	Technique applied	Sessions	Results
		Intervention group	Compared group	Control Group (no intervention)						
Evans *et al.*	1998/ UK	7	13 received foot reflexology without pressing the areas affecting healing of the knee	9	Randomised controlled trial	Knee replacement surgery	Visual Analogue Scale Analgesic consumption Before treatment and after treatment	N/A	24 hours after surgery 3 times a week until discharge	No significant difference in pain level but significant difference in morphine consumption
Launso, Brendstrup & Arnberg	1999/ Denmark	220	-	-	Randomised double-blind controlled trial	Migraine/ headache	Self-report headache diary Before treatment, during treatment sessions, at final treatment, at 3 month follow-up	N/A	6 months	Headache cured (23%), pain relief (55%) by the final treatment At the end of follow-up headache cured (16%), pain relief (65%), and stop taking pain medications (19%)

Authors	Year/ country	Number of participants			Research design	Medical conditions	Pain tools	Technique applied	Sessions	Results
		Intervention group	Compared group	Control Group (no intervention)						
Stephenson, Weinrich & Tavakoli	2000/ USA	13 breast cancer, 10 lung cancer	-	13 breast cancer, 10 lung cancer	A pre-post crossover trial		The visual analogue scale, and The Short Form McGill Pain Questionnaire were used to measure pain intensity level before and immediately after treatment	Ingham method	15 minutes on specific areas related to pain and cancer sites, and 15 minutes on the rest of the feet	Pain was significantly decreased in patients with breast cancer. Only two patients with lung cancer reported pain, a calculation was unable to be produced for this group
Panyim	2000/ Thailand	30	-	30	Quasi-experimental research	Patients underwent vertical line abdominal hysteric-tomy	Pain rating scale	Foot reflex zone therapy	30 minutes, Once daily within first three days post-operation	Pain level significantly lower in experimental group on day 1, 2, and 3 Pain level in experimental group was significantly lower than in control group on day

Authors	Year/ country	Number of participants			Research design	Medical conditions	Pain tools	Technique applied	Sessions	Results
		Intervention group	Compared group	Control Group (no intervention)						
										1 and 2, but not day 3
Tovey	2002/ UK	19	15 received foot massage without pressing specific areas on the feet	-	Single-blind trial design	Irritable bowel syndrome	Health assessment sheet Before treatment and after treatment	N/A	30 mins, Once a week for 4 weeks	No difference in abdominal pain level
Stephenson, Dalton & Carlson	2003/ USA	36 (19 treatment, 17 control)	-	36 (19 control, 17 treatment)	Crossover design	Metastasised cancer	Short Form McGill Pain Questionn-aire Before treatment and immediately, 3 and 24 hours after treatment	Ingham method	30 mins Once to experim-ental group particip-ants	Pain significantly decreased immediately after treatment, but not at 3 and 24 hours after treatment
Pongpiya-piboon	2005/ Thailand	20	-	20	Pre- and post-test, control group design Data collection done in 20 control participants first, then 20 participants in	Male patients underwent prostatect-omy	Pain rating scale	Foot reflex zone therapy	40 mins, Once	Pain level in experimental group significantly decreased Pain level in experimental group significantly lower than control group

Authors	Year/ country	Number of participants			Research design	Medical conditions	Pain tools	Technique applied	Sessions	Results
		Intervention group	Compared group	Control Group (no intervention)						
					experimental group, matched pairs according to control group in terms of age and surgery experiences					Pain medication consumption experimental group significantly lower than control group

Table 2.2 Summary of scientific evidence of foot reflexology for quality of life

Authors	Year/ country	Number of participants			Research designs	Medical conditions	Quality of life tools	Technique applied	Sessions	Results
		Intervention group	Compared group	Control Group (no intervention)						
Brygge *et al.*	2001/ Denmark	20	20 received placebo reflexology without pressing specific areas on the feet	-	Randomised double-blind controlled trial	Bronchial asthma	Short Form 36	N/A	45 minutes, Once a week for ten weeks	No significant difference
Somchock	2006/ Thailand	64	64 received light foot massage without pressing specific areas on the feet	-	Randomised controlled trial	Hypertension	WHO QOL-BREF	Ingham method	50 minutes, twice a week for four weeks	No significant difference

2.4 Quality of life

2.4.1 Definition of quality of life

Quality of life is linked with individuals' happiness and satisfaction with life (Fayers & Machin 2000). It means different things to different people, and different things in the different settings to which it is applied (Fayers & Machin 2000). In health care services, quality of life (QOL) is used as a measurement of the quality of health care, including health policy, medical interventions and patients' satisfaction with health care services (Fayers & Machin 2000; Renwick, Brown & Nagler 1996; World Health Organization 1996). The term health-related quality of life (HRQoL) is used (Fayers & Machin 2000) to differentiate between quality of life in general and quality of life in clinical settings. The ultimate goal of health professionals committed to improving quality of life is to promote physical, psychological, sociocultural and spiritual well-being that is satisfactory to the patient (Gerstle, All & Wallace 2001).

Many authors define quality of life as comprising objective and subjective aspects (see Table 2.3). In this current study, the researcher applied the health-related quality of life (HRQoL) called Short-Form 36 (SF-36), which is a generic health measurement assessing health-related quality of life outcomes and represents basic human values relevant to an individual's functional status and well-being (Ware, Kosinski & Gandek 2005). More details of SF-36 measurement are provided in Chapter 3.

Table 2.3 Definitions of quality of life

Authors	Definition
Schalock 1996 cited in Keith, Heal & Schalock 1996, p. 274	'Quality of life is a subjective phenomenon, influenced greatly by individual experience. The assessment of a person's subjective perceptions of life experiences should include factors such as relationships, community activities, physical and material well-being, personal development, satisfaction, and happiness'
The World Health Organization 1997, p. 1	'Individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns'
Cummins 1999, p. 4	'Quality of life is both objective and subjective, each being the aggregate of seven domains as material well-being, health, productivity, intimacy, safety, community, and emotional well-being. Objective domains comprise culturally relevant measures of objective well-being. Subjective domains comprise domain satisfaction weighted by importance'
Groulx *et al.* 2000 cited in Rapley 2003, p. 49	'To feel good and to have what is needed to cope with your life in the best way possible'
Schalock & Parmenter 2000 cited in Rapley 2003, p. 51	'Quality makes us think of the excellence or exquisite standard associated with human characteristics and positive values such as happiness, success, wealth, health, and satisfaction; whereas, life indicates that the concept concerns the very essence or essential aspects of human existence'
Schalock & Parmenter 2000 cited in Rapley 2003, p. 52	'Quality of life encompasses the basic conditions of life such as adequate food, shelter, and safety plus life enrichers such as inclusive social, leisure, and community activities. These enrichers are based on the individual's values, beliefs, needs and interests'
Carr *et al.* 2001, p. 1240	'Quality of life…is concerned with whether disease or impairment limits a person's ability to fulfil a normal role…health related quality of life is the gap between our expectations of health and our experience of it'
Bowling 2005, p. 7	'In general term…quality of life…is about the goodness of life, and in relation to health is about the goodness of those aspects of life affected by health'

2.5 Quality of life in older people

2.5.1 Non-Thai population

Measuring quality of life can be difficult. For example, although good quality of life was reported among older people in Sweden (aged 75 and over), the older age among this group had a poorer quality of life than their younger counterparts (Hellstrom, Persson & Hallberg 2004). A more recent study from the same country (Borglin *et al.* 2006) confirmed this finding, with low quality of life in the older old age group than in the younger old age group (mean age 86.2 < 85.7 < 83.1 years respectively). In addition, the authors reported that the majority of the former group were women who were less physically active and had poor self-rated health, high frequencies of health problems and low social support from family members (especially partners).

In the UK, Bowling *et al.* (2007) report that 62 percent of older adults (aged 65 and over) described their self-rated quality of life as 'good'. The authors found that factors related to good quality of life in this population included good self-rated health, low burden of chronic diseases, no falls, high social engagement and a high level of perceived control over life. Murphy, Shea and Cooney (2007) report that in another study from the UK, factors required for a good quality of life in later life include social support from family and friends, flexibility in routine activities and older adults' preferences for following a schedule to maintain well-being and develop independence and autonomy. These factors were found to contribute to this population's dignity and self-respect.

2.5.2 Thai population (aged 60 and over)

The quality of life in older Thai people living in the rural areas, who represented 69.1 percent of older participants in one study (Khumpheng 1997), was found to be at the

average level. Panitta Panitchachewakun developed the quality of life tool used in Khumpheng's study in 1994. This tool measured objective and subjective aspects of activities of daily living, physical health, mental health and environment. Level of quality of life was interpreted in three categories: high; moderate/average; and low. A study by Visetkamin (2002) with older Thai people living in the urban area reported a similar finding. More than half of this population felt positive toward the things in their lives, and felt satisfied in their accommodation and neighbourhood (Visetkamin 2002). Results showed that 70.9 percent of these older Thai people had a moderate quality of life (Visetkamin 2002).

Factors commonly found to affect quality of life in older Thai people are:

- *age* (Chawarangkool 1995; Chikeaw 1994; Chinuntuya, 1993; Karnjanavorawong 1997; Khumpheng 1997; Kumarnjan 2000; Panichacheewakul, 1994; Visetkamin 2002; Wivatvanit 2002);

- *sex* (Chinuntuya 1993; Gorin 1993; Kumarnjan 2000; Panichacheewakul 1994; Somchock 1997; Visetkamin 2002);

- *social support* (Chawarangkool 1995; Chinuntuya 1993; Grueggultorn 1993; Karnjanavorawong 1997; Khumpheng 1997; Panichacheewakul 1994; Plianbumroong 1997; Somchock 1997; Tuanwong 1997; Udomsappayakul 1992; Visetkamin 2002);

- *education* (Chawarangkool 1995; Chinuntuya 1993; Karnjanavorawong 1997; Panawattanakul 1991; Panichacheewakul 1994; Somboonsit 1992; Somchock 1997; Tuanwong 1997; Visetkamin 2002; Wivatvanit 2002); *occupation* (Khumpheng 1997; Visetkamin 2002);

- *income* (Chawarangkool 1995; Chinuntuya 1993; Grueggultorn 1993; Karnjanavorawong 1997; Khumpheng 1997; Kumarnjan 2000; Panawattanakul 1991; Panichacheewakul 1994; Somboonsit 1992; Tuanwong 1997; Visetkamin 2002; Wangsa-ard 1987; Wivatvanit 2002);
- *social activities* (Khumpheng 1997);
- *health access* (Khumpheng 1997; Visetkamin 2002).

Khumpheng (1997) reports that from the subjective quality of life point of view, 95.8 percent of older people felt they were useful for their children, 95 percent felt their children loved them and 94.7 percent felt proud to be able to undertake their own daily living activities. In contrast, 92 percent felt they had less ability to do daily living activities, 66 percent felt hopeless about their sickness and aging, and 60.3 percent felt loss of ability to do their jobs, even though they considered themselves to be healthy persons. Khumpheng (1997) also found that older Thai people felt discouraged (54.2 percent), anxious (51.2 percent), worthless (50 percent) and grumpy (49.3 percent).

Illnesses in older Thai people were found to impact on the physiological, psychological and socioeconomic parts of their lives (Aree-ue 1997; Gorin 1993; Karnjanavorawong 1997). With co-morbidities, quality of life level in older Thai people was reported to be at the average level (Aree-ue 1997; Gorin 1993; Karnjanavorawong 1997).

Othaganont, Sinthuvorakan and Jensupakarn (2002) found more less commonly reported factors that improve life satisfaction in older Thai people, including involvement in religious activity and regular exercise.

2.6 Quality of life in older people with pain

2.6.1 Non-Thai population

It is well documented that pain negatively affects quality of life (Ahmedzai 1995; Asghari, Ghaderi & Ashory 2006; Bostrom *et al.* 2003; Closs 2007; Morrow, Saxton & Rodriguez 2002; Thomas, Dunn & Jinks 2007; Wang *et al.* 1999), including its physiological, psychological and socioeconomic aspects. The long-term pain patients experience may be responsible for psychosocial issues that affect their social, emotional and physical well-being (Becker *et al.* 2000; Closs 2007; Reyes-Gibby, Aday & Cleeland 2002; Wilkes, *et al.* 2003), especially in persons with pain and combinations of chronic diseases and low education (Reyes-Gibby, Aday & Cleeland 2002). Psychosocial issues such as financial worries and problems with marital relationships can trigger pain to return, or vice versa (Wilkes *et al.* 2003). Thomas *et al.* (2007) found that pain interference doubled as age increased from the 50 to 59 years age group (16%) to the 80 and over age group (35%). This may be influenced by poor treatment for pain in older people (Lovheim *et al.* 2006) and co-morbidity (Von Korff *et al.* 2005). Pain interference has also been found to be more prevalent in older females than males (Thomas *et al.* 2004; Thomas *et al.* 2007). Wang *et al.* (1999) and Bostrom *et al.* (2003) found that patients with moderate or severe pain had significantly lower quality of life than those with no pain or mild pain. This is supported by a recent study in Sweden by Jakobsson, Hallberg and Westergren (2007), who found that older adults (aged 75 and over) with pain had a poorer quality of life than those with no pain. Furthermore, mobility problems, sleeping problems and depressed moods contributed to low quality of life in older adults with pain.

Some factors related to pain that decrease quality of life include the duration of pain (Skevington 1998); pain intensity (Larue, Fontaine & Colleau 1997; Rummans 1998;

Skevington 1998); the extent of pain (Croft et al. 1993); and co-morbidity (Cuijpers, van Lammern & Duzijn 1999; Dartigues *et al*. 1998). Skevington (1998) found that the longer the pain duration, the worse the patient's quality of life. The more intense the evaluated pain, the greater was the impact of pain on quality of life (Larue, Fontaine & Colleau 1997; Rummans 1998; Skevington 1998), and widespread pain impaired quality of life more than regional pain (Croft *et al*. 1993). It is particularly important to note Loder and Witkower's (2002) finding that the intensity of pain had a negative impact on patients' ability to participate in rehabilitation activities.

2.6.1.1 Physiological impact

Pain is shown to affect physical functioning, resulting in sleep disturbance and fatigue (Closs 2007; Feine & Lund 1997; Gagliese & Melzack 1997; Nikolaus & Zeyfang 2004; The American Geriatrics Society Panel 2002; Tsai *et al.* 2004; Weiner 2007), impairment in activities of daily living or mobility, and decreased activity (Closs 2007; Leveille, Fried & Guralnik 2002; Morrow, Saxton & Rodriguez 2002; The American Geriatrics Society Panel 2002; Thomas *et al.* 2004; Tsai *et al.* 2004; Weiner 2007; Won *et al*. 1999). Activity restriction itself can cause depression in older people because functional disability means loss of independence, control and rewarding pastimes (Williamson & Schulz 1992).

2.6.1.2 Psychological impact

Pain often profoundly affects the patient's mood, personality and social relationships (Closs 2007; Won *et al*. 1999; Woolf & Mannion 1999; The American Geriatrics Society Panel 2002; Weiner 2007). Lynch *et al.* (1998) have reported that pain levels are associated with increased risk of delirium or an acute confused state. Pain is also known to affect feelings of hopelessness (Hitchcock, Ferrell & McCaffery 1994) and is linked to depression (Asghari, Ghaderi & Ashory 2006; Closs 2007; Feine & Lund

1997; Morrow, Saxton & Rodriguez 2002; Nikolaus & Zeyfang 2004; Rudy *et al* 2007; The American Geriatrics Society Panel 2002; Weiner 2007; Won *et al*. 1999). It exacerbates cognitive impairment, leading to impaired functioning, difficulty with decision-making and poor judgement, resulting in poor compliance with medications and thus in increased morbidity and mortality (Morrow, Saxton & Rodriguez 2002; Rudy *et al* 2007). Conversely, older adults with depression were about twice as likely to report having pain frequently as those who were not depressed (Reyes-Gibby, Aday & Cleeland 2002). Lin *et al.* (2003) found that the improvement of the symptoms of depression in older people with arthritis had improved functional impairment and reduced pain, and also improved their quality of life.

2.6.1.3 Socioeconomic impact

Pain can prevent continued participation in the workplace, resulting in loss of income (Fifield, Reisine & Grady 1991). It also increases health care use and costs (Federman, Litke & Morrison 2006; Nikolaus & Zeyfang 2004; The American Geriatrics Society Panel 2002). Health care costs can be a huge economic burden for retirees (Thomas, Dunn & Jinks 2007), with higher treatment costs and a lack of health insurance associated with poor quality of life (Gerstle, All & Wallace 2001). Medical treatments affect quality of life (Niv & Kreitler 2001), and a number of researchers have shown that quality of life is positively associated with more effective treatment for pain (Aparasu et al. 1999; Mannix et al. 1999; Zhao et al. 1999). Other researchers have shown that toxic effects from pain medications deteriorate quality of life (Aparasu et al. 1999; Bruera & Pereira 1997).

Social aspects of the impact of pain include its effect on personal relationships (Hitchcock, Ferrell & McCaffery 1994), and recreational and social activities (Hicks 2000; Nikolaus & Zeyfang 2004; Rudy *et al* 2007; The American Geriatrics Society

Panel 2002). The elderly, who have experienced the loss of their partners, social isolation and loss of independence tend to report more pain (Bruckenthal, Reid & Reisner 2009).

2.6.2 Thai population (aged 60 and over)

There is very limited published evidence in the reporting of pain in older Thai adults. Pain was reported to affect the quality of life of older Thai people in all aspects of life: physiological; psychological; and socioeconomic. Jitapunkul's 1999 study (cited in Sasat 2006, p. 96) stated that one in every four of the older Thai population could not do their daily activities due to their physical health problems. Aree-ue (1997) reported that pain encouraged impairments in activities of daily living or mobility, and so decreased activities. In addition, pain negatively impacted recreational and social activities in older Thai people (Aree-ue 1997), leading to stress and stress-related illnesses that caused a reduced quality of life (Aree-ue 1997).

2.7 Related factors in changing the quality of life in older people

It is not only pain that impairs the quality of life in older adults. Other related factors also influence the quality of life in this population either negatively or positively. These factors include age, gender, education, occupation, income, social support, social activities and co-morbidities.

2.7.1 Age

2.7.1.1 Non-Thai population

Age affects the prevalence of pain symptoms (Anderson *et al.* 1999; Eggen 1994). Some types of pain, such as back pain, increase and are more frequent with age (Foppa & Noack 1996; Rubin 2007). McCleane (2006) found that the pain threshold increases with advancing age. It has been reported that older people are less likely to

feel pain than younger people. A study in the USA by Li *et al.* (2001) showed that US older people (aged 65 and over) reported significantly less pain than younger counterparts when they had intravenous catheter insertion (*P <0.01*). Older people seem to have the ability to cope with, and adapt to the consequences of chronic pain and chronic conditions over time (Gerstle, All & Wallace 2001) by learning and adjusting ways of coping, beliefs about pain and self-efficacy to control pain (Keefe & France 1999; Rudy, Hanlon & Markham 2002). Gerstle, All and Wallace (2001) showed that better quality of life was associated with chronic pain persons of older age. In general, quality of life was better among younger old age persons than in their older old age counterparts (Hellstrom, Persson & Hallberg 2004).

2.7.1.2 Thai population (aged 60 and over)

Older Thai people are likely to be weak, with less ability to do activities, loss of their important position in society (work or family) and reaching retirement, resulting in loss of value and power (Sasat 2006). Dependence on others makes older people feel they are burdens on their family or society (Nanthamongkolchai *et al.* 2007). This would affect their quality of life. Younger age older people had lower dependency and a greater ability to perform self-care (Khumpheng 1997; Panawattanakul, 1991). The ability to perform self-care had a positive correlation with quality of life (Panawattanakul, 1991). Consequently, older people of a younger age had better quality of life than those of an older age (Chawarangkool 1995; Chikeaw 1994; Chinuntuya, 1993; Karnjanavorawong 1997; Khumpheng 1997; Kumarnjan 2000; Panichacheewakul, 1994; Visetkamin 2002; Wivatvanit 2002). However, in opposition to the above findings, Somboonsit (1992) found that age was not related to quality of life in older people, and Udomsappayakul (1992) found that an older age group of older people had a better quality of life.

2.7.2 Gender

2.7.2.1 Non-Thai population

Gender has been found to affect the prevalence of pain symptoms (Anderson, *et al.* 1999; Eggen 1994). Women were reported to have more pain than men and also a lower pain threshold than men (International Association for the Study of Pain 2007; Reyes-Gibby, Aday & Cleeland 2002; Thomas, Dunn & Jinks 2007). This could be explained by their experiences of higher incidences of pain conditions such as headache, neck/shoulder/knee/back pain and fibromyalgia (International Association for the Study of Pain 2007). Gerstle, All and Wallace (2001) reported that better quality of life was associated with women who had chronic pain. Whilst this may seem contradictory to the above information, the reason for it is that the traditional nurturing and care giving roles of women provide a more adaptable, stronger ability to cope with pain. Gender not only presented biological differences but also determined roles and status in family, community and society (Kutner & Kutner 1979). However, a study by Thomas and Rose (1991) showed no difference in the experience of pain between women and men.

Wilkes *et al*. (2003) found that men in their study, unlike the women, demonstrated a significant improvement in bodily pain during a combination of treatments including analgesics, muscle strengthening and counseling. Using comparison T-test, it was found that males reported the bodily pain (SF-36) before treatment at 19.32 and after treatment at 27.32 ($P = 0.01$; the highest possible scores of bodily pain means 'no pain or limitations due to pain'), whereas there was no significant decrease in bodily pain in their female counterparts. In addition, this study showed that men younger than 65 years of age reported a significant improvement in bodily pain during treatment ($P = 0.01$), whereas those 65 years of age and older showed no changes in

bodily pain (Wilkes, *et al*. 2003). Ong and Jordan reported similar results (1997) in a study of British older men and women. The older men had better scores for quality of life (SF-36) than their women counterparts (aged 65-74 years), particularly in role limitation due to emotional problems (mean = 77.2, 65.1; $P = 0.05$) and mental health (mean = 77.7, 67.7; $P = 0.01$) respectively. Moreover, with increasing age older men had better quality of life scores than older women (aged 75 years and over) in physical functioning (mean = 51.7, 36.2; $P = 0.01$), bodily pain (mean = 60.5, 45.0; $P = 0.01$) and social functioning (mean = 70.1, 56.4; $P = 0.05$) respectively.

A study in the USA on pain in adults aged 20-73 years (Sheffield *et al.* 2000) showed that women tend to report greater sensitivity to pain and painful stimuli than men, and exhibit lower pain thresholds and tolerance than men. Another study found that older women had a poorer quality of life than their male counterparts (Hellstrom, Persson & Hallberg 2004).

2.7.2.2 Thai population (aged 60 and over)

Thai women express their feelings about pain more than their male counterparts, are more concerned about their health and put more effort into getting treatments for their pain than men (Rungchucheun 2006). In the past, Thai men had more significant roles than women, including family roles and social roles (Wongthet 1992). Thai women only did the housework and therefore men had higher status than women (Wongthet 1992). This gave the Thai men greater respect from society and a corresponding higher self-esteem than women (Wongkunchorn 1994). Studies by Chinuntuya (1993), Kumarnjan (2000), Panichacheewakul (1994) and Somchock (1997) found that older Thai men had a better quality of life than women, whereas Panawattanakul (1991), Somboonsit (1992), Udomsappayakul (1992),

Karnjanavorawong (1997) and Khumpheng (1997) reported that gender was not related to quality of life in older Thai people. Gorin (1993) investigated quality of life in older Thai people with osteoarthritis and found that the older women had a poorer quality of life than the older men. She gave several explanations for this, namely that the older women: 1) had less self-care and were more dependent on caregivers; 2) had less social support, especially from their partners; and 3) had more anxiety and poorer coping with disease than their male counterparts.

2.7.3 Education

2.7.3.1 Non-Thai population

Older adults with low education had a high prevalence of fair or poor self-rated health scores and had high prevalence of pain (Reyes-Gibby, Aday & Cleeland 2002). These groups with chronic medical conditions reported worse mental health scores than those with higher levels of education (Kempen et al. 1999). Allison *et al*. (1998) reported that lower educational level, unemployment, older age and female gender tend to increase the impact of pain on quality of life. Low education seems to exacerbate the impact of chronic medical morbidity on mental health in older persons (Kempen *et al*. 1999).

2.7.3.2 Thai population (aged 60 and over)

The studies of Panawattanakul (1991), Somboonsit (1992), Chinuntuya (1993), Panichacheewakul (1994), Chawarangkool (1995), Karnjanavorawong (1997), Somchock (1997), Tuanwong (1997), Visetkamin (2002) and Wivatvanit (2002) showed that older people with high education had better quality of life than those with low education or no education. Education influences one's thought, encourages rational thinking and problem solving for one's life events, and influences one's health behaviours (Visetkamin 2002). Research showed 34 percent of older Thai

people living in rural areas had no education, and only 63.3 percent of them finished primary school (Khumpheng 1997). The majority of the older people with no education were women. The reason for this lack of education among older people, particularly women, is that in the past Thai people had to study at temples, which had monks living in them, making it difficult for education to take place (Khumpheng 1997). Furthermore, girls had to help their parents with the housework and fieldwork (Khumpheng 1997).

2.7.4 Occupation

2.7.4.1 Non-Thai population

OIt has been shown that occupation also influences a individual's quality of life. Riise, Moen and Nortvedt (2003) surveyed the influence of occupation on the quality of life in 23,312 Norwegian people aged 40-47 years. The authors found that those in occupations such as legislators, senior officials and managers had a better quality of life in both physical and mental components than those in occupations such as drivers, agriculturists and fishery workers, who had a poor quality of life, especially in mental health. Physical health problems from work, stress at work, financial difficulty and family problems may impact the poor quality of life in the latter groups (Riise, Moen & Nortvedt 2003). Occupation is also where individuals can get emotional support from their colleagues (Ruesch *et al.* 2004). These authors concluded that emotional support and social networks derived from an individual's occupation positively affect one's life satisfaction, which is also known as 'subjective quality of life'.

2.7.4.2 Thai population (aged 60 and over)

In the Thai population of older people, those who had a job were in the minority. Khumpheng (1997) showed that 61.8 percent of older people living in the rural areas

had no job, and 31.4 percent of them had agriculture as their career. There was not much difference in the percentage of those having an agricultural career between older people living in the urban areas and those in rural areas. Visetkamin (2002) found that 42.8 percent of older people in urban areas were agriculturists. Khumpheng (1997) reported that older people who were still working had a better quality of life than those without a job. Working made older people feel independent and proud, and gave them better self-esteem (Khumpheng 1997; Visetkamin 2002).

2.7.5 Income

2.7.5.1 Non-Thai population

Older people in America with only Medicaid (government health insurance) and no private supplemental insurance had taken less medication than was prescribed due to cost (Reyes-Gibby, Aday & Cleeland 2002). These people reported fair or poor self-rated health. In addition, pain also led to a number of visits to the doctor (Reyes-Gibby, Aday & Cleeland 2002; Woo *et al.* 1994). Socioeconomic level and ethnicity were also shown to affect the prevalence of pain symptoms (Anderson *et al*. 1999). The better quality of life was associated with employed people with chronic pain, whereas poor quality of life was associated with those with a low income (Gerstle, All & Wallace 2001). In addition, employment was shown to decrease physical disability in the people with pain (Gerstle, All & Wallace 2001).

2.7.5.2 Thai population (aged 60 and over)

The income level of older people living in rural areas was very low. A study found that 30.9 percent of these people had only 1,127 Baht (Thai monetary currency) per month, which is considered as very low income, and 8.4 percent had no income (Khumpheng 1997). Updated evidence showed 80.6 percent of older agriculturists in urban areas earned more than double the income of those in rural areas (3,000 Baht

per month) (Visetkamin 2002). Although even this amount of money is considered as low income, it is enough to fulfil some of the older people's needs, particularly for food. Older people who had an income felt valuable and useful to their family and society. Older people who worked and earned higher wages from their careers had a better quality of life than those with no job and no income (Chawarangkool 1995; Chinuntuya 1993; Grueggultorn 1993; Karnjanavorawong 1997; Khumpheng 1997; Kumarnjan 2000; Panawattanakul 1991; Panichacheewakul 1994; Somboonsit 1992; Tuanwong 1997; Visetkamin 2002; Wangsa-ard 1987; Wivatvanit 2002). While most studies of older Thai people found a positive relationship between income and quality of life in people with chronic diseases (Chiaree 1990; Chikeaw 1994; Somchock 1997), one study found that income had no correlation with quality of life in older people (Aree-ue 1997).

2.7.6 Social support

2.7.6.1 Non-Thai population

In America, studies have shown that social support contributes to improvement in older people's health status (Weinberger, Hiner & Tierney 1986; Weinberger *et al*. 1990). Thoits (1982) stated that partners are the most significant resource of social support, and help individuals solve problems and face life crises. Psychosocial support from family members or a partner can improve the quality of life in individuals with pain (Mannix *et al*. 1999; Mantovani et al. 1996). Some kinds of pain, such as back pain, are associated with emotional (Foppa & Noack 1996). Hellstrom, Persson and Hallberg (2004) reported that older widowed adults living alone had a poorer quality of life than those with partners. A lower quality of life was associated with chronic pain in persons with a lack of compensation insurance (Gerstle, All & Wallace 2001).

2.7.6.2 Thai population (aged 60 and over)

Udomsappayakul (1992), Chinuntuya (1993), Grueggultorn (1993); Panichacheewakul (1994), Chawarangkool (1995), Karnjanavorawong (1997), Khumpheng (1997), Plianbumroong (1997), Somchock (1997), Tuanwong (1997) and Visetkamin (2002) found that older Thai couples had a better quality of life than those with single, divorced, widowed or separated status. Having a partner was seen as the best resource of social support for older people because they have spent a longer time living together, experienced many life events together and are similar in age (Khumpheng 1997; Visetkamin 2002). Older couples not only had a better quality of life than non-couples, but also had higher self-care ability (Rattana-amornchai 1992). Married status had a positive relationship with self-care and health in the older Thai people (Vittayachokekittikun 1991), while those who were single, divorced, widowed or separated were more depressed than older people living as couples (Tansiri 1992).

Wongsit and Siriboon's study (1998 cited in Sasat 2006, p. 277) stated that in the past 70.9 percent of older people had lived with their partners, children and grandchildren, getting social support including basic needs, respect, love and mental support from their family members (Khumpheng 1997; Visetkamin 2002; Wongsit & Siriboon's study 1998 cited in Sasat 2006, p. 277). Older people in the rural areas still have the value of respect from their family members, which gives them high self-esteem and a better quality of life (Nanthamongkolchai *et al.* 2007). The Thai culture encourages the idea of nurturing older people; children are expected to take care of their parents (Othaganont, Sinthuvorakan & Jensupakarn 2002). Recently, however, the social evolution from agriculture to industrialisation has seen most older people having no caregivers because their children have moved to work in the city rather than staying at home and take care of them (Sasat 2006). Khumpheng

(1997) found that 6.8 percent of older people in rural areas lived alone, which may cause feelings of loneliness and depression, resulting in poor quality of life (Nanthamongkolchai *et al.* 2007).

2.7.7 Social activities

2.7.7.1 Non-Thai population

Social activities can significantly improve the well-being of older adults, as shown in a British study of people aged 65 and over (Greaves & Farbus 2006). The authors found that social activities also decreased depression, loneliness, health visits and medication use, and increased social interaction and community involvement, a sense of self-worth, physical activity and enjoyment of life in this population. A study in Turkey by Sertoz *et al.* (2009) confirmed that social activity significantly reduced depression symptoms and enhanced self-esteem.

2.7.7.2 Thai population (aged 60 and over)

Social activities in clubs or organisations for older Thai people have been shown to improve their self-value and self-esteem, and help them not feel lonely (Visetkamin 2002). Older people (73.7 percent) who lived in the rural area but had no clubs or organisations to participate in as social activities joined funerals as a means of social activity (Khumpheng 1997). By doing this, the older people thought it was also a way to show respect for a person who had just passed away (Khumpheng 1997). Apart from this activity, 64.1 percent liked to join in traditional festivals and 35.5 percent went to temples (Khumpheng 1997).

2.7.8 Co-morbidities

2.7.8.1 Non-Thai population

Older people are more likely to have a combination of medical health problems

(McCleane 2006). Chronic medical health problems in older people substantially affect their quality of life (Kempen et al. 1999; Reyes-Gibby, Aday & Cleeland 2002). Co-morbidities in older people such as arthritis, lung disease, heart disease, diabetes and stroke cause higher prevalence of pain (Reyes-Gibby, Aday & Cleeland 2002). The degree of pain accompanying these co-morbidities is not completely understood (Bruckenthal, Reid & Reisner 2009), however Von Korff *et al.* (2005) have reported that in the USA the percentage of chronic spinal pain is higher in adult patients with physical co-morbidities, mental disorders and other pain conditions than in those without these co-morbidities (17 percent of persons aged 60 and over were represented in this study). Among people with no chronic physical co-morbidities, 14.1 percent reported chronic spinal pain, whereas 35.1 percent of people with three or more physical co-morbidities reported chronic spinal pain. The same study also showed that the percentage of chronic spinal pain increased from 15.9 percent in people without a mental disorder to 34.5 percent in those with a mood disorder, and to 31.4 percent in those with an anxiety disorder. The study showed that chronic spinal pain increased from 9.6 percent in persons without other chronic pain conditions to 46.4 percent in persons with other chronic pain conditions.

2.7.8.2 Thai population (aged 60 and over)

Long-term co-morbidity and its intensity induced poor quality of life in the older Thai people in one study (Karnjanavorawong 1997). Wivatvanit (2002) found that morbidity was higher among older females, uneducated older people, older people with insufficient income and older people in rural areas. Older people's health was related to life satisfaction or quality of life. Older Thai people with good health had better life satisfaction or quality of life than those with co-morbidities (Chinuntuya 1993; Nuchsangplee 1989; Sinchai 1989; Sukamwang 1997). Older Thai people who have the ability to help themselves in their routine daily activities, housework and

other hobbies do not feel they are a burden to their offspring, which results in them having higher self-esteem and a better quality of life (Nanthamongkolchai *et al.* 2007).

2.8 Conclusion

The literature review presented in this chapter shows why older people were the target group of the study: what impacted older people with pain, and what options are available to manage pain in older people through both conventional and unconventional treatments. Pain is shown to cause suffering and decrease quality of life in older people, especially when it occurs in combination with co-morbidity, financial difficulties and stressful events. However, a possible strategy for relieving pain and improving the quality of life in older people is the use of 'foot reflexology', a complementary therapy, in combination with conventional pain treatments.

The next chapter will describe the aims of the study, research design, and data collection and analysis methods.

3 Methods

This chapter presents the study aims, hypotheses, research design, research method, and data collection and analysis methods.

The study consisted of a six-week trial among 160 older Thai people with pain to explore the effects of foot reflexology on pain and quality of life. The 160 people were allocated to three groups: the intervention group (intervention group); the home-based interview group talking about pain (alternative intervention group); and the group who received no intervention (no intervention group). This is described in more detail in the study design section. The study was undertaken at the Primary Health Care Centre, Lamsompung district, Saraburi, Central Thailand, over the period 2 July to 28 September 2007. Lamsompung district has a total land area of 67.2 square kilometres, much of which is high land with mountains all around. The land is good for agriculture, suited to crops such as sugar cane, corn, and tapioca. It is also excellent for farming animals such as dairy cows, cattle, and goats. Lamsompung has a population of 4,892 (2,128 male, 2,764 female) (Tambon Administration Organisation 2007). There are 435 older adults in this population (217 male, 218 female) (Saraburi Provincial Health Office 2007).

Lamsompung Primary Health Care Centre is a two-storey building, as shown in Picture 3.1, which is run by two health care officers and a registered nurse. There is no medical doctor, so only initial treatment can be given. In case of severe illnesses or serious accidents, patients are transferred to hospital in the city about 33 kilometres away to receive proper treatment. The ground level of the Primary Health Care Centre is for registration and treatment. The foot reflexology trial was carried out on the second level.

Picture 3.1 Lamsompung Primary Health Care Centre

3.1 Aims

This study had two aims: 1) to investigate the effect of foot reflexology on reducing pain levels in older Thai people with pain; and 2) to assess the effect of foot reflexology on the quality of life scores of the same older Thai people with pain.

3.2 Hypotheses

3.2.1 Primary hypothesis

The study aimed to confirm or discount two primary hypotheses: the null hypothesis and the alternative hypothesis.

3.2.1.1 Null hypothesis

The null hypothesis intimated that there would be no difference in mean pain scores

between the intervention (foot reflexology) group and the alternative intervention (home-based interview talking about pain) group, or between the intervention (foot reflexology) group and the no intervention group (group with no intervention) at the end of the intervention (week 4) and the end of the follow-up period (week 6).

3.2.1.2 Alternative hypothesis

The alternative hypothesis intimated a difference in mean pain scores between the intervention (foot reflexology) group and the alternative intervention (home-based interview talking about pain) group, or between the intervention (foot reflexology) group and the no intervention group (group with no intervention) at the end of the intervention (week 4) and the end of the follow-up period (week 6).

3.2.2 Secondary hypothesis

The study also aimed to confirm or discount two secondary hypotheses, parallel to the primary hypotheses but related to quality of life; null hypothesis and alternative hypothesis.

3.2.2.1 Null hypothesis

It was hypothesised that there would be no difference in mean quality of life scores between the intervention (foot reflexology) group and the alternative intervention (home-based interview talking about pain) group, or between the intervention (foot reflexology) group and the no intervention group (group with no intervention) at the end of the intervention (week 4) and the end of the follow-up period (week 6).

3.2.2.2 Alternative hypothesis

Opposite to the null hypothesis, the alternate hypothesis intimated that there would be a difference in mean quality of life scores between the intervention (foot reflexology) group and the alternative intervention (home-based interview talking

about pain) group, or between the intervention (foot reflexology) group and the no intervention group (group with no intervention) at the end of the intervention (week 4) and the end of the follow-up period (week 6).

3.3 Research design

3.3.1 The quasi-experimental design

A quasi-experimental, pre- and post-test design was used to measure the effect of foot reflexology on older Thai people with pain. A randomised controlled trial (RCT) was not suitable for this study or its context (Lamsompung community setting), including location, people and culture.

The quasi-experimental design allows for practicality as well as feasibility while allowing for a degree of generalisation. In this study, the design allowed for the evaluation of several hypotheses in a health setting, which, being situated in Thailand, allowed for a real world practice setting to be explored rather than a strict controlled experimental design. Most studies of public health interventions are non-experimental or quasi-experimental but their importance should not be minimised since the results can provide useful information which could at times be applied to a more general situation.

Dealing with Thai people living in a village in Northern Thailand required flexibility, allowance for uncertainty and use of available resources, including available participants. A randomised controlled trial would not have been possible in such a context. The quasi-experimental design allowed for more flexibility than a randomised controlled trial, in that:

- it enabled use of a convenience sample consisting of those people who usually came to the Health Centre, heard about the study and decided to agree to participate;

- it used six available masseurs and the intervention was carried out in one large room, hence at any one time 6 participants could communicate with one another – this could not be controlled;

- there could have been communication between people from the intervention group and the no intervention group, even though much care was taken to prevent this; such exclusion was not totally possible.

The context in which this project was carried out determined the study design used. It was not possible to have the controls required for a RCT or experimental design due to the culture of the Thai people, the fact that participants knew one another and that there was only one health centre in the village.

However, it was possible to randomly allocate participants to one of three groups after they had consented to participate, which fulfilled part of the requirements for a quasi-experimental design.

The intervention used in this project was foot reflexology but the focus of the thesis was on gathering and disseminating information about the pain status of older people in Northern Thailand, hence the use of the alternative intervention and no intervention groups. The researcher used the three groups to gain insight into whether the foot reflexology intervention, as opposed to just talking about pain or opposed to nothing at all, made any difference to the participants' pain status.

3.3.2 The study description

It was believed the intervention would be beneficial for participants. The effects of foot reflexology on pain and quality of life were explored over a six-week period (four-week intervention period and two-week follow-up period) in an intervention group (foot reflexology intervention) compared with two other groups; an alternative intervention group (home-based interview talking about pain) and a group with no intervention. Measures of pain and quality of life were taken from all participants before the four-week intervention period, at the end of the four-week intervention period and again after a two-week follow-up period (week 6). No comparable intervention had been applied in other known research. One hundred and sixty older Thai people who met the study criteria were enrolled in the study. After the follow-up measures had been taken, in week seven, all participants in the alternative intervention and no intervention groups were offered the same foot reflexology sessions as had been given to the intervention group. This was to ensure these participants would gain the same benefits from foot reflexology (if any) as those gained by participants in the intervention group.

3.3.3 Inclusion criteria

Subjects were eligible for inclusion in the study if they:

- were aged 60 years or over (Thai definition for an older people person: Ministry of Social Development and Human Security 2004)
- had pain right now on the first day of interviewing
- had two feet
- gave informed consent to be involved in the study.

3.3.4 Exclusion criteria

Subjects were excluded from the study if they:

- had signs of vascular disease affecting the lower extremities, appearing as
    - swelling of the lower limbs
    - pain in the lower limbs
    - calf pain that is noticeable, or worse when standing or walking (Quekett & Stoddart 2006)
- had foot ulcers, foot infections or had undergone foot surgery
- had had recent major surgery such as open heart surgery
- had unstable conditions such as chest pain associated with cardiac disease
- had broken bones, sprains, bruises or other injuries of the lower extremities
- had confusion, sensory or cognitive impairment, which may be indicated by
    - not able to recall recent events
    - difficulty listening for concentrated periods of time
    - difficulty finding the words to express thoughts or feelings (Mann & Carr 2006).

3.3.5 Random allocation

Participants were randomly allocated to one of the three groups by picking a label. Number one meant participants would receive foot reflexology. Number two meant participants would receive a home-visit and talking about pain. Number three meant participants would receive no intervention. There were 80 in the intervention group (foot reflexology intervention), 40 in the alternative intervention group (home-based interview talking about pain) and 40 in the group with no intervention. All participants were interviewed for demographic data (see Appendix 3), pain status

using the Brief Pain Inventory (BPI) (Thai version) (see Appendix 4), and quality of life status using SF-36 (Thai version) (see Appendix 5) at the beginning of the study. Foot reflexology was used in the intervention group, which received a fifty-minute foot reflexology session twice a week for four weeks. The Brief Pain Inventory (BPI) (Thai version) and the SF-36 (Thai version) were used again at the end of the intervention sessions (week 4) and the end of the follow-up period (week 6) to evaluate pain status and quality of life status in this group.

Participants in the alternative intervention group talked about pain twice a week for four weeks. The third group was given no intervention for four weeks. As with the foot reflexology intervention group, the Brief Pain Inventory (BPI) (Thai version) and the SF-36 (Thai version) were used again to evaluate pain and quality of life status in the alternative intervention and no intervention groups at the end of week 4 and week 6. At the beginning of week seven, all participants in these two groups were offered fifty-minute foot reflexology sessions twice a week for four weeks. All participants continued their usual medical treatments and medications for the duration of the study.

3.4 Research methods

3.4.1 Power calculation

One hundred and sixty participants were selected for the study because a sample size of 160 (N = 80) in the intervention group and 80 across the two other groups: 40 in the alternative intervention group and 40 in the no intervention group) is required to yield a power of 95 percent, which is the probability of rejecting the null hypothesis when it is false at 95 percent (Swinscow 1997). However, 17 participants in the intervention group dropped out. This number was replaced during data collection (6

replaced during the allocation process and 11 after the allocation process).

3.4.2 Recruitment and administration

Posters were displayed on the notice board of the Primary Health Care Centre for two weeks before starting recruitment. Also, village representatives made an announcement about the study to people in the village every day for a few weeks prior to the study. Picture 3.2 shows the project being advertised in this way. Early each morning at around 6 am, a village representative named Khun Sa-man Srivichai started doing his job as a spokesman for the district. He advertised the project for a few weeks to encourage potential participants to join in. Other ways of advertising included district representatives co-operating with the investigator and talking to their next door neighbours about the project, as well as passing on information sheets to potential participants. Some potential participants got the information sheets from the health officers at the Primary Health Care Centre when they came to join the project.

The information sheets identified the study topic, objectives, methodology and intervention benefits (see Appendix 6). The research assistants clarified this information verbally. The investigator provided further details upon request. People who wished to participate in the study and met the selection criteria were asked to read and sign a consent form to confirm their willingness to be involved in the study. Illiterate participants were asked to put their thumb print on the consent form to confirm their willingness to be involved. The eligibility to participate and consent forms were administered by the investigator or the registered nurse at the Health Centre. The first 180 participants that presented throughout the day at the Health Centre were asked to participate in this study. All agreed to participate. As stated

previously, participants were allocated randomly to the no intervention group, the alternative intervention group or the intervention group. The investigator organised appointments for the intervention group to receive eight sessions of foot reflexology at times to suit the participants. Transportation was provided to get participants to the Primary Health Care Centre and return them to their accommodation after each session.

Picture 3.2 A village representative advertising the project

Two main research assistants carried out the interviews in the ground floor area of the Primary Health Care Centre. One assistant interviewed participants in the intervention group, while the other interviewed participants in the alternative intervention and no intervention groups. A registered nurse and the investigator sometimes helped with the pre-intervention interview for the intervention group to

make the process flow in terms of 1) participants not having to wait too long to be interviewed; and 2) masseurs being able to give foot reflexology on time.

All research assistants received payment of 30 Baht per questionnaire in the intervention group and the no intervention group, and 50 Baht per questionnaire in the alternative intervention group. Participants in the intervention group were interviewed to complete questionnaires including demographic data, the Brief Pain Inventory (BPI: Thai version) and the Short-Form 36 (SF-36: Thai version) before the foot reflexology session started at Lamsompung Primary Health Care Centre. After the interview, the participants were given their 50-minute foot reflexology intervention and sent home. Participants in the other two groups were sent home immediately after the first interview.

3.5 Intervention

The foot reflexology intervention was given in a big vacant room on the second level of the Primary Health Care Centre. Six masseurs who learnt foot reflexology procedures from the researcher and practised for a week before the project began performed the intervention. Two of the masseurs were traditional Thai masseurs. The other four had experience using massage with family members. All were paid at the end of the day on which the intervention was given (70 Baht per foot reflexology session). The researcher hired a cook to make lunch for the masseurs because it was difficult for them to get something to eat at lunch time. They had only a one-hour lunch break between 12 noon and 1 pm. Meals were delivered to the Primary Health Care Centre for all other staff involved in the project, including a driver, the cook, health professionals and the researcher throughout the data collection period.

Participants in the intervention group were managed so they received equal amounts

of foot reflexology from each of the six masseurs. The foot reflexology procedures (Ingham method) applied are detailed in Appendices 1 and 2. Fifty-minute foot reflexology sessions were given to each participant twice a week for four weeks. Six participants were given foot reflexology at the same time from six masseurs in the big room, which was cleaned every day. Windows were open to let outside air in for good ventilation. On hot days, the fan was turned on. A mattress, pillow and blanket were provided for each participant to lie on. Conversation was allowed between masseurs and participants, or between participants and participants. This was restricted to quiet conversation to maintain a relaxed atmosphere. No music was played during the intervention. Feet were cleaned with a damp towel and dried with a dry towel. Baby powder was applied to both feet before the massage and during the intervention to help the masseurs' hands move smoothly on the feet. Examples of the atmosphere during the foot reflexology intervention appear in Pictures 3.3 and 3.4.

Picture 3.3 Atmosphere during the foot reflexology intervention 1

After each foot reflexology session, sweets or fruits were provided to all participants.

Picture 3.4 Atmosphere during the foot reflexology intervention 2

The alternative intervention group had twice-weekly sessions for four weeks to talk about their pain. This was to replicate any positive effect of the foot reflexology intervention group's twice-weekly contact and discussion of their pain during their intervention session, which may have influenced the results from this group. One of the research assistants undertook the home visit in the evening after work. This timing was for both the participant's and assistant's convenience. Questions asked about pain included: 1). Do you still have pain today? 2). How do you deal with it? 3). Does pain management you used relieve your pain?

The no intervention group received no intervention of any description for four weeks. At the beginning of week seven (after four weeks of intervention for the intervention and alternative intervention groups and the two week follow-up period), all

participants in the alternative intervention and no intervention groups were offered fifty-minute foot reflexology twice a week for four weeks. This was done to ensure that participants were not disadvantaged by missing out on any positive effects the intervention regime might have had. All participants continued their usual medications during intervention sessions for the duration of the study.

3.6 Data collection

Before beginning the project, the investigator obtained a letter of permission from the head of the community, with the agreement of the head of the Primary Health Care Centre, to collect data (see Appendix 6). Participants completed the demographic data, pain questionnaire (The Brief Pain Inventory [BPI], Thai version) and quality of life questionnaire (SF-36, Thai version) at the Primary Health Care Centre before intervention sessions began. As described earlier in the recruitment and administration section, two main research assistants conducted these first interviews with participants; one interviewed participants in the intervention group and the other interviewed participants in the alternative intervention and no intervention groups. A registered nurse and the investigators helped with interviewing the intervention group to ensure the process ran smoothly and on schedule.

All participants were interviewed again at the end of week 4) using the pain questionnaire (The Brief Pain Inventory [BPI] Thai version) and the quality of life questionnaire (SF-36, Thai version). Again these interviews were conducted by the two main research assistants, one interviewing participants in the intervention group at the Primary Health Care Centre, and the other interviewing participants in the other two groups at their homes. As previously, the investigator helped interview the intervention group to help the process run smoothly in terms of 1) participants not

having to wait too long to have the interview; and 2) the driver not having to wait too long for participants in any trip so they could pick up participants for the next trip in time.

All participants were interviewed again at the end of the follow-up period (week 6) using the pain questionnaire (The Brief Pain Inventory [BPI], Thai version) and the quality of life questionnaire (SF-36, Thai version). The two main research assistants conducted these interviews in the participants' homes.

3.6.1 Study instruments

3.6.1.1 Demographic data questionnaire

The demographic data questionnaire (Appendix 3) included questions on gender, age, marital status, educational background, occupation, economic factors (specifically, whether patients had financial problems), medical history and treatments, and co-morbidities. Participants completed this questionnaire on the first day of the trial.

3.6.1.2 Brief Pain Inventory (BPI)

The Brief Pain Inventory (BPI) (Appendix 4) 'is designed as a practical measure for use in clinical settings to record pain severity and its impact on the patient's functioning' (McDowell 2006, p. 491). The BPI records the location of pain as shown on a human figure (item 2); includes rating of the intensity of pain (items 3-6); indicates the extent and duration of pain relief obtained from analgesics (items 7-12); describes pain (item 13); and records the impact of pain (item 14) (McDowell 2006).

Intensity of pain is recorded on numerical scales running from 0 (no pain) to 10 (pain

as bad as you can imagine). Pain interference also runs from 0 (does not interfere) to 10 (completely interferes) (McDowell 2006). The American Geriatrics Society (2002) suggested that a verbally administered 0-10 scale is a good first choice for measuring pain intensity in most older persons. The Joint Commission on Accreditation of Healthcare Organisations has often accepted this method for routine pain assessment, and many institutions have adopted it (The American Geriatrics Society 2002). If pain rating is higher than the midpoint on the pain intensity scale it is considered as 'significant pain' (McDowell 2006). Serlin *et al.* (1995) reported that pain severity was based on the degree of interference with patients' function: ratings of 1-4 correspond to mild pain; 5-6 to moderate pain; and 7-10 to severe pain. Reliability data for versions of BPI in different languages have been collected, including the English version (coefficient alpha values were 0.87 for pain intensity, 0.91 for pain interference) (McDowell 2006) and the Thai version (coefficient alpha values were 0.819 for pain intensity and 0.925 for pain interference) (Khlongyant 2001). This instrument took ten to fifteen minutes to complete (McDowell 2006).

3.6.1.3 Quality of life questionnaire (SF-36)

The SF-36 (Appendix 5) is a generic tool to assess one's functional health status and well-being (Ware, Kosinski & Gandek 2005). The SF-36 is also a perfect tool to monitor pain outcomes (Wilkes *et al*. 2003). It assesses physical and mental functioning, contains a pain scale and has been shown to address treatments for pain (Rogers *et al*. 2000). It is practical because it is a short form measurement, and can be self-administered at home, used for face-to-face or telephone interviews, or used as mail-out/mail-back questionnaires (Ware, Kosinski & Gandek 2005). The SF-36 measures health status in eight general areas, including physical functioning (10 items); role limitations because of physical health problems (4 items); bodily pain (2

items); general health (5 items),; vitality (energy or fatigue 4 items); social functioning (2 items); role limitations because of emotional problems (3 items); and mental health (5 items) (Oermann & Templin 2000; Ware, Kosinski & Gandek 2005). Table 3.1 represents the abbreviated content for items in these areas.

Table 3.1 Abbreviated content for items in eight areas and health transition in SF-36

Dimension	Item numbers	Abbreviated item content
Physical Functioning (PF)	3a	Vigorous activities, such as running, lifting heavy objects, strenuous sports
	3b	Moderate activities, such as moving a table, vacuuming, bowling
	3c	Lifting or carrying groceries
	3d	Climbing several flights of stairs
	3e	Climbing one flight of stairs
	3f	Bending, kneeling, or stooping
	3g	Walking more than a mile
	3h	Walking several blocks
	3i	Walking one block
	3j	Bathing or dressing
Role-Physical (RP)	4a	Limited in the kind of work or other activities
	4b	Cut down the amount of time spent on work or other activities
	4c	Accomplished less than would like
	4d	Difficulty performing the work or other activities
Bodily Pain (BP)	7	Intensity of bodily pain
	8	Extent pain interfered with normal work
General Health (GH)	1	Is your health: excellent, very good, good, fair, poor
	11a	My health is excellent
	11b	I am as healthy as anybody I know
	11c	I seem to get sick a little easier than other people
	11d	I expect my health to get worse
Vitality (VT)	9a	Feel full of pep
	9e	Have a lot of energy
	9g	Feel worn out
	9i	Feel tired

Table 3.1 continued

Dimension	Item numbers	Abbreviated item content
Social Functioning (SF)	6	Extent health problems interfered with normal social activities
	10	Frequency health problems interfered with social activities
Role-Emotional (RE)	5a	Cut down the amount of time spent on work or other activities
	5b	Accomplished less than would like
	5c	Didn't do work or other activities as carefully as usual
Mental Health (MH)	9b	Been a very nervous person
	9c	Felt so down in the dumps nothing could cheer you up
	9d	Felt calm and peaceful
	9f	Felt downhearted and blue
	9h	Been a happy person
Reported Health Transition (HT)	2	Rating of health now compared to one year ago

(Ware, Kosinski & Gandek 2005, p. 5:2)

Each area of health status is measured using Likert's rating scores, with a higher score indicating better health (Ware, Kosinski & Gandek 2005; Wilks *et al*. 2003). Raw scores from each item are recoded, as presented in Table 3.2, then each raw scale score is transformed to a 0 to 100 scale using the formula shown below.

$$\text{Transformed Scale} = \frac{(\text{Actual raw score} - \text{lowest possible raw score})}{\text{Possible raw score range}} \times 100$$

Table 3.2 Item's recoding in eight areas and health transition in SF-36

Dimension	Item numbers	Response choices	Precoded value	Recoded value
Physical Functioning (PF)	3a-3j	Yes, limited a lot	1	1
		Yes, limited a little	2	2
		No, not limited at all	3	3
Role-Physical (RP)	4a-4d	Yes	1	1
		No	2	2

Table 3.2 continued

Dimension	Item numbers	Response choice	Precoded value		Recoded value
Bodily Pain (BP)	7	None	1		6.0
		Very mild	2		5.4
		Mild	3		4.2
		Moderate	4		3.1
		Severe	5		2.2
		Very severe	6		1.0
			If 8	**If 7**	
	8 if both items 7 and 8 are answered	Not at all	1	1	6
		Not at all	1	2-6	5
		A little bit	2	1-6	4
		Moderately	3	1-6	3
		Quite a bit	4	1-6	2
	8 if both items 7 and 8 are answered	Extremely	5	1-6	1
	8 if item 7 is not answered	Not at all	1	6.0	
		A little bit	2	4.75	
		Moderately	3	3.5	
		Quite a bit	4	2.25	
		Extremely	5	1.0	
General Health (GH)	1	Excellent	1		5.0
		Very good	2		4.4
		Good	3		3.4
		Fair	4		2.0
		Poor	5		1.0
	11a & 11c	Definitely true	1		1
		Mostly true	2		2
		Don't know	3		3
		Mostly false	4		4
		Definitely false	5		5
	11b & 11d	Definitely true	1		5
		Mostly true	2		4
		Don't know	3		3
		Mostly false	4		2
		Definitely false	5		1
Vitality (VT)	9a & 9e	All of the time	1		6
		Most of the time	2		5
		A good bit of the time	3		4
		Some of the time	4		3
		A little of the time	5		2
		None of the time	6		1
	9g & 9i	All of the time	1		1
		Most of the time	2		2
		A good bit of the time	3		3
		Some of the time	4		4
		A little of the time	5		5
		None of the time	6		6

Table 3.2 continued

Dimension	Item numbers	Response choice	Precoded value	Recoded value
Social Functioning (SF)	6	Not at all	1	5
		Slightly	2	4
		Moderately	3	3
		Quite a bit	4	2
		Extremely	5	1
	10	All of the time	1	1
		Most of the time	2	2
		Some of the time	3	3
		A little of the time	4	4
		None of the time	5	5
Role-Emotional (RE)	5a-5c	Yes	1	1
		No	2	2
Mental Health (MH)	9b, 9c, 9f	All of the time	1	1
		Most of the time	2	2
		A good bit of the time	3	3
		Some of the time	4	4
		A little of the time	5	5
		None of the time	6	6
	9d & 9h	All of the time	1	6
		Most of the time	2	5
		A good bit of the time	3	4
		Some of the time	4	3
		A little of the time	5	2
		None of the time	6	1
Reported Health Transition (HT)	2	Much better now than one year ago	1	-
		Somewhat better now than one year ago	2	-
		About the same as one year ago	3	-
		Somewhat worse now than one year ago	4	-
		Much worse now than one year age	5	-

(Ware, Kosinski & Gandek 2005, pp. 6:5-6:13)

The lowest possible raw score and possible raw score range in each dimension are presented in Table 3.3. The scores are interpreted as follows: the lowest score on the SF-36 is zero (Wilks *et al*. 2003). As a very general guide, total scores from 0 to 10 relate to very severe problems in the relevant scale; scores from 10 to 40 indicate a degree of problems; and high scores of more than 80 suggest little or no problem on

that dimension (Ong & Jordan 1997).

Table 3.3 Formulas for scoring and transforming scales of SF-36

Dimension	Sum final item values (after recoding items)	Lowest and highest possible raw scores	Possible score range
Physical Functioning (PF)	3a+3b+3c+3d+3e+3f+3g+3h+3i+3j	10, 30	20
Role-Physical (RP)	4a+4b+4c+4d	4, 8	4
Bodily Pain (BP)	7+8	2, 12	10
General Health (GH)	1+11a+11b+11c+11d	5, 25	20
Vitality (VT)	9a+9e+9g+9i	4, 24	20
Social Functioning (SF)	6+10	2, 10	8
Role-Emotional (RE)	5a+5b+5c	3, 6	3
Mental Health (MH)	9b+9c+9d+9f+9h	5, 30	25

(Ware, Kosinski & Gandek 2005, p. 6:18)

The meaning of scores in each area is shown in Table 3.4.

Table 3.4 Meaning of scores in eight dimensions and health transition of SF-36

Dimension	Meaning of scores	
	low	**high**
Physical Functioning (PF)	Limited a lot in performing all physical activities including bathing or dressing due to health	Perform all types of physical activities including the most vigorous without limitations due to health
Role-Physical (RP)	Problems with work or other daily activities as a result of physical health	No problems with work or other daily activities as a result of physical health
Bodily Pain (BP)	Very severe and extremely limiting pain	No pain or limitations due to pain
General Health (GH)	Evaluates personal health as poor and believes it is likely to get worse	Evaluates personal health as excellent
Vitality (VT)	Feels tired and worn out all of the time	Feels full of pep and energy all of the time
Social Functioning (SF)	Extreme and frequent interference with normal social activities due to physical or emotional problems	Performs normal social activities without interference due to physical or emotional problems

Table 3.4 continued

Dimension	Meaning of scores	
	low	**high**
Role-Emotional (RE)	Problems with work or other daily activities as a result of emotional problems	No problems with work or other daily activities as a result of emotional problems
Mental Health (MH)	Feelings of nervousness and depression all of the time	Feels peaceful, happy, and calm all of the time
Reported Health Transition (HT)	Believes general health is much better now than one year ago	Believes general health is much worse now than one year ago

(Ware, Kosinski & Gandek 2005, p. 3:5)

After calculating each scale score, physical component summary measures (PCS) are calculated comprising Physical Functioning (PF), Role-Physical (RP), Bodily Pain (BP) and General Health (GH), and mental component summary measures (MCS) are calculated comprising Vitality (VT), Social Functioning (SF), Role-Emotional and Mental Health (MH). There are three steps in PCS and MCS calculation. First, all dimensions are standardised using means and standard deviations from the 1998 general US population using a z-score transformation (formulas as shown below) (Ware & Kosinski 2007, p. 30).

PCS measures

PF_Z = (PF – 82.96845) / 23.83795

RP_Z = (RP – 77.93107) / 35.34865

BP_Z = (BP – 70.22865) / 23.35310

GH_Z = (GH – 70.10060) / 21.35900

MCS measures

VT_Z = (VT – 56.99917) / 21.12677

SF_Z = (SF – 83.56494) / 23.02758

RE_Z = (RE – 83.10276) / 31.64149

MH_Z = (MH – 75.21913) / 17.60698

The next step is to calculate the aggregate component scale score for PCS and MCS measures by multiplying each scale z-score for the physical and mental components using the physical and mental factor score coefficients from the 1990 general US population (formulas for Aggregating Scales as shown below) (Ware & Kosinski 2007, p. 30):

AGG_PHYS = (PF_Z*.42402) + (RP_Z*.35119) + (BP_Z*.31754) + (GH_Z*.24954) + (VT_Z*.02877) + (SF_Z*–.00753) + (RE_Z*–.19206) + (MH_Z*–.22069)

AGG_MENT = (PF_Z*–.22999) + (RP_Z*–.12329) + (BP_Z*–.09731) + (GH_Z*–.01571) + (VT_Z*.23534) + (SF_Z*.26876) + (RE_Z*.43407) + (MH_Z*.48581)

The last step is to multiply each aggregate component scale score by 10 and add the resulting product to 50 (formulas for t-score transformation of component scores as shown below) (Ware & Kosinski 2007, pp. 30-31):

Transformed Physical (PCS) = 50 + (AGG_PHYS*10)
Transformed Mental (MCS) = 50 + (AGG_MENT*10)

The SF-36 is shown to have very good reliability and validity in the older population group (Ware, Kosinski & Gandek 2005). The Medical Outcomes Study (MOS) group tested the reliability of SF-36 across that age group (N = 3,445) and reported that the Cronbach's alpha ranged from 0.78-0.92 and 0.77-0.92 across eight dimensions at ages 65-74, and 75 and over respectively (Ware, Kosinski & Gandek 2005, p. 7:8). The SF-36 (Thai version) was translated for the purposes of this study and tested for validity and reliability under Thai conditions (Jirarattanaphochai *et al*. 2005; Kongsakon & Silpakit 2000). At the time of undertaking the study, the researcher was aware that there were no published articles to show the Cronbach's alpha of SF-36 (Thai version) in the older population group. There was only an unpublished study from Khlongyant (2001), who investigated pain experiences, depression and pain management of hospitalised elderly patients. The study reported that the reliability coefficient of the SF-36 (Thai version) in this population varied from 0.72 to 0.94.

There were a number of published studies in other population groups, however, which reported that the SF-36 was an acceptable tool to measure the quality of life in

Thai people in the following studies:

1) 212 participants with cardiac disease, with an average age of 49±13 years. The Cronbach's alpha ranged from 0.75-0.91 across eight domains (Krittayaphong *et al.* 2000).

2) 705 healthy participants, and 900 participants with allergic rhinoconjunctivitis (mean aged 25.3±8.9, and 34.8±12.5 years respectively). The Cronbach's alpha was above 0.70 across six domains, except Social Functioning which was 0.56 in the healthy participants and 0.65 in the participants with allergic rhinoconjunctivitis (Bunnag *et al.* 2005).

3) 100 participants, aged 34-85 years with total knee arthroscopy. The Cronbach's alpha ranged from 0.71-0.99 across six domains, but was lower than 7 in Vitality (0.65) and Mental Health (0.67) (Charoencholvanich & Pongcharoen 2005).

4) 52 participants, mean age = 58.4 years with knee osteoarthritis. The Cronbach's alpha ranged from 0.74-0.88 across six domains, but was lower than 7 in Role-Physical (0.63) and in Bodily Pain (0.63) (Tangtrakulwanich *et al.* 2006).

5) 1345 healthy participants, median age = 31 years. The Cronbach's alpha ranged from 0.73-0.80 across six domains, but was lower than 7 in Vitality (0.68) and in Social Functioning (0.55) (Lim, Seubsman & Sleigh 2008).

In the research study reported in this thesis, the Cronbach's alpha of SF-36 was tested for the particular population of older Thai people who participated (N = 160). Cronbach's alpha was shown to range from 0.72-0.93 across eight dimensions. This

is detailed further in the next chapter, which reports the results of the data analysis.

3.7 Ethical considerations

Ethics approval, in the form of the research proposal, was sought from and granted by Flinders Clinical Research Ethics Committee, Flinders Medical Centre/Flinders University, Adelaide (see Appendix 6). The study was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Research Involving Humans (NHMRC) 1999 guidelines (Commonwealth of Australia 1999). There was no research ethics committee at the Primary Health Care Centre where the study was undertaken, but the investigator had a letter signed by the head of the community and the head of the Primary Health Care Centre, giving permission for her to carry out the study at the centre (see Appendix 6). Participants were asked to sign a consent form prior to commencement of the study confirming their willingness to participate. Illiterate persons were asked to provide their thumb print if they consented. Participants were also informed that they could withdraw from the study at any time without any impact on their treatment or medical care at the clinic. In addition, they were informed that their participation in the study was entirely voluntary and they had the right to withdraw at any time of their own free will without prejudice to any treatment at the Primary Health Care Centre, either at the time of the study or in the future.

3.8 Data analysis

Different types of data were analysed, including the participants' demographic data, and the data relating to measuring pain and quality of life. Demographic data were analysed in terms of frequency and percentage. Differences in baseline results (pre-test) between the intervention group and the two other groups were analysed in terms

of mean and standard error of mean. Differences in outcome measures between the three groups post-intervention were explored using Analysis of Variance (ANOVA). Analysis of Co-variance (ANCOVA) was used to assess differences post-intervention, adjusting for baseline levels. All tests were analysed using SPSS 17.0 for Windows.

3.9 Summary of research design and methods

Figure 3.1 on the next page provides a summarised flow chart of the research design and methods, indicating the timeline for each part of the study.

The next chapter details the data and results of the data analysis.

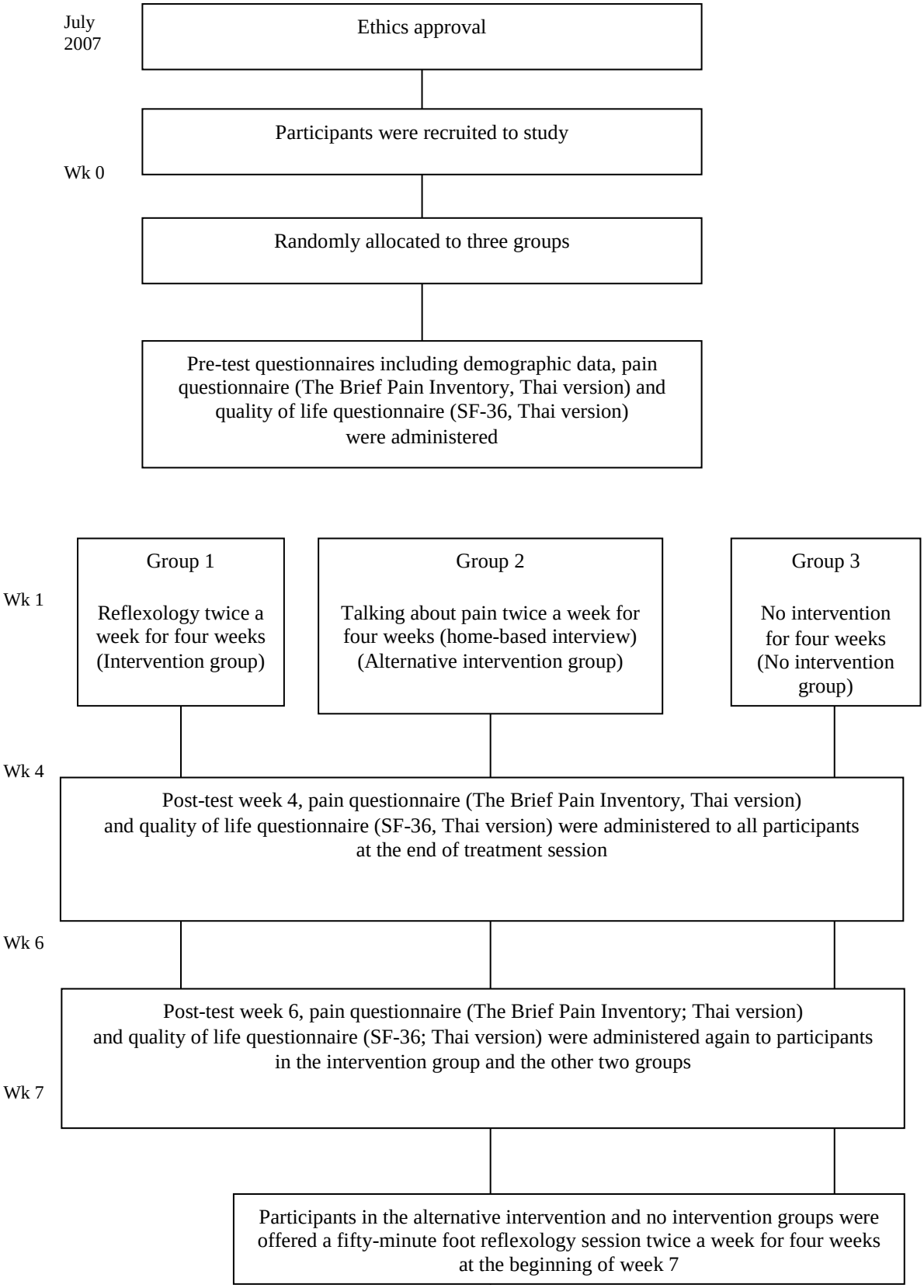


Figure 3.1 Flow chart of study research design and methods

4 Results

This chapter presents the findings of the research undertaken at the Lamsompung District Primary Health Care Centre, Saraburi, Thailand over the period of three months from 2nd July to 28th September 2007. It includes the demographic characteristics (descriptive statistics only), medication usage (descriptive statistics only), and pre- and post-intervention outcomes of pain scores (Brief Pain Inventory - BPI) and quality of life scores (The Short-Form-36 Health Survey - SF-36). Some bias may have occurred during participant allocation or interviewing because all participants were present during these activities. Therefore, some caution must be applied when interpreting these results. The findings for pain management may not be well represented.

While analysis of each question is made, the rejection or acceptance of the two hypotheses is made only on the total scores for each instrument at the 4- and 6-week measurements.

4.1 Participants' demographic characteristics

In this study, 160 participants were categorised into three groups: an intervention group (foot reflexology); an alternative intervention group (home-based interview with talking about pain); and a no intervention group (no intervention given). Eighty participants were allocated to the intervention group, 40 were allocated to the alternative intervention group and the remaining 40 were allocated to the group with no intervention. The intervention group was numbered as one (1), the alternative intervention group was numbered as two (2) and the group with no intervention was numbered as three (3). Those participants aged 60 years or over who had pain and

who met the study criteria were requested to pick one of these numbers and were allocated to a group accordingly.

Demographic data for the participants were collected and analysed against gender, age, marital status, educational background, occupation, economic factors (specifically financial status), medical history and treatment, and co-morbidities. These data are presented and discussed in sections 4.1.1 – 4.1.8.

4.1.1 Demographic characteristics of gender as shown in demographic data question 1; *'1. Gender □male □female'*

Percentages of gender between the three groups of the study were approximately even. Comparison within groups revealed that most participants in the intervention group and the alternative intervention group were female while the majority in the group with no intervention was male (see Table 4.1).

Table 4.1 Demographic characteristics: gender

Gender	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Male	(25)	31.3	(17)	42.5	(22)	55
Female	(55)	68.8	(23)	57.5	(18)	45

4.1.2 Demographic characteristics of age as shown in demographic data question 2; *'2. Age □60-74 years (early old age) □75-84 years (middle old age) □85 years and over (late old age)'*

The majority of all participants were in the early old age range (60-74 years old). There was no difference in age (i.e. 60-74 years, 75-84 years, 85 years and over) between the three groups. It is apparent from Table 4.2 that the early old age range (60-74 years old) represented the majority of the population for this study. This finding reflects the demographics of the geographical area of Saraburi province as per the province's 'Annual Report' 2007 (Saraburi Provincial Health Office 2007),

which showed the number of people in the early old age range (60-74 years old) as being much higher than the other two age ranges (75-80 years and over) in a ratio of 3.7:1.

Table 4.2 Demographic characteristics: age by gender

Age	Intervention group			Alternative intervention group			Group with no intervention		
	(n=80)	M	F	(n=40)	M	F	(n=40)	M	F
60-74 years	72	19	53	35	14	21	31	20	11
75-84 years	8	6	2	4	3	1	7	1	6
85 years and over	0	0	0	1	0	1	2	1	1

4.1.3 Demographic characteristics of marital status as shown in demographic data question 3; *'3. Marital status □ single □ couple □ divorced/separated/widowed'*

As shown in Table 4.3, the majority of participants in each of the three groups being studied were couples (53.8–67.5%). Divorced/separated/widowed status represented one-third of the participants (30–37.5%) in each group. There was similarity in the couple status and divorced/separated/widowed status among the three groups. It appears that single status in the intervention group was higher than in both comparison groups. The percentage of single status combined with divorced/separated/widowed status in the intervention group was about 50:50 compared to the couple status, whereas the percentage of this comparison was approximately 70:30 in the alternative intervention and no intervention groups. These statistics could affect the perception of pain and the quality of life in the older population, taking into consideration the social support perspective. As mentioned in studies by Udomsappayakul (1992), Chinuntuya (1993), Grueggultorn (1993), Panichacheewakul (1994), Chawarangkool (1995), Karnjanavorawong (1997), Khumpheng (1997), Plianbumroong (1997), Somchock (1997), Tuanwong (1997)

and Visetkamin (2002), older Thai couples had a better quality of life than those with single, divorced, widowed or separated status. Mannix *et al*. (1999) and Mantovani *et al*. (1996) found that psychosocial support from family members improved the quality of life in individuals with pain.

Table 4.3 Demographic characteristics: marital status

Marital status	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Single	(7)	8.8	(1)	2.5	(1)	2.5
Couple	(43)	53.8	(27)	67.5	(27)	67.5
Divorced/separated/widowed	(30)	37.5	(12)	30	(12)	30

4.1.4 Demographic characteristics of education as shown in demographic data question 4; '*4. Education* ☐ *no formal* ☐ *primary school* ☐ *secondary school* ☐ *university/college*'

Findings re the participants' education levels are presented in Table 4.4. The majority of participants (between 50–82.5%) across the groups had a primary school certificate, whereas older people with no education represented between 15 and 50 percent of participants in each group. There was a dramatic difference between the percentage of participants with no education in the intervention group and the group with no intervention, which may have affected the quality of life levels between these two groups. Allison *et al*. (1998) and Kempen *et al*. (1999) found that low education level impacted chronic medical morbidity and pain in older persons. Similar to earlier Thai studies by Panawattanakul (1991), Somboonsit (1992), Chinuntuya (1993), Panichacheewakul (1994), Chawarangkool (1995), Karnjanavorawong (1997), Somchock (1997), Tuanwong (1997), Visetkamin (2002) and Wivatvanit (2002), the researcher found that older people with high levels of education had a better quality of life than those with low levels of, or no, education.

No older person in the rural area studied had a college/university degree, and only a small number of participants in the study had a high school degree (2.5%).

Table 4.4 Demographic characteristics: education level

Education	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
No education	(12)	15	(12)	30	(20)	50
Primary school	(66)	82.5	(28)	70	(20)	50
Secondary school	(2)	2.5	(0)	0	(0)	0
University/college	(0)	0	(0)	0	(0)	0

These results were representative of the education standard in the overall population of Thailand, and rural areas in particular where most people would only have primary school level education. The national report from the National Statistical Office (1994, cited in Ronrittivichai & Thongjaruern 2005) reported that 92.5 percent of the older people had an education level up to the primary school certificate. Chuprapawan (1997, cited in Ronrittivichai & Thongjaruern 2005) reported twice as many illiterate older people in the rural areas as in the urban areas. More recently, it was reported that one third of older people have no education, particularly in rural areas (Jitapunkul 2004).

4.1.5 Demographic characteristics of occupations as shown in demographic data question 5; *'5. Occupation □worker, officer, government officer (hired by government or private) □your own business □retiree □no career □others'*

The majority of participants (47.5–62.5%) had their own business, including plant and animal farming, while 27.5–37.5 percent had no career. A minority of participants (10–17.5%) were workers. There was no dramatic difference in occupation among the three groups. No participant ticked 'others'.

Table 4.5 Demographic characteristics: occupation

Occupations	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Worker, officer, government officer	(12)	15	(7)	17.5	(4)	10
Your own business	(38)	47.5	(21)	52.5	(25)	62.5
Retiree	(0)	0	(0)	0	(0)	0
No career	(30)	37.5	(12)	30	(11)	27.5

*** Note: Worker designates working in the plant field, i.e. sugar cane field, corn field, tapioca field; business owner designates working on their own field or farm, i.e. sugar cane field, cow farm, goat farm; retiree is described as having a government pension; no career means no job bringing in income.

4.1.6 Demographic characteristics of economic factors as shown in demographic data question 6; *'6. Financial difficulty? ☐no ☐yes'*

Table 4.6 below shows that 70 percent of participants in the intervention group had financial difficulty. In contrast, only 30 percent of those in the group with no intervention reported having financial difficulty. These findings seem to support the evidence that participants having occupations and their own businesses were less likely to have financial difficulty. Even though transportation and snacks were provided to all participants who came to get foot reflexology at the Primary Health Care centre, participants did not consider this significant in terms of financial support.

Table 4.6 Demographic characteristics: economic factors

Economic factors	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
No financial difficulty	(24)	30	(18)	45	(28)	70
Have financial difficulty	(56)	70	(22)	55	(12)	30

***Note: No financial difficulty is described as an individual's perception towards his or her economic status that they have enough to spend for living and other daily requirements. Have financial difficulty is described as an individual's perception towards his or her economic status that they do not have enough to spend for living and other daily requirements.

The findings in this study are congruent with the information reported by Jitapunkul

(2004) that almost 66 percent of older people have low incomes, especially those in rural areas, and that nearly 32 percent of older people still work for an income, especially those in rural and agricultural areas. In addition, Siripanit (1999, cited in Ronrittivichai & Thongjaruern 2005) found that 35.4 percent of older people had financial difficulties.

4.1.7 Top ten medical treatments of the three study groups as shown in demographic data question 7; *'7. Do you take any medication?*

☐ no ☐ yes; please list

medication dose how often

Table 4.7 shows there was no difference in medication usage within the alternative intervention and no intervention groups at day 1, at the end of week 4 and at the end of the follow-up period (week 6). In the intervention group, however, there was a decrease in medication usage at the end of the intervention (week 4) in comparison to usage at day 1. There was a slight increase in medication usage among this group at the end of the follow-up period (week 6) in comparison to usage at the end of the intervention (week 4).

Table 4.7 Demographic characteristics: medication usage

Medication usage	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(70)	87.5	(30)	75	(16)	40
No	(10)	12.5	(10)	25	(24)	60
Week 4						
Yes	(59)	73.75	(30)	75	(16)	40
No	(21)	26.25	(10)	25	(24)	60
Week 6						
Yes	(64)	80	(30)	75	(16)	40
No	(16)	20	(10)	25	(24)	60

The types of medication used in association with co-morbidities of the three study

groups are shown in Table 4.8. Table 4.9 expands this data to show the use of pain medications by all three groups across the different time spans measured in the study, while Table 4.10 indicates the top five co-morbidities of the three study groups. The use of Beta-Blockers such as Atenolol and Propanolol, Diuretics such as Hctz (Hydrochlorothiazide) and ACE inhibitors such as Enalapril were found to be quite high in the intervention group and the alternative intervention group because hypertension was the prominent co-morbidity in both groups. Higher use of Anti-diabetic Agents such as Glibenclamide, Metformin and Glipizide was found in the intervention group than in the other two groups. These findings reflect the higher percentage of diabetes in the intervention group than in the other groups.

The use of Analgesics and Antipyretics Agents (such as Paracetamol, Nuosic, Nimesulide, Aspirin powder), Anti-rheumatic, Anti-inflammatory Analgesics Agents (such as Diclofenac, Piroxicam, Indomethacin and Ibuprofen), and a group of drugs provided by groceries (such as Neotica balm and Counterpain) for pain management was higher in the intervention group than in the alternative intervention group and the group with no intervention. This can be explained by a higher co-morbidity of musculoskeletal and joint problems, combined with a higher mean pain level at day 1, in the participants in the intervention group compared to the other groups, as shown in Table 4.8.

As can be seen from Table 4.9, there was a decrease in the intervention group's use of pain medications, including Analgesics and Antipyretics Agents and Anti-rheumatic, Anti-inflammatory Analgesics Agents at the end of the intervention (week 4) and at the end of the follow-up period (week 6) compared to use at day 1. There was no difference in taking pain medications in the alternative intervention group

and the no intervention group at the end of week 4 and at the end of follow-up period (week 6) compared to use at day 1.

Table 4.8 Top ten medical treatments of the three study groups at day 1

Day 1						
Medical treatments	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Analgesics & Antipyretics	(44)	55	(19)	47.5	(10)	25
Anti-rheumatic, Anti-inflammatory Analgesics	(34)	42.5	(9)	22.5	(5)	12.5
Diuretic	(20)	25	(8)	20	(1)	2.5
Beta-Blockers	(12)	15	0	0	0	0
Anti-diabetic Agents	(11)	13.75	0	0	(2)	5
Anticoagulants, Antithrombotics & Fibrinolytics	(7)	8.75	0	0	0	0
Minor tranquilisers	(7)	8.75	0	0	(1)	2.5
ACE Inhibitors/Other Antihypertensives	(6)	7.5	0	0	0	0
Antacid & Antiulcerants	(6)	7.5	(1)	2.5	0	0
Peripheral Vasodilators & Cerebral activators	(4)	5	0	0	0	0

Table 4.9 The use of pain medications of the three study groups at day 1, at the end of the intervention (week 4), and at the end of the follow-up period (week 6)

Period	**Medical treatments**	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
		(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Day 1	Analgesics & Antipyretics	(44)	55	(19)	47.5	(10)	25
	Anti-rheumatic, Anti-inflammatory Analgesics	(34)	42.5	(9)	22.5	(5)	12.5
At the end of intervention (week 4)	Analgesics & Antipyretics	(26)	32.5	(19)	47.5	(10)	25
	Anti-rheumatic, Anti-inflammatory Analgesics	(20)	25	(9)	22.5	(5)	12.5
At the end of follow-up period (week 6)	Analgesics & Antipyretics	(33)	41.25	(18)	45	(11)	27.5
	Anti-rheumatic, Anti-inflammatory Analgesics	(17)	21.25	(9)	22.5	(5)	12.5

During data collection, participants showed no changes in taking the following medications: Beta-Blockers; Diuretics; ACE inhibitors; Anticoagulants/ Antithrombotics and Fibrinolytics; Peripheral Vasodilators and Cerebral Activators; and Anti-diabetic Agents.

4.1.8 Top five co-morbidities of the three study groups as shown in demographic data question 8; *'8. Which of the following medical conditions have you had diagnosed by a doctor? (please tick ☐ one or more boxes)*

☐ heart disease ☐ diabetes ☐ stroke ☐ kidney disease
☐ others ☐ none of the above'

Data gathered from this question showed that hypertension was a prominent co-morbidity in the intervention and alternative intervention groups. Incidences of musculoskeletal problems (osteoarthritis, sciatica and gout), diabetes mellitus and heart disease were high in the intervention group. The incidence of other co-morbidities was similar between the alternative intervention group and the group with no intervention. The incidence of hypertension was the only striking difference found between these two groups, as can be seen in Table 4.10 (see Appendix 7, Table 323 for more comprehensive data showing little difference in other co-morbidities among all three groups studied).

Table 4.10 Top five co-morbidities of the three study groups

Co-morbidities	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Hypertension	(23)	28.8	(10)	25	(6)	15
Musculoskeletal and joint	(11)	13.75	(5)	12.5	(3)	7.5
Diabetes Mellitus	(11)	13.8	(1)	2.5	(2)	5
Heart disease	(8)	10	(0)	0	(0)	0
Peptic ulcer	(3)	3.8	(1)	2.5	(0)	0

The findings corroborate the Thailand national reports (see Gulsatitporn 2006; Jitapunkul 2004) that the most common illnesses in older Thai people are

hypertension, diabetes mellitus, coronary heart disease, cerebrovascular disease, osteoarthritis and hypercholesterolemia.

4.2 The Brief Pain Inventory

The following part of this chapter, from section 4.2.1 to 4.2.14, presents findings from 14 questionnaires from the Brief Pain Inventory (BPI) (see Appendix 4) used to assess participants' perceptions of the location of pain, the intensity of pain, the extent and duration of pain, relief obtained from analgesics, pain descriptions and the impact of pain.

4.2.1 Experience of pain *during the last week* as shown in the Brief Pain Inventory, question 1; *'1. Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain during the last week?'* ☐ *yes* ☐ *no*

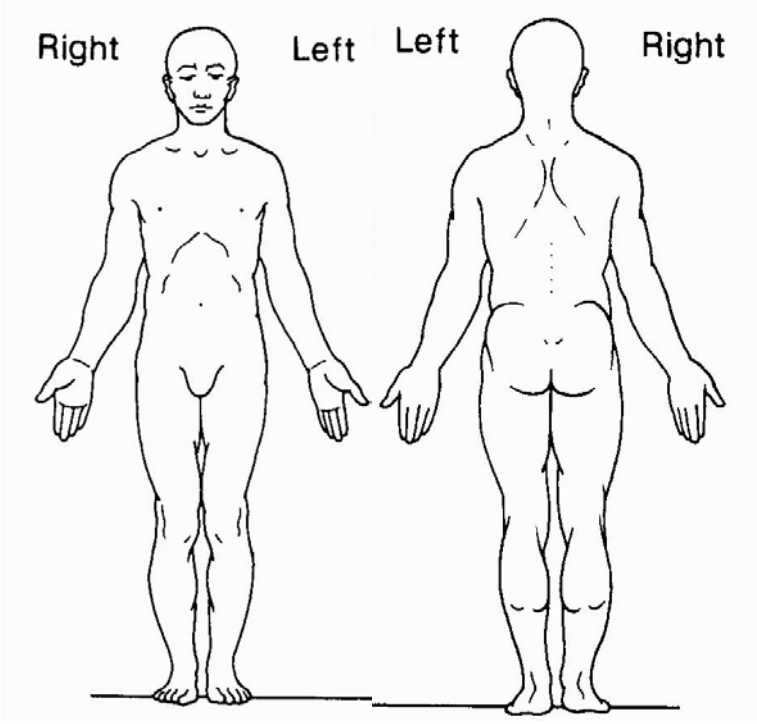
If you answered yes to this question, please go on to question 2 and finish this questionnaire. If no, you are finished with the questionnaire. Thank you'

The results from this question show that 100 percent of the participants in the three groups had had pain during the past week at day 1 (Table 4.11). At the end of week 4, 32 participants (40%) in the intervention group reported that they had had no pain during the last week, whereas 48 participants (60%) still had pain. All participants in the alternative intervention and no intervention groups experienced pain during the last week of this period. At the end of the follow-up period (week 6), 56 participants (70%) in the intervention group had had pain during the past week whereas 100 percent of all participants in the other groups reported pain. The findings imply that foot reflexology may have influenced participants' perception of pain at the end of the intervention (week 4) and at the follow-up period (week 6).

Table 4.11 Experience of pain by all three groups during the week before each measurement phase

Experience of pain throughout three phases of the study	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(80)	100	(40)	100	(40)	100
No	(0)	0	(0)	0	(0)	0
Week 4						
Yes	(48)	60	(40)	100	(40)	100
No	(32)	40	0	0	0	0
Week 6						
Yes	(56)	70	(40)	100	(40)	100
No	(24)	30	0	0	0	0

4.2.2 The location of pain as shown in the Brief Pain Inventory, question 2; *'2. On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most'*



Participant responses to this question indicated that most had pain in the lower limbs such as lower back, thigh, knee and calf. There were slightly different percentages in the pain location among the three groups at all stages. Tables 4.12 – 4.14 on the next

three pages present these findings.

Table 4.12 Pain location at day 1

Day 1						
Pain location	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Upper limbs						
Head	(9)	4.7	(0)	0	(0)	0
Teeth	(5)	2.6	(0)	0	(0)	0
Neck	(7)	3.7	(3)	3.8	(1)	1.3
Shoulder	(17)	8.9	(0)	0	(0)	0
Arm	(10)	5.3	(4)	5.1	(2)	2.6
Wrist	(2)	1.1	(0)	0	(0)	0
Hand	(2)	1.1	(0)	0	(0)	0
Upper back	(3)	1.6	(6)	7.6	(1)	1.3
Abdomen	(2)	1.1	(0)	0	(0)	0
Lower limbs						
Lower back	(38)	20	(20)	25.3	(19)	25
Buttock	(6)	3.2	(0)	0	(0)	0
Thigh	(17)	8.9	(10)	12.7	(3)	3.9
Knee	(35)	18.4	(26)	32.9	(36)	47.4
Calf	(32)	16.8	(4)	5.1	(10)	13.2
Ankle	(4)	2.1	(3)	3.8	(4)	5.3
Feet	(1)	0.5	(3)	3.8	(0)	0

Table 4.13 Pain location at the end of the intervention (week 4)

	Week 4					
Pain location	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Upper limbs						
Head	(3)	3.1	(0)	0	(0)	0
Teeth	(2)	2.0	(0)	0	(0)	0
Neck	(4)	4.1	(0)	0	(0)	0
Shoulder	(8)	8.2	(0)	0	(0)	0
Arm	(2)	2.0	(1)	1.6	(0)	0
Wrist	(1)	1.0	(0)	0	(0)	0
Hand	(2)	2.0	(0)	0	(0)	0
Upper back	(2)	2.0	(3)	4.8	(2)	3.7
Abdomen	(1)	1.0	(0)	0	(0)	0
Lower limbs						
Lower back	(24)	24.5	(16)	25.8	(15)	27.8
Buttock	(6)	6.1	(0)	0	(0)	0
Thigh	(9)	9.2	(1)	1.6	(0)	0
Knee	(15)	15.3	(38)	61.3	(36)	66.7
Calf	(18)	18.4	(3)	4.8	(1)	1.9
Ankle	(1)	1.0	(0)	0	(0)	0
Feet	(0)	0	(0)	0	(0)	0

Table 4.14 Pain location at the follow-up period (week 6)

Week 6						
Pain location	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Upper limbs						
Head	(2)	1.8	(1)	1.8	(0)	0
Teeth	(1)	0.9	(0)	0	(0)	0
Neck	(1)	0.9	(0)	0	(0)	0
Shoulder	(8)	7.3	(0)	0	(0)	0
Arm	(3)	2.8	(1)	1.8	(0)	0
Wrist	(0)	0	(0)	0	(0)	0
Hand	(1)	0.9	(0)	0	(0)	0
Upper back	(2)	1.8	(2)	3.6	(1)	2.0
Abdomen	(1)	0.9	(0)	0	(0)	0
Lower limbs						
Lower back	(24)	22	(15)	26.8	(10)	20.4
Buttock	(5)	4.6	(0)	0	(0)	0
Thigh	(13)	11.9	(1)	1.8	(1)	2.0
Knee	(23)	21.0	(34)	60.7	(37)	75.5
Calf	(19)	17.4	(1)	1.8	(0)	0
Ankle	(5)	4.6	(1)	1.8	(0)	0
Feet	(1)	0.9	(0)	0	(0)	0

4.2.3 Pain *at its worst* as shown in the Brief Pain Inventory, question 3; '3. *Please rate your pain by circling the one number that best describes your pain at its worst in the last week'*

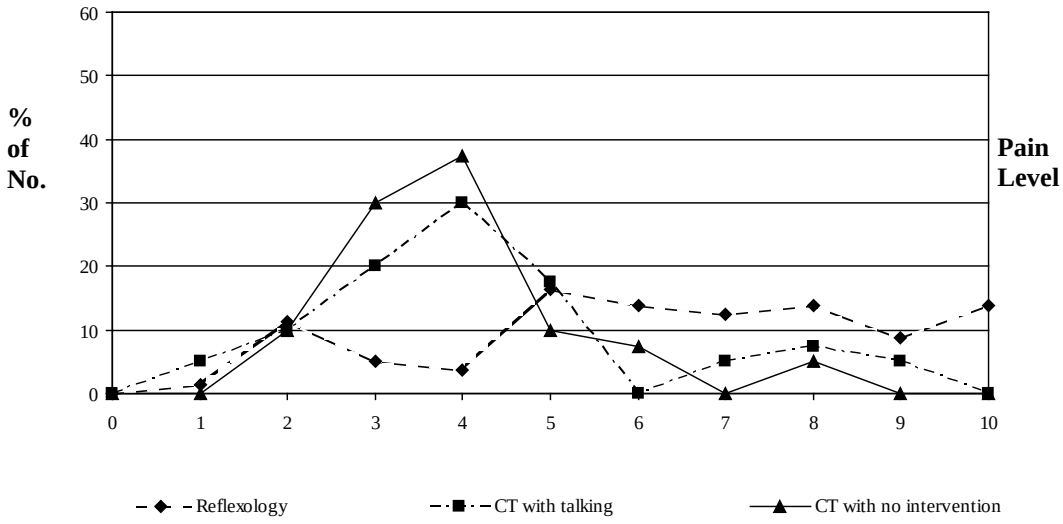
0 1 2 3 4 5 6 7 8 9 10
No pain — Pain as bad as you can imagine

Responses to this question resulted in 62.7 percent of the participants in the intervention group reporting 'significant pain' at its worst (pain that was rated higher than the midpoint on the pain intensity scale). Only 17.5 and 12.5 percent respectively in the alternative intervention group and the group with no intervention reported this level of pain. Results indicate that 82.5 and 87.5 percent respectively of participants in the alternative intervention group and the group with no intervention

did not have ‘significant pain’ at its worst. These findings are presented in Table 4.15 and Graph 4.1.

Table 4.15 Pain *at its worst* in the past week at day 1

	Day 1					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
1	(1)	1.3	(2)	5	(0)	0
2	(9)	11.3	(4)	10	(4)	10
3	(4)	5	(8)	20	(12)	30
4	(3)	3.8	(12)	30	(15)	37.5
5	(13)	16.3	(7)	17.5	(4)	10
6	(11)	13.8	(0)	0	(3)	7.5
7	(10)	12.5	(2)	5	(0)	0
8	(11)	13.8	(3)	7.5	(2)	5
9	(7)	8.8	(2)	5	(0)	0
10	(11)	13.8	(0)	0	(0)	0



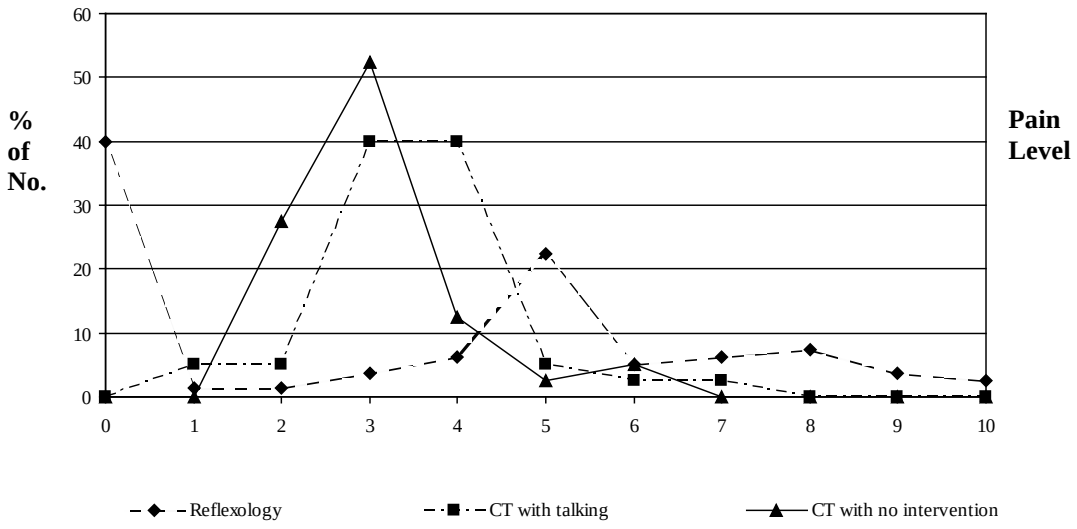
Graph 4.1 Pain level *at its worst* in the past week at day 1

Table 4.16 and Graph 4.2 show that 40 percent of participants in the intervention group had no pain at the end of the intervention (week 4), and only 25.1 percent had significant pain *at its worst* at this period - a dramatic improvement from the day 1 results. In both the alternative intervention and no intervention groups, however,

findings of pain intensity *at its worst* in the past week leading up to the measurement at the end of week 4 were similar to those presented at day 1.

Table 4.16 Pain *at its worst* in the past week at the end of the intervention (week 4)

	Week 4					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(32)	40	(0)	0	(0)	0
1	(1)	1.3	(2)	5	(0)	0
2	(1)	1.3	(2)	5	(11)	27.5
3	(3)	3.8	(16)	40	(21)	52.5
4	(5)	6.3	(16)	40	(5)	12.5
5	(18)	22.5	(2)	5	(1)	2.5
6	(4)	5	(1)	2.5	(2)	5
7	(5)	6.3	(1)	2.5	(0)	0
8	(6)	7.5	(0)	0	(0)	0
9	(3)	3.8	(0)	0	(0)	0
10	(2)	2.5	(0)	0	(0)	0



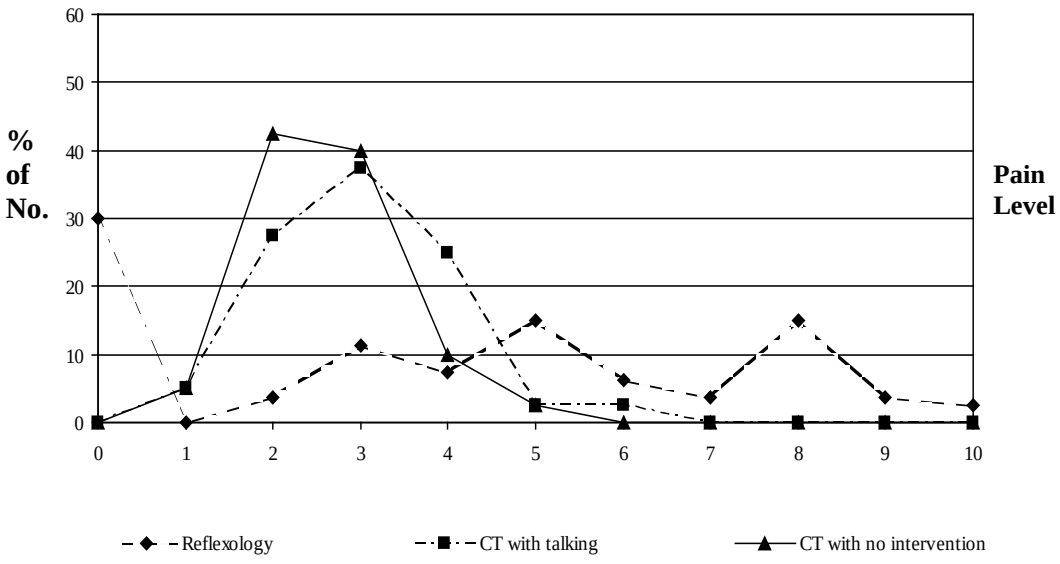
Graph 4.2 Pain level *at its worst* in the past week at the end of the intervention (week 4)

Table 4.17 and Graph 4.3 below show that 30 percent of participants in the intervention group had no pain at the end of the follow-up period (week 6). The percentage of this group having significant pain *at its worst* in the last week of this

period increased to 31.4 percent compared to 25.1 percent at the end of the intervention (week 4), but the pain intensity was still lower than at day 1. Pain intensity *at its worst* in the last week in the alternative intervention and no intervention groups week 6 was similar to that at day 1 and at the end of week 4.

Table 4.17 Pain *at its worst* in the last week at the follow-up period (week 6)

	Week 6					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(24)	30	(0)	0	(0)	0
1	(0)	0	(2)	5	(2)	5
2	(3)	3.8	(11)	27.5	(17)	42.5
3	(9)	11.3	(15)	37.5	(16)	40
4	(6)	7.5	(10)	25	(4)	10
5	(12)	15	(1)	2.5	(1)	2.5
6	(5)	6.3	(1)	2.5	(0)	0
7	(3)	3.8	(0)	0	(0)	0
8	(12)	15	(`0)	0	(0)	0
9	(5)	3.8	(0)	0	(0)	0
10	(1)	2.5	(0)	0	(0)	0



Graph 4.3 Pain level *at its worst* in the last week at the follow-up period (week 6)

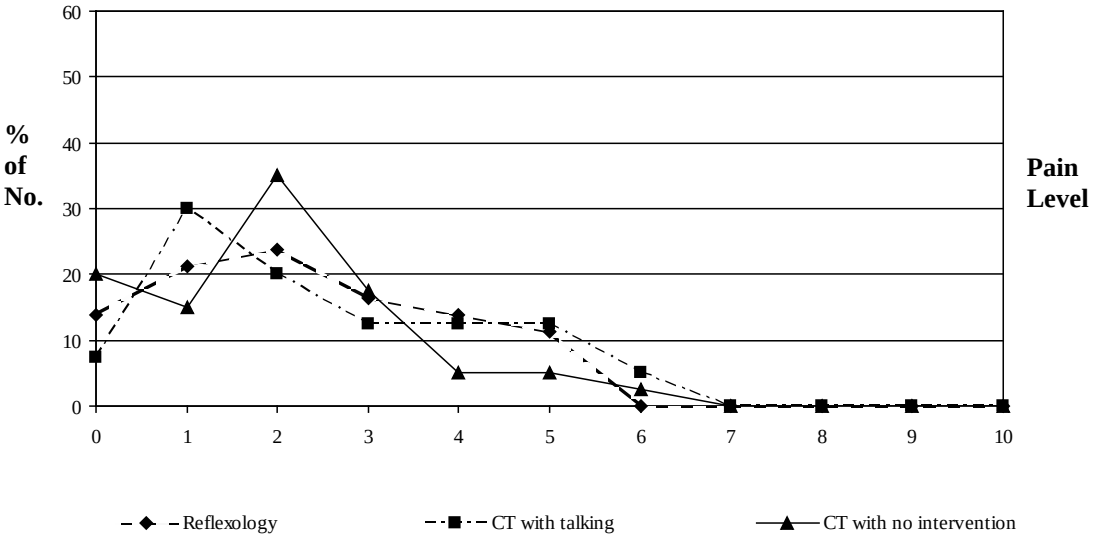
4.2.4 Pain *at its least* as shown in the Brief Pain Inventory, question 4; *'4. Please rate your pain by circling the one number that best describes your pain at its least in the last week'*

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine

There was no report of pain intensity *at its least* of more than level 6 at day 1. As shown in Table 4.18 and Graph 4.4, pain intensity at its least in the past week as reported at day 1 was slightly different among the three groups. Most participants in all three groups reported their pain *at its least* to be lower than significant pain level. In the intervention group, 13.8 percent of participants reported no pain *at its least*, whereas 7.5 percent of participants in the alternative intervention group and 20 percent of the group with no intervention reported no pain. Thus, the intensity of pain *at its least* in the past week was lowest in the group with no intervention at day 1.

Table 4.18 Pain *at its least* in the past week at day 1

	Day 1					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(11)	13.8	(3)	7.5	(8)	20
1	(17)	21.3	(12)	30	(6)	15
2	(19)	23.8	(8)	20	(14)	35
3	(13)	16.3	(5)	12.5	(7)	17.5
4	(11)	13.8	(5)	12.5	(2)	5
5	(9)	11.3	(5)	12.5	(2)	5
6	(0)	0	(2)	5	(1)	2.5

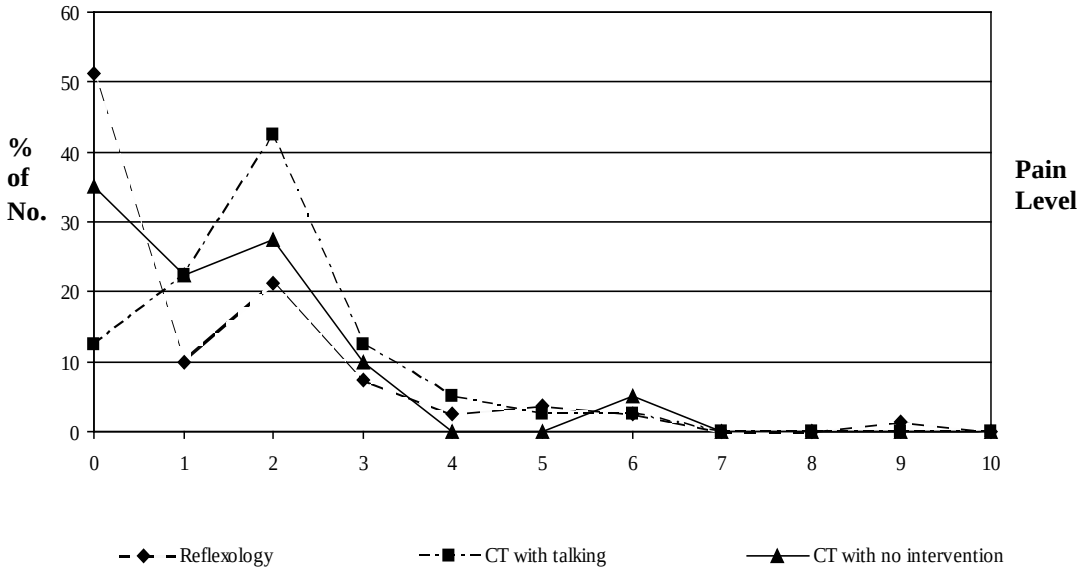


Graph 4.4 Pain level *at its least* in the past week at day 1

After receiving the foot reflexology intervention for 4 weeks, participants in the intervention group reported a decrease of pain intensity *at its least* compared to day 1, as shown in Table 4.19 and Graph 4.5, with 51.3 percent of participants reporting no pain *at its least* at this stage. This number included 40 percent (32 participants) who reported they had no experience of pain in the last week at this period, as shown previously in Table 4.11, and 11.3 percent (9 participants) who reported they had pain in the last week but no pain *at its least* at this phase. Pain intensity *at its least* in participants in the alternative intervention group at this period was similar to that reported at day 1. The intensity of pain *at its least* in the group with no intervention was lower in the last week of the second phase (at week 4) than at day 1.

Table 4.19 Pain *at its least* in the past week at the end of the intervention (week 4)

Week 4						
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(41)	51.3	(5)	12.5	(14)	35
1	(8)	10	(9)	22.5	(9)	22.5
2	(17)	21.3	(17)	42.5	(11)	27.5
3	(6)	7.5	(5)	12.5	(4)	10
4	(2)	2.5	(2)	5	(0)	0
5	(3)	3.8	(1)	2.5	(0)	0
6	(2)	2.5	(1)	2.5	(2)	5
7	(0)	0	(0)	0	(0)	0
8	(0)	0	(0)	0	(0)	0
9	(1)	1.3	(0)	0	(0)	0



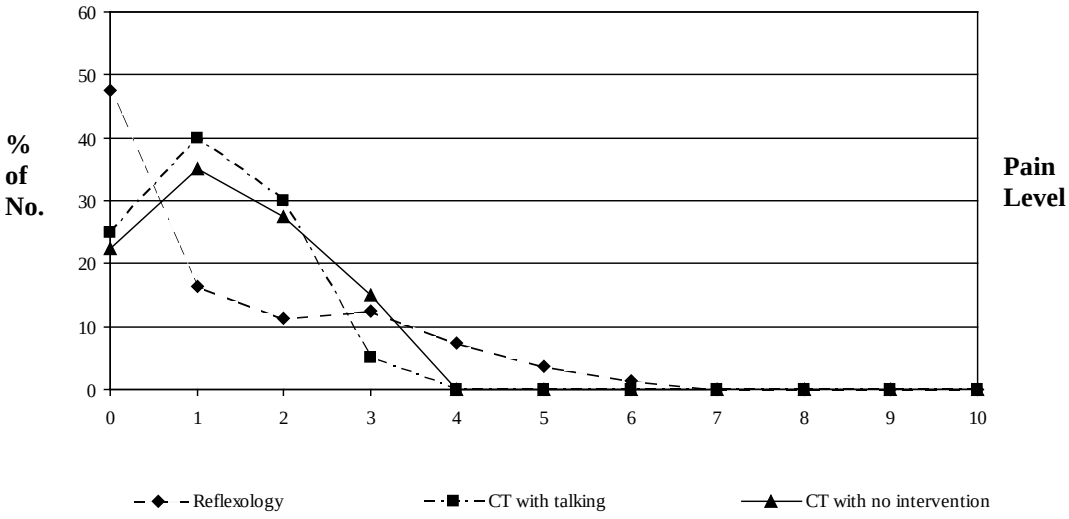
Graph 4.5 Pain level *at its least* in the last week at the end of the intervention (week 4)

Table 4.20 and Graph 4.6 illustrate that pain intensity *at its least* in the intervention group at the end of the follow-up period (week 6) was similar to that reported at the end of the intervention (week 4), and lower than at day 1. Pain intensity *at its least* in the alternative intervention group at this phase was slightly less than that reported at the end of week 4. In the group with no intervention, reported pain intensity *at its*

least was slightly higher than at the end of week 4, but similar to day 1.

Table 4.20 Pain *at its least* in the last week at the follow-up period (week 6)

Week 6						
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(38)	47.5	(10)	25	(9)	22.5
1	(13)	16.3	(16)	40	(14)	35
2	(9)	11.3	(12)	30	(11)	27.5
3	(10)	12.5	(2)	5	(6)	15
4	(6)	7.5	(0)	0	(0)	0
5	(3)	3.8	(0)	0	(0)	0
6	(1)	1.3	(0)	0	(0)	0



Graph 4.6 Pain level *at its least* in the last week at the follow-up period (week 6)

4.2.5 Pain *on the average* as shown in the Brief Pain Inventory, question 5; '*5. Please rate your pain by circling the one number that best describes your pain on the average*'

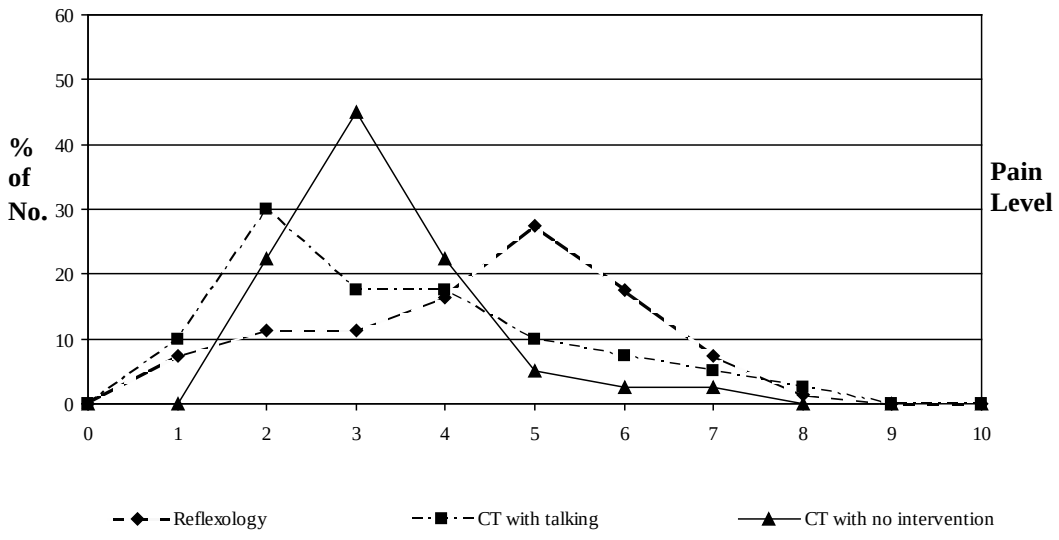
0 1 2 3 4 5 6 7 8 9 10
No pain — Pain as bad as you can imagine

There was no report of pain at levels 0, 9 and 10 at day 1, as shown in Table 4.21 and Graph 4.7. Most participants in all groups reported their pain *on the average* lower

than the significant pain point, however the percentage of pain intensity *on the average* above the significant pain point was higher in the intervention group (26.3%) than in the alternative intervention group (15%) and the group with no intervention (5%).

Table 4.21 Pain *on the average* at day 1

	Day 1					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
1	(6)	7.5	(4)	10	(0)	0
2	(9)	11.3	(12)	30	(9)	22.5
3	(9)	11.3	(7)	17.5	(18)	45
4	(13)	16.3	(7)	17.5	(9)	22.5
5	(22)	27.5	(4)	10	(2)	5
6	(14)	17.5	(3)	7.5	(1)	2.5
7	(6)	7.5	(2)	5	(1)	2.5
8	(1)	1.3	(1)	2.5	(0)	0



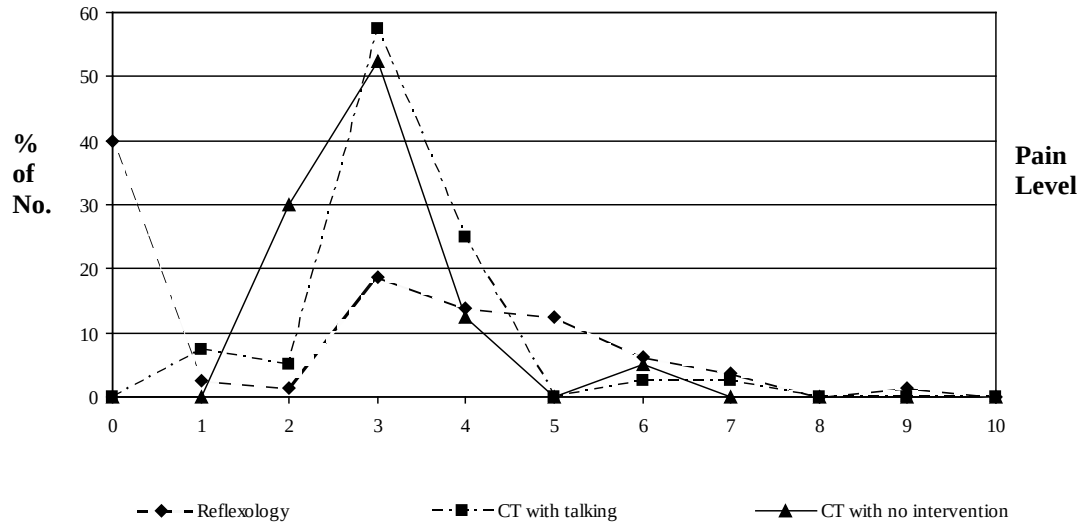
Graph 4.7 Pain *on the average* at day 1

There was no report of pain at level 10 at the end of week 4. After the 4-week foot reflexology intervention, the report of pain intensity *on the average* in the intervention group had decreased, as shown in Table 4.22 and Graph 4.8. The

findings show that 40 percent of participants in this group reported no pain, as previously shown in Table 4.11. Also, the percentage of having significant pain *on the average* decreased from 26.3 percent at day 1 to 11.4 percent at the end of week 4. The alternative intervention group reported a slight decrease in pain intensity *on the average* compared to day 1. Pain intensity *on the average* at week 4 was similar to that at day 1 for participants in the group with no intervention.

Table 4.22 Pain *on the average* at the end of week 4

	Week 4					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(32)	40	(0)	0	(0)	0
1	(2)	2.5	(3)	7.5	(0)	0
2	(1)	1.3	(2)	5	(12)	30
3	(15)	18.8	(23)	57.5	(21)	52.5
4	(11)	13.8	(10)	25	(5)	12.5
5	(10)	12.5	(0)	0	(0)	0
6	(5)	6.3	(1)	2.5	(2)	5
7	(3)	3.8	(1)	2.5	(0)	0
8	(0)	0	(0)	0	(0)	0
9	(1)	1.3	(0)	0	(0)	0

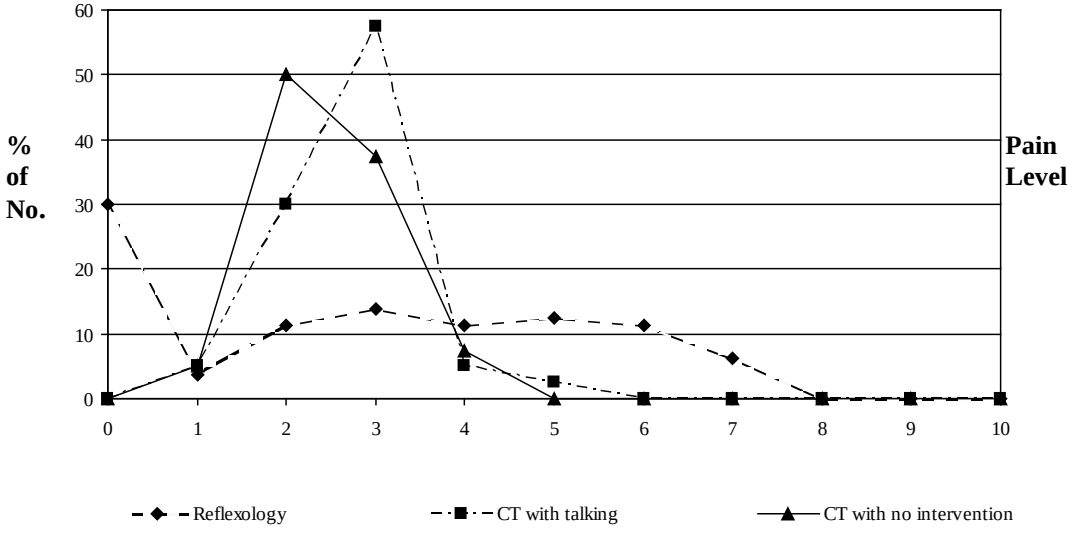


Graph 4.8 Pain *on the average* at the end of week 4

There was no report of pain at levels 8, 9 and 10 at the follow-up at week 6. Pain intensity *on the average* in the intervention group was slightly increased compared to the end of the intervention (week 4), but was still lower than at day 1. There was similar pain intensity *on the average* in the alternative intervention group compared to the end of week 4, but it was still lower than at day 1. The no intervention group reported similar pain intensity *on the average* at week 6 to that reported at the end of week 4 and at day 1. These results are presented in Table 4.23 and Graph 4.9.

Table 4.23 Pain *on the average* at the follow-up period (week 6)

	Week 6					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(24)	30	(0)	0	(0)	0
1	(3)	3.8	(2)	5	(2)	5
2	(9)	11.3	(12)	30	(20)	50
3	(11)	13.8	(23)	57.5	(15)	37.5
4	(9)	11.3	(2)	5	(3)	7.5
5	(10)	12.5	(1)	2.5	(0)	0
6	(9)	11.3	(0)	0	(0)	0
7	(5)	6.3	(0)	0	(0)	0



Graph 4.9 Pain *on the average* at the follow-up period (week 6)

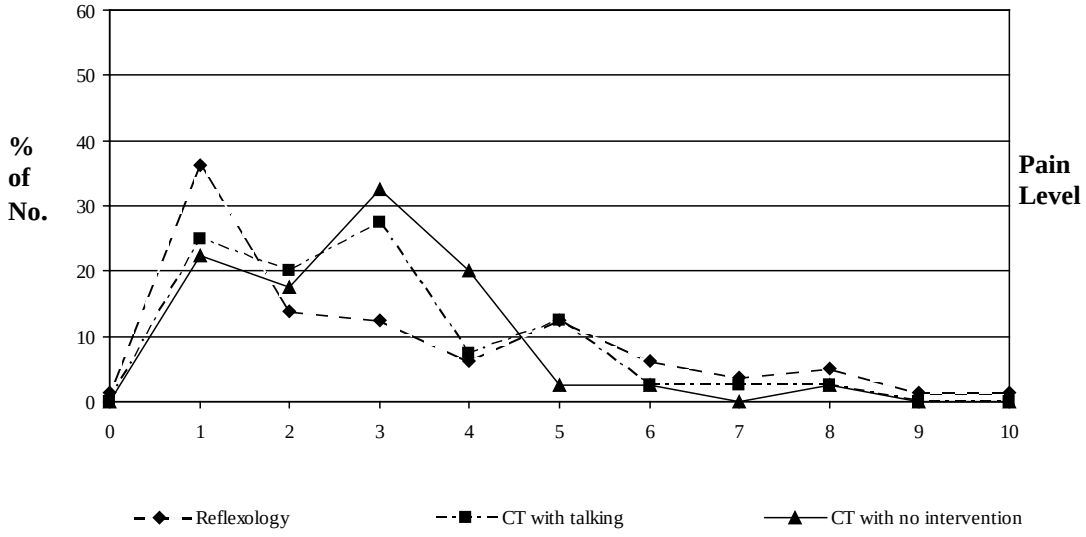
4.2.6 Pain *right now* as shown in the Brief Pain Inventory, question 6; '*6. Please rate your pain by circling the one number that tells how much you have right now*'

0	1	2	3	4	5	6	7	8	9	10
No pain										Pain as bad as you can imagine

As shown in Table 4.24 and Graph 4.10, most participants reported their pain was less than the significant pain point at day 1. There were slight differences in reports of *pain right now* among the three groups, with 81.4 percent of the intervention group, 92.5 percent of the alternative intervention group, and 95 percent in the group with no intervention reporting pain.

Table 4.24 Pain *right now* at day 1

Day 1						
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(1)	1.3	(0)	0	(0)	0
1	(29)	36.3	(10)	25	(9)	22.5
2	(11)	13.8	(8)	20	(7)	17.5
3	(10)	12.5	(11)	27.5	(13)	32.5
4	(5)	6.3	(3)	7.5	(8)	20
5	(10)	12.5	(5)	12.5	(1)	2.5
6	(5)	6.3	(1)	2.5	(1)	2.5
7	(3)	3.8	(1)	2.5	(0)	0
8	(4)	5	(1)	2.5	(1)	2.5
9	(1)	1.3	(0)	0	(0)	0
10	(1)	1.3	(0)	0	(0)	0

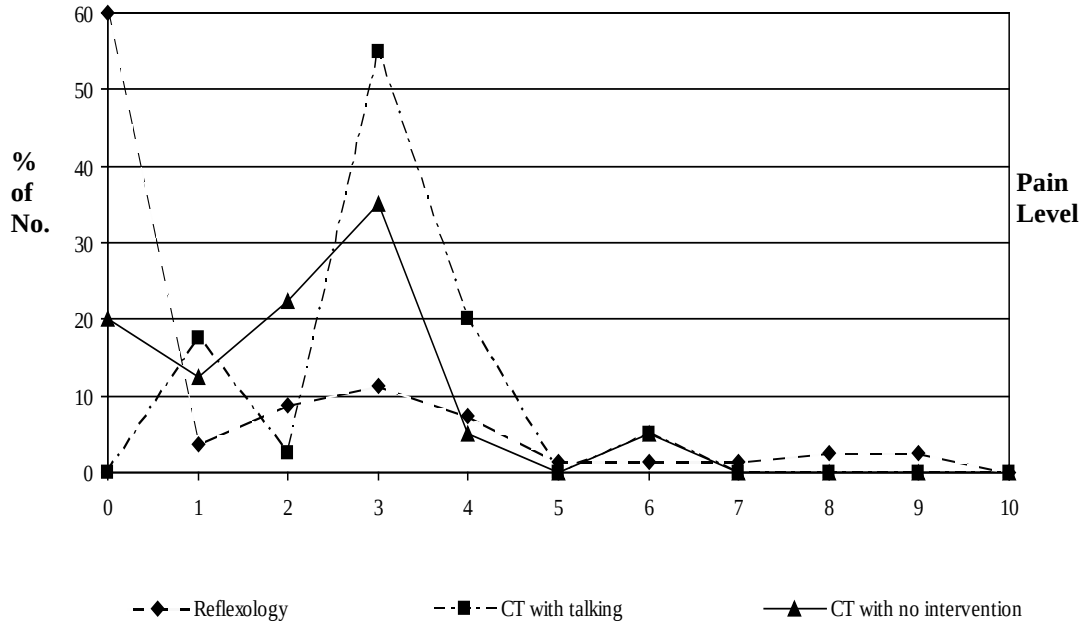


Graph 4.10 Pain *right now* at day 1

After 4 weeks of foot reflexology intervention, *pain right now* decreased dramatically for participants in the intervention group compared to the levels reported at day 1. Participants in the alternative intervention group reported similar *pain right now* at this phase as they had at day 1. Surprisingly, the level of *pain right now* in participants in the group with no intervention decreased from levels at day 1.

Table 4.25 Pain *right now* at the end of week 4

	Week 4					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(48)	60	(0)	0	(8)	20
1	(3)	3.8	(7)	17.5	(5)	12.5
2	(7)	8.8	(1)	2.5	(9)	22.5
3	(9)	11.3	(22)	55	(14)	35
4	(6)	7.5	(8)	20	(2)	5
5	(1)	1.3	(0)	0	(0)	0
6	(1)	1.3	(2)	5	(2)	5
7	(1)	1.3	(0)	0	(0)	0
8	(2)	2.5	(0)	0	(0)	0
9	(2)	2.5	(0)	0	(0)	0

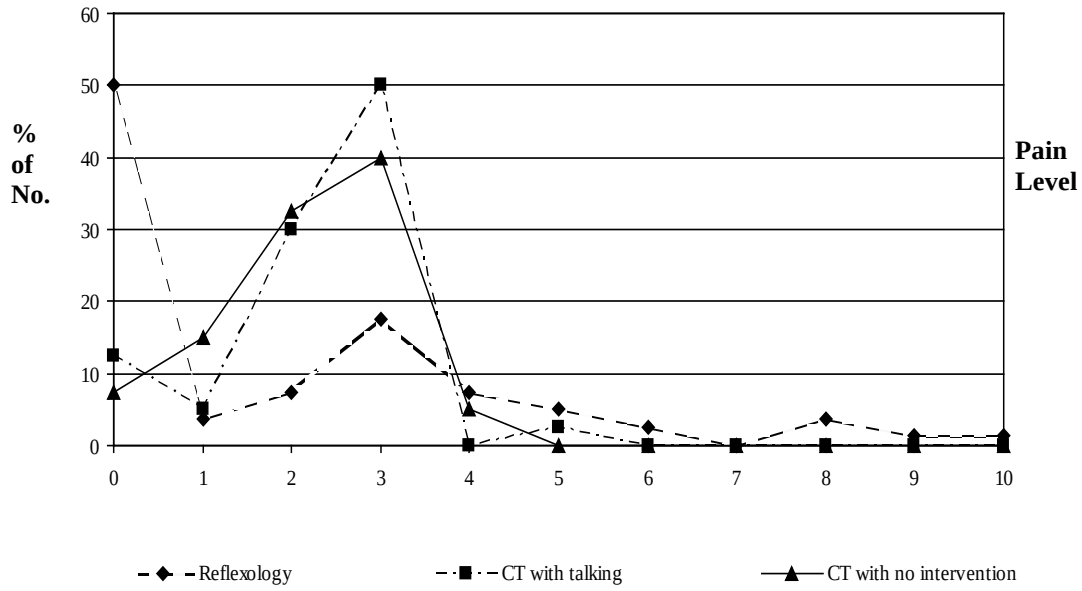


Graph 4.11 ***Pain right now*** **at the end of the intervention (week 4)**

At the end of the follow-up period, reports of *pain right now* in participants in the intervention group increased slightly from the percentage at the end of the intervention (week 4) but were lower than at day 1 even though participants did not receive foot reflexology during the follow-up period. *Pain right now* in the participants in the alternative intervention group at the end of the follow-up period decreased slightly compared to day 1 and at the end of week 4. In the group with no intervention, reported levels of *pain right now* at this phase were similar to those at day 1 but slightly higher than at the end of week 4.

Table 4.26 Pain *right now* at the follow-up period (week 6)

	Week 6					
Level of pain	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0	(40)	50	(5)	12.5	(3)	7.5
1	(3)	3.8	(2)	5	(6)	15
2	(6)	7.5	(12)	30	(13)	32.5
3	(14)	17.5	(20)	50	(16)	40
4	(6)	7.5	(0)	0	(2)	5
5	(4)	5	(1)	2.5	(0)	0
6	(2)	2.5	(0)	0	(0)	0
7	(0)	0	(0)	0	(0)	0
8	(3)	3.8	(0)	0	(0)	0
9	(1)	1.3	(0)	0	(0)	0
10	(1)	1.3	(0)	0	(0)	0



Graph 4.12 Pain level *right now* at the follow-up period (week 6)

4.2.7 Choices for pain relief of the three study groups as shown in the Brief Pain Inventory, question 7; *'7. What kinds of things make your pain feel better (for example, heat, medicine, rest)?'*

Medicine, self-massage, rest and using balm were the most common choices for pain relief in the participants in the intervention group at day 1 (see Table 4.27).

Participants in both the alternative intervention and no intervention groups made similar choices, with the exception of using balm.

Table 4.27 Choices for pain relief of the three study groups at day 1

Choices for pain relief	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Medicine	(59)	73.75	(27)	67.5	(17)	42.5
Massage	(20)	25	(8)	20	(9)	22.5
Rest	(16)	20	(9)	22.5	(26)	65
Balm	(15)	18.75	(1)	2.5	(0)	0
Thai herbs	(3)	3.75	(0)	0	(0)	0
Exercise	(4)	5	(0)	0	(0)	0
Hot pack	(1)	1.25	(0)	0	(1)	2.5
Distracting activities	(1)	1.25	(0)	0	(0)	0

Changes can be seen in choices for pain relief at the end of week 4 compared with those at day 1. After receiving 8 foot reflexology interventions, 48 participants in the intervention group reported no pain *right now,* as shown in Table 4.25. This influenced the decrease in percentages of choices for pain relief in the participants in this group. It can be seen from Table 4.28 that after the foot reflexology intervention, medicine and massage had become even more predominant as strategies for pain relief in the participants who reported pain in this group, and that there had also been a dramatic reduction in the choice 'medicine' as a strategy (previously 73.75% compared with 42.5% after the intervention). A slight decrease in pain levels *at its worst, at its least, on the average and pain right now* was reported by participants in the alternative intervention group at the end of week 4. This changed the choices for pain relief in this group, with common choices being medicine and rest only, as shown in Table 4.28. In the group with no intervention, pain levels *at its worst, at its least and pain right now* at the end of week 4 were reported to be slightly decreased from those at day 1. This influenced choices of pain relief for participants in this

group, with their most common choice now being ‘rest’ instead of ‘medicine’ or ‘massage’.

Table 4.28 Choices for pain relief of the three study groups at the end of intervention (week 4)

Week 4						
Choices for pain relief	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Medicine	(34)	42.5	(26)	65	(14)	35
Massage	(23)	28.75	(0)	0	(2)	5
Rest	(4)	5	(19)	47.5	(29)	72.5
Balm	(4)	5	(0)	0	(0)	0
Thai herbs	(1)	1.25	(0)	0	(0)	0
Exercise	(1)	1.25	(0)	0	(0)	0
Hot pack	(0)	0	(0)	0	(0)	0
Distracting activities	(0)	0	(0)	0	(0)	0

At the end of the follow-up period (week 6), 40 participants in the intervention group reported no pain *right now*, as shown in Table 4.26. This number was considered similar to that at the end of intervention (week 4), hence participants in this group chose similar pain relief options at the end of week4 and the end of week 6. Differences in choice of pain relief for this group at follow-up and day 1 can be explained by the lower level of *pain right now* at week 6 compared to day 1. Pain levels *right now* in the alternative intervention group at the follow-up period had decreased slightly from those at day 1 and at the end of week 4. This changed the choices for pain relief in this group at week 6. As shown in Table 4.29, more participants in this group chose ‘rest’. In the group with no intervention, pain level *right now* at this phase was reported to be lower than at day 1, but slightly higher than at the end of week 4. The choices of pain relief in participants in this group were similar at all three measurement phases.

Table 4.29 Choices for pain relief of the three study groups at the end of the follow-up period (week 6)

Week 6						
Choices for pain relief	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Medicine	(38)	47.5	(23)	57.5	(16)	40
Massage	(17)	21.25	(1)	2.5	(4)	10
Rest	(11)	13.75	(22)	55	(28)	70
Balm	(2)	2.5	(0)	0	(0)	0
Thai herbs	(2)	2.5	(0)	0	(0)	0
Exercise	(0)	0	(0)	0	(0)	0
Hot pack	(0)	0	(0)	0	(0)	0
Distracting activities	(0)	0	(0)	0	(0)	0

4.2.8 Reasons for pain aggravation in the three study groups as shown in the Brief Pain Inventory, question 8; *'8. What kinds of things make your pain worse (for example, walking, standing, lifting)?'*

As illustrated in Table 4.30, the main causes of pain in the three groups were lifting, working, walking, standing/sitting too long and changing position. This may be explained by the fact that most participants in the three groups (62.5% in the intervention group, 70% in the alternative intervention group and 72.5% in the group with no intervention) still worked for a living. Lifting, working and walking were found to be common causes of pain in the intervention group. Walking, changing position and working played an important role in pain incidence in the alternative intervention group. In the group with no intervention, participants indicated walking, changing position and standing/sitting too long as inducing pain.

Table 4.30 Reasons for pain aggravation in the three study groups at day 1

Reasons for pain aggravation	Day 1					
	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Lifting	(27)	33.75	(6)	15	(4)	10
Work	(24)	30	(9)	22.5	(6)	15
Walk	(23)	28.75	(27)	67.5	(36)	90
Stand/sit too long	(10)	12.5	(5)	12.5	(8)	20
Change position	(5)	6.25	(11)	27.5	(9)	22.5
Pain with no reason	(4)	5	0	0	0	0
Stress	(2)	2.5	0	0	0	0
Eat conservative foods	(2)	2.5	0	0	0	0
Driving	(1)	1.25	0	0	0	0

As shown earlier in Table 4.11, 40 percent (32 participants) of the intervention group reported no pain *in the last week* at the end of intervention (week 4). Therefore, these 32 participants were not asked question 8 from the BPI questionnaire, resulting in a decreased percentage of reasons for pain aggravation in this group. However, main reasons for pain aggravation reported by other participants in this group were working, lifting and walking.

While there were no changes in experience of pain during *the last week* in the alternative intervention and no intervention groups, as shown earlier in Table 4.11, all participants in these groups were asked all questions in the BPI questionnaire. Table 4.31 shows that walking, standing/sitting too long, working and changing position played an important role in pain aggravation in both of these groups.

Table 4.31 Reasons for pain aggravation in the three study groups at the end of the intervention (week 4)

Week 4						
Reasons for pain aggravation	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Lifting	(8)	10	(2)	5	(1)	2.5
Work	(21)	26.25	(9)	22.5	(12)	30
Walk	(8)	10	(40)	100	(33)	82.5
Stand/sit too long	(4)	5	(13)	32.5	(8)	20
Change position	(7)	8.75	(10)	25	(12)	30
Pain with no reason	(2)	2.5	(0)	0	(0)	0
Stress	(0)	0	(0)	0	(0)	0
Eat conservative foods	(1)	1.25	(0)	0	(0)	0
Driving	(1)	1.25	(0)	0	(0)	0

The report of no pain *in the last week* in the intervention group at the end of the follow-up period (week 6) was at a level of 30 percent (24 participants), as shown in Table 4.11, hence these 24 participants were not asked about reasons for pain aggravation at this period. This decreased percentages for reasons for pain aggravation in this group. However, the main reasons reported for pain aggravation among the other participants in this group were working, walking and lifting.

There were no changes in experience of pain during *the last week* in the alternative intervention and no intervention groups, as shown in Table 4.11, but all participants in these groups were asked all questions in the BPI questionnaires. Table 4.32 shows that walking, standing/sitting too long, changing position and lifting played an important role in pain aggravation in these two groups.

Table 4.32 Reasons for pain aggravation in the three study groups at the end of follow-up period (week 6)

Week 6						
Reasons for pain aggravation	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Lifting	(7)	8.75	(9)	22.5	(10)	25
Work	(29)	36.25	(7)	17.5	(6)	15
Walk	(11)	13.75	(38)	95	(39)	97.5
Stand/sit too long	(3)	3.75	(11)	27.5	(19)	47.5
Change position	(0)	0	(11)	27.5	(14)	35
Pain with no reason	(5)	6.25	(0)	0	(0)	0
Stress	(0)	0	(0)	0	(0)	0
Eat conservative foods	(4)	5	(0)	0	(0)	0
Driving	(1)	1.25	(0)	0	(0)	0
Medical conditions	(2)	2.5	(0)	0	(0)	0

4.2.9 Medications for pain relief in the three study groups as shown in the Brief Pain Inventory, question 9; *'9. What treatments or medications are you receiving for your pain?'*

Table 4.33 shows that participants in the intervention group took more pain medications, including Analgesics and Antipyretics, Anti-rheumatic/Anti-inflammatory analgesics and balm made from Thai herbs than those in both the alternative intervention group and the group with no intervention. Participants in the alternative intervention group took more pain medications than those in the group with no intervention at day 1.

Table 4.33 Medications for pain relief in the three study groups at day 1

Day 1						
Medications for pain relief	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Analgesics & Antipyretics	**(44)**	**55**	**(19)**	**47.5**	**(10)**	**25**
Paracetamol	(40)	50	(17)	42.5	(10)	25
Nuosic	(1)	1.25	(0)	0	(0)	0
Nimesulide	(1)	1.25	(0)	0	(0)	0
Aspirin powder	(2)	2.5	(2)	5	(0)	0
Anti-rheumatic, Anti-inflammatory Analgesics	**(34)**	**42.5**	**(9)**	**22.5**	**(5)**	**12.5**
Diclofenac	(14)	17.5	(6)	15	(3)	7.5
Piroxicam	(7)	8.75	(0)	0	(0)	0
Indomethacin	(5)	6.25	(3)	7.5	(2)	5
A group of drugs for pain relief provided by groceries	(4)	5	(0)	0	(0)	0
Ibuprofen	(2)	2.5	(0)	0	(0)	0
Counterpain	(1)	1.25	(0)	0	(0)	0
Neotica balm	(1)	1.25	(0)	0	(0)	0
Other groups						
Balm from Thai herbs	(15)	18.75	(1)	2.5	(0)	0
Herbs for pain relief	(4)	5	(0)	0	(0)	0
Colchicine	(2)	2.5	(0)	0	(0)	0
Mydocalm	(1)	1.25	(0)	0	(0)	0

It can be seen from Table 4.34 that pain medication use at the end of week 4 was decreased in the intervention group but was similar in both the alternative intervention group and the no intervention group. Table 4.35 shows that at the end of the follow-up period (week 6), the percentage of participants in the intervention group using pain medications was slightly higher than at the end of the intervention (week 4), but it was still lower than at day 1. There was similar use of pain medications in the other two groups at this phase compared to at the end of week 4 and at day 1.

Table 4.34 Medications for pain relief in the three study groups at the end of the intervention (week 4)

Week 4						
Medications for pain relief	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Analgesics & Antipyretics	**(26)**	**32.5**	**(19)**	**47.5**	**(10)**	**25**
Paracetamol	(26)	32.5	(17)	42.5	(10)	25
Nuosic	(0)	0	(0)	0	(0)	0
Nimesulide	(0)	0	(0)	0	(0)	0
Aspirin powder	(0)	0	(2)	5	(0)	0
Anti-rheumatic, Anti-inflammatory Analgesics	**(20)**	**25**	**(9)**	**22.5**	**(5)**	**12.5**
Diclofenac	(7)	8.75	(6)	15	(3)	7.5
Piroxicam	(3)	3.75	(0)	0	(0)	0
Indomethacin	(2)	2.5	(3)	7.5	(2)	5
A group of drugs for pain relief provided by groceries	(6)	7.5	(0)	0	(0)	0
Ibuprofen	(1)	1.25	(0)	0	(0)	0
Counterpain	(0)	0	(0)	0	(0)	0
Neotica balm	(1)	1.25	(0)	0	(0)	0
Other groups						
Balm from Thai herbs	(5)	6.25	(0)	0	(0)	0
Herbs for pain relief	(1)	1.25	(0)	0	(0)	0
Colchicine	(2)	2.5	(0)	0	(0)	0
Mydocalm	(1)	1.25	(0)	0	(0)	0

Table 4.35 Medications for pain relief in the three study groups at the end of the follow-up period (week 6)

Week 6						
Medications for pain relief	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Analgesics & Antipyretics	**(33)**	**41.25**	**(18)**	**45**	**(11)**	**27.5**
Paracetamol	(31)	38.75	(16)	40	(11)	27.5
Nuosic	(0)	0	(0)	0	(0)	0
Nimesulide	(0)	0	(0)	0	(0)	0
Aspirin powder	(2)	2.5	(2)	5	(0)	0

Table 4.35 continued

Medications	Intervention group		Alternative intervention group		Group with no intervention	
Anti-rheumatic, Anti-inflammatory Analgesics	**(17)**	**21.25**	**(9)**	**22.5**	**(5)**	**12.5**
Diclofenac	(7)	8.75	(7)	17.5	(3)	7.5
Piroxicam	(2)	2.5	(0)	0	(0)	0
Indomethacin	(1)	1.25	(2)	5	(2)	5
A group of drugs for pain relief provided by groceries	(5)	6.25	(0)	0	(0)	0
Ibuprofen	(1)	1.25	(0)	0	(0)	0
Counterpain	(0)	0	(0)	0	(0)	0
Neotica balm	(1)	1.25	(0)	0	(0)	0
Other groups						
Balm from Thai herbs	(1)	1.25	(0)	0	(0)	0
Herbs for pain relief	(3)	3.75	(0)	0	(0)	0
Colchicine	(0)	0	(0)	0	(0)	0
Mydocalm	(2)	2.5	(0)	0	(0)	0

4.2.10 Pain relief after treatment as shown in the Brief Pain Inventory, question 10; '*10. In the last week, how much relief have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received*'

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
No relief										Complete relief

Pain relief was quite similar after treatment or medications *in the last week* between the intervention group and the alternative intervention group at day 1 (see Table 4.36), whereas most participants in the group with no intervention reported pain relief after treatment at a lower percentage than the other two groups.

Table 4.36 Pain relief after pain treatments or medications in the last week at day 1

Day 1						
Percentage of pain relief	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0%	(1)	1.3	(0)	0	(0)	0
10%	(2)	2.5	(3)	7.5	(0)	0
20%	(3)	3.8	(2)	5	(2)	5
30%	(3)	3.8	(2)	5	(5)	12.5
40%	(6)	7.5	(1)	2.5	(14)	35
50%	(19)	23.8	(4)	10	(10)	25
60%	(8)	10	(7)	17.5	(6)	15
70%	(10)	12.5	(5)	12.5	(3)	7.5
80%	(10)	12.5	(7)	17.5	(0)	0
90%	(5)	6.3	(5)	12.5	(0)	0
100%	(13)	16.3	(4)	10	(0)	0

Table 4.37 provides the results at the end of intervention (week 4) in the intervention group. Forty percent of these participants reported no pain and took no pain relief medication, while pain treatments or medications still provided some pain relief to the rest of this group. Pain relief after treatment or medications was slightly different between the alternative intervention group (30-70%) and the no intervention group (30-50%) at the end of week 4.

As shown in Table 4.38, 30 percent of participants in the intervention group reported no pain and took no pain relief medications in the last week of the follow-up period, even though there was no intervention. Pain medications were shown to work well in the rest of the participants in this group who had pain. Most participants in both the alternative intervention and no intervention groups reported that the pain medications or treatments they used relieved their pain less at week 6 than at week 4 (30-50% in the alternative intervention group and 20-40% in the group with no intervention).

Table 4.37 Pain relief after pain treatments or medications in the last week at the end of week 4

Week 4						
Percentage of pain relief	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0%	(2)	2.5	(0)	0	(0)	0
10%	(0)	0	(0)	0	(0)	0
20%	(0)	0	(1)	2.5	(3)	7.5
30%	(2)	2.5	(5)	12.5	(12)	30
40%	(5)	6.3	(17)	42.5	(17)	42.5
50%	(15)	18.8	(12)	30	(5)	12.5
60%	(2)	2.5	(4)	10	(2)	5
70%	(5)	6.3	(1)	12.5	(1)	2.5
80%	(1)	1.3	(0)	0	(0)	0
90%	(3)	3.8	(0)	0	(0)	0
100%	(13)	16.3	(0)	0	(0)	0
Did not use any pain treatments or medications in the last week	(32)	40	(0)	0	(0)	0

Table 4.38 Pain relief after pain treatments or medications in the last week at the follow-up period (week 6)

Week 6						
Percentage of pain relief	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
0%	(1)	1.3	(0)	0	(0)	0
10%	(0)	0	(0)	0	(0)	0
20%	(2)	2.5	(1)	2.5	(6)	15
30%	(2)	2.5	(9)	22.5	(18)	45
40%	(7)	8.8	(17)	42.5	(12)	30
50%	(14)	17.5	(10)	25	(3)	7.5
60%	(7)	8.8	(2)	5	(1)	2.5
70%	(7)	8.8	(1)	2.5	(0)	0
80%	(7)	8.8	(0)	0	(0)	0
90%	(1)	1.3	(0)	0	(0)	0
100%	(8)	10	(0)	0	(0)	0
Did not use any pain treatments or medications in the last week	(24)	30	(0)	0	(0)	0

4.2.11 Duration of pain as shown in the Brief Pain Inventory, question 11; *'11. If you take pain medication, how many hours does it take before the pain returns?'*

☐1. Pain medication doesn't help at all ☐2. One hour
☐3. Two hours ☐4 Three hours ☐5. Four hours
☐6. Five to twelve hours ☐7. More than twelve hours
☐8. I do not take pain medication

Table 4.39 illustrates that pain returned quite quickly to participants in the intervention group after they had taken pain medications, within one hour for some, but was slower in the other two groups, starting at 4 hours. Ten percent of participants in the intervention group did not take pain medication at day 1, whereas 32.5 and 62.5 percent respectively of those in the alternative intervention group and the group with no intervention took no pain medication. This might relate to pain level *at its worst* in participants in the intervention group, which was higher than that in participants in the other two groups. The reason for the difference between the alternative intervention and no intervention groups in not using pain medication was unclear, as their pain level was quite similar. It may have been due to the differences in co-morbidities and how participants in these groups perceived pain interfered with their daily activities.

Table 4.39 Duration of pain returns at day 1

	Day 1					
Duration of pain returns	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Pain medication doesn't help	(4)	5	(0)	0	(0)	0
One hour	(15)	18.8	(2)	5	(0)	0
Two hours	(5)	6.3	(0)	0	(0)	0
Three hours	(4)	5	(0)	0	(0)	0
Four hours	(8)	10	(4)	10	(5)	12.5
Five to twelve hours	(8)	10	(19)	47.5	(8)	20
More than twelve hours	(28)	35	(2)	5	(2)	5
No pain medication	(8)	10	(13)	32.5	(25)	62.5

A decrease in using pain medications can be seen clearly in participants in the intervention group after foot reflexology was given as an intervention for four weeks, while there were no changes in the other two groups (see Table 4.40).

Table 4.40 Duration of pain returns at the end of week 4

Week 4						
Duration of pain returns	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Pain medication doesn't help	(1)	1.3	(0)	0	(0)	0
One hour	(3)	3.8	(0)	0	(0)	0
Two hours	(3)	3.8	(0)	0	(0)	0
Three hours	(2)	2.5	(0)	0	(0)	0
Four hours	(1)	1.3	(4)	10	(4)	10
Five to twelve hours	(6)	7.5	(15)	37.5	(9)	22.5
More than twelve hours	(13)	16.3	(7)	17.5	(3)	7.5
No pain medication	(51)	63.8	(14)	35	(24)	60

The decrease of using pain medication continued in the participants in the intervention group at the follow-up period (week 6) (see Table 4.41). This finding was unexpected, suggesting it might be related either to the effects of foot reflexology or because participants had better health with no pain.

Table 4.41 Duration of pain returns at the follow-up period (week 6)

Week 6						
Duration of pain returns	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Pain medication doesn't help	(2)	2.5	(0)	0	(0)	0
One hour	(1)	1.3	(0)	0	(1)	2.5
Two hours	(2)	2.5	(0)	0	(1)	2.5
Three hours	(0)	0	(0)	0	(0)	0
Four hours	(8)	10	(7)	17.5	(7)	17.5

Table 4.41 continued

	Intervention group		Alternative intervention group		Group with no intervention	
Five to twelve hours	(15)	18.8	(17)	42.5	(6)	15
More than twelve hours	(11)	13.8	(3)	7.5	(0)	0
No pain medication	(41)	51.3	(13)	32.5	(25)	62.5

4.2.12 Participants' belief of causes of pain as shown in the Brief Pain Inventory, question 12; '*12. Circle the appropriate answer for each item: I believe my pain is due to*':

Yes ☐ *No* ☐ *1. The effects of treatment (for example, medication, surgery, radiation, prosthetic device).*
Yes ☐ *No* ☐ *2. My primary disease (meaning the disease currently being treated and evaluated).*
Yes ☐ *No* ☐ *3. A medical condition unrelated to primary disease (for example, arthritis).*

Tables 4.42, 4.43 and 4.44 show that most participants in the three groups believed their pain was caused by their co-morbidities.

Table 4.42 Belief of causes of pain at day 1

		Day 1					
Belief of causes of pain		**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
		(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Effects of treatment							
	Yes	(5)	6.3	(0)	0	(0)	0
	No	(75)	93.8	(40)	100	(40)	100
Primary disease							
	Yes	(20)	25	(1)	2.5	(1)	2.5
	No	(60)	75	(39)	97.5	(39)	97.5
Medical condition							
	Yes	(76)	95	(40)	100	(40)	100
	No	(4)	5	(0)	0	(0)	0

Table 4.43 Belief of causes of pain at the end of week 4

Week 4							
Belief of causes of pain		**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
		(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Effects of treatment							
	Yes	(2)	2.5	(0)	0	(0)	0
	No	(46)	57.5	(40)	100	(40)	100
Primary disease							
	Yes	(9)	11.3	(9)	22.5	(3)	7.5
	No	(39)	48.8	(31)	77.5	(37)	92.5
Medical condition							
	Yes	(46)	57.5	(40)	100	(40)	100
	No	(2)	2.5	(0)	0	(0)	0
No pain this week							
	Yes	(32)	40	(0)	0	(0)	0
	No	(48)	60	(40)	100	(40)	100

Table 4.44 Belief of causes of pain at the follow-up period (week 6)

Week 6							
Belief of causes of pain		**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
		(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Effects of treatment							
	Yes	(2)	2.5	(0)	0	(0)	0
	No	(54)	67.5	(40)	100	(40)	100
Primary disease							
	Yes	(2)	2.5	(8)	20	(1)	2.5
	No	(54)	67.5	(32)	80	(39)	97.5
Medical condition							
	Yes	(55)	68.8	(40)	100	(40)	100
	No	(1)	1.3	(0)	0	(0)	0
No pain this week							
	Yes	(24)	30	(0)	0	(0)	0
	No	(56)	70	(40)	100	(40)	100

4.2.13 Pain descriptions as shown in the Brief Pain Inventory, question 13; *'13. For each of the following words, check yes or no if that adjective applies to your pain'*

Aching	☐ Yes	☐ No
Throbbing	☐ Yes	☐ No
Shooting	☐ Yes	☐ No
Heavy	☐ Yes	☐ No
Cramping	☐ Yes	☐ No
Sharp	☐ Yes	☐ No
Tender	☐ Yes	☐ No
Burning	☐ Yes	☐ No
Stabbing/Penetrating	☐ Yes	☐ No
Gnawing/Nagging	☐ Yes	☐ No
Tiring/Exhausting	☐ Yes	☐ No
Numb	☐ Yes	☐ No
Miserable	☐ Yes	☐ No
Unbearable	☐ Yes	☐ No

Common pain descriptions reported by participants in the intervention group at day 1 were Tiring/exhausting, miserable, numb, throbbing and tender while the most common complaints among participants in the alternative intervention group were cramping, stabbing/penetrating, tender, sharp and aching. In the group with no intervention, cramping, stabbing/penetrating, burning, tender and numb were common pain descriptions at this phase (Table 4.45).

Table 4.45 Pain descriptions at day 1

	Day 1					
Pain descriptions	**Intervention group (n=80) %**		**Alternative intervention group (n=40) %**		**Group with no intervention (n=40) %**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**
Aching	(22)	(58)	(8)	(32)	(0)	(40)
	27.5	72.5	20	80	0	100
Throbbing	(25)	(55)	(1)	(39)	(0)	(40)
	31.3	68.8	2.5	97.5	0	100

Table 4.45 continued

	Intervention group		Alternative intervention group		Group with no intervention	
Shooting	(14)	(66)	(0)	(40)	(0)	(40)
	17.5	82.5	0	100	0	100
Heavy	(20)	(60)	(1)	(39)	(1)	(39)
	25	75	2.5	97.5	2.5	97.5
Cramping	(17)	(63)	(28)	(12)	(35)	(5)
	21.3	78.8	70	30	87.5	12.5
Sharp	(16)	(64)	(9)	(31)	(3)	(37)
	20	80	22.5	77.5	7.5	92.5
Tender	(24)	(56)	(9)	(31)	(5)	(35)
	30	70	22.5	77.5	12.5	87.5
Burning	(2)	(78)	(2)	(38)	(6)	(34)
	2.5	97.5	5	95	15	85
Stabbing/Penetrating	(6)	(74)	(14)	(26)	(8)	(32)
	7.5	92.5	35	65	20	80
Gnawing/Nagging	(0)	(80)	(1)	(39)	(1)	(39)
		100	2.5	97.5	2.5	97.5
Tiring/Exhausting	(47)	(33)	(2)	(38)	(0)	(40)
	58.8	41.3	5	95	0	100
Numb	(35)	(45)	(7)	(33)	(5)	(35)
	43.8	56.3	17.5	82.5	12.5	87.5
Miserable	(41)	(39)	(0)	(40)	(0)	(40)
	51.3	48.8	0	100	0	100
Unbearable	(14)	(66)	(0)	(40)	(0)	(40)
	17.5	82.5	0	100	0	100

Table 4.46 illustrates that at the end of the foot reflexology intervention (week 4), 32 participants in the intervention group reported they had no pain, as shown in section 4.2.1 (BPI question 1), so the percentage of pain descriptions was decreased. Participants in this group who reported pain this week expressed their pain as throbbing, tiring/exhausting, numb and miserable, while participants in the alternative intervention group reported their pain as cramping and tender. In the group with no intervention, cramping, tender and sharp were the most common descriptors for their pain this week.

Table 4.46 Pain descriptions at the end of the intervention (week 4)

Week 4						
Pain descriptions	**Intervention group (n=80) %**		**Alternative intervention group (n=40) %**		**Group with no intervention (n=40) %**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**
Aching	(10)	(70)	(0)	(40)	(0)	(40)
	12.5	87.5	0	100	0	100
Throbbing	(16)	(64)	(1)	(39)	(0)	(40)
	20	80	2.5	97.5	0	100
Shooting	(10)	(70)	(0)	(40)	(0)	(40)
	12.5	87.5	0	100	0	100
Heavy	(10)	(70)	(0)	(40)	(0)	(40)
	12.5	87.5	0	100	0	100
Cramping	(5)	(75)	(40)	(0)	(39)	(1)
	6.3	93.8	100	0	97.5	2.5
Sharp	(9)	(71)	(2)	(38)	(4)	(36)
	11.3	88.8	5	95	10	90
Tender	(9)	(71)	(5)	(35)	(6)	(34)
	11.3	88.8	12.5	87.5	15	85
Burning	(1)	(79)	(0)	(40)	(0)	(40)
	1.3	98.8	0	100	0	100
Stabbing/Penetrating	(3)	(77)	(3)	(37)	(2)	(38)
	3.8	96.3	7.5	92.5	5	95
Gnawing/Nagging	(0)	(80)	(0)	(40)	(0)	(40)
	0	100	0	100	0	100
Tiring/Exhausting	(15)	(65)	(0)	(40)	(0)	(40)
	18.8	81.3	0	100	0	100
Numb	(14)	(66)	(1)	(39)	(1)	(39)
	17.5	82.5	2.5	97.5	2.5	97.5
Miserable	(13)	(67)	(0)	(40)	(0)	(40)
	16.3	83.8	0	100	0	100
Unbearable	(4)	(76)	(0)	(40)	(0)	(40)
	5	95	0	100	0	100

At the end of the follow-up period (week 6), 24 participants in the intervention group reported they had no pain, as shown in section 4.2.1 (BPI question 1), so the percentage of pain descriptions was decreased at this phase. Participants in this group who reported pain this week expressed their pain descriptions as throbbing,

tiring/exhausting, numb and sharp, while cramping and sharp were reported by participants in both the alternative intervention group and the group with no intervention (see Table 4.47).

Table 4.47 Pain descriptions at the end of week 6

	Week 6					
Pain descriptions	**Intervention group (n=80) %**		**Alternative intervention group (n=40) %**		**Group with no intervention (n=40) %**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**
Aching	(8)	(72)	(0)	(40)	(0)	(40)
	10	90	0	100	0	100
Throbbing	(14)	(66)	(0)	(40)	(0)	(40)
	17.5	82.5	0	100	0	100
Shooting	(4)	(76)	(0)	(40)	(0)	(40)
	5	95	0	100	0	100
Heavy	(11)	(69)	(1)	(39)	(1)	(39)
	13.8	86.3	2.5	97.5	2.5	97.5
Cramping	(3)	(77)	(40)	(0)	(39)	(1)
	3.8	96.3	100	0	97.5	2.5
Sharp	(12)	(68)	(5)	(35)	(6)	(34)
	15	85	12.5	87.5	15	85
Tender	(3)	(77)	(2)	(38)	(2)	(38)
	3.8	96.3	5	95	5	95
Burning	(1)	(79)	(0)	(40)	(0)	(40)
	1.3	98.8	0	100	0	100
Stabbing/Penetrating	(3)	(77)	(0)	(40)	(0)	(40)
	3.8	96.3	0	100	0	100
Gnawing/Nagging	(3)	(77)	(0)	(40)	(0)	(40)
	3.8	96.3	0	100	0	100
Tiring/Exhausting	(13)	(67)	(0)	(40)	(1)	(39)
	16.3	83.8	0	100	2.5	97.5
Numb	(13)	(67)	(1)	(39)	(0)	(40)
	16.3	83.8	2.5	97.5	0	100
Miserable	(9)	(71)	(0)	(40)	(0)	(40)
	11.3	88.8	0	100	0	100
Unbearable	(1)	(79)	(0)	(40)	(0)	(40)
	1.3	98.8	0	100	0	100

4.2.14 The impact of pain as shown in the Brief Pain Inventory, question 14;

'14. Circle the one number that describes how, during the past week, pain has interfered with your: A. General activity B. Mood C. Walking ability D. Normal work (includes both work outside the home and housework) E. Relations with other people F. Sleep G. Enjoyment of life'

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

As seen in Table 4.48, 37.6 percent of participants in the intervention group reported pain interference with general activity at day 1 as 'severe pain' (scores of 7-10), 26.3 percent reported 'moderate pain' (scores of 5-6) and 25.1 percent reported 'mild pain' (scores of 1-4). Participants in the alternative intervention group and in the group with no intervention reported pain interference with general activity at day 1 as 'mild pain' at 70 and 77.5 percent respectively. This might be connected to pain level *at its worst* in the participants in the intervention group, which were higher than those in the other two groups at this period.

Table 4.48 The impact of pain *on general activity* at day 1

	Day 1										
	General activity										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(9)	(3)	(7)	(4)	(6)	(13)	(8)	(5)	(14)	(3)	(8)
%	11.3	3.8	8.8	5	7.5	16.3	10	6.3	17.5	3.8	10
Alternative intervention group (n=40)	(1)	(1)	(7)	(12)	(8)	(6)	(0)	(1)	(3)	(1)	(0)
%	2.5	2.5	17.5	30	20	15	0	2.5	7.5	2.5	0
Group with no intervention (n=40)	(0)	(0)	(0)	(10)	(21)	(6)	(1)	(1)	(0)	(1)	(0)
%	0	0	0	25	52.5	15	2.5	2.5	0	2.5	0

Over half the participants in the intervention group reported no pain interference with general activity at the end of the intervention (after 8 sessions of foot reflexology),

whereas pain interference with general activity in both other groups was slightly decreased at this stage (Table 4.49).

Table 4.49 The impact of pain *on general activity* at the end of the intervention (week 4)

	Week 4										
	General activity										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(41)	(2)	(4)	(9)	(4)	(4)	(3)	(5)	(5)	(2)	(1)
%	51.3	2.5	5	11.3	5	5	3.8	6.3	6.3	2.5	1.3
Alternative intervention group (n=40)	(0)	(0)	(2)	(20)	(14)	(1)	(3)	(0)	(0)	(0)	(0)
%	0	0	5	50	35	2.5	7.5	0	0	0	0
Group with no intervention (n=40)	(0)	(0)	(1)	(17)	(17)	(3)	(1)	(1)	(0)	(0)	(0)
%	0	0	2.5	42.5	42.5	7.5	2.5	2.5	0	0	0

Table 4.50 shows that 42.5 percent of participants in the intervention group reported they had no pain interference with general activity at the end of week 6.

Table 4.50 The impact of pain *on general activity* at the end of week 6

	Week 6										
	General activity										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(34)	(1)	(3)	(7)	(10)	(8)	(6)	(5)	(5)	(1)	(0)
%	42.5	1.3	3.8	8.8	12.5	10	7.5	6.3	6.3	1.3	0
Alternative intervention group (n=40)	(0)	(0)	(3)	(21)	(14)	(2)	(0)	(0)	(0)	(0)	(0)
%	0	0	7.5	52.5	35	5	0	0	0	0	0
Group with no intervention (n=40)	(0)	(0)	(7)	(27)	(4)	(1)	(0)	(0)	(1)	(0)	(0)
%	0	0	17.5	67.5	10	2.5	0	0	2.5	0	0

However, pain interference with general activity in both the alternative intervention and no intervention groups was similar to that at the end of week 4 but lower than at day 1.

The impact of pain on mood in participants in the intervention group was reported as 'mild' at 32.5 percent (rating 1-4), 'severe' at 30.2 percent (rating 7-10), 'not interfere' at 20 percent and 'moderate' at 17.6 percent (rating 5-6). Most participants in the alternative intervention group with talking about pain and in the group with no intervention reported pain impact on their mood as 'mild' at 75 and 92.5 percent respectively. Participants in the alternative intervention group reported pain did 'not interfere' with their mood at 15 percent (see Table 4.51).

Table 4.51 The impact of pain *on mood* at day 1

	Day 1										
	Mood										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(16)	(4)	(4)	(10)	(8)	(9)	(5)	(9)	(7)	(5)	(3)
%	20	5	5	12.5	10	11.3	6.3	11.3	8.8	6.3	3.8
Alternative intervention group (n=40)	(6)	(15)	(5)	(7)	(3)	(2)	(2)	(0)	(0)	(0)	(0)
%	15	37.5	12.5	17.5	7.5	5	5	0	0	0	0
Group with no intervention (n=40)	(1)	(8)	(6)	(13)	(10)	(1)	(0)	(0)	(1)	(0)	(0)
%	2.5	20	15	32.5	25	2.5	0	0	2.5	0	0

The percentage of pain interference with mood at the end of the intervention (week 4) in participants in the intervention group decreased dramatically from that at day 1, as shown in Table 4.52. In this group, 57.5 percent of participants reported they had no pain interference with mood this week. There was a slightly increased percentage of pain interference with mood in participants in the alternative intervention group

this week compared to the percentage at day 1. In the group with no intervention, a similar percentage of participants to that at day 1 reported pain interference with mood this week.

Table 4.52 The impact of pain *on mood* at the end of the intervention (week 4)

	Week 4										
	Mood										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(46)	(3)	(6)	(4)	(6)	(5)	(2)	(3)	(4)	(1)	(0)
%	57.5	3.8	7.5	5	7.5	6.3	2.5	3.8	5	1.3	0
Alternative intervention group (n=40)	(0)	(6)	(20)	(12)	(1)	(1)	(0)	(0)	(0)	(0)	(0)
%	0	15	50	30	2.5	2.5	0	0	0	0	0
Group with no intervention (n=40)	(1)	(11)	(20)	(4)	(3)	(1)	(0)	(0)	(0)	(0)	(0)
%	2.5	27.5	50	10	7.5	2.5	0	0	0	0	0

The percentage of pain interference with mood at the end of the follow-up period (week 6) in participants in the intervention group was slightly increased from that at the end of the intervention (week 4), however it was lower than at day 1. There was a similar percentage of pain interference with mood in participants in the alternative intervention group in this week compared to at the end of week 4, but it was slightly increased compared to day 1. There was a similar percentage of pain interference with mood in participants in the group with no intervention in this week compared to at the end of week 4, but the percentage in this group was also similar to that at day 1 (see Table 4.53).

Table 4.53 The impact of pain *on mood* at the end of the follow-up period (week 6)

	Week 6										
	Mood										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(36)	(4)	(7)	(8)	(9)	(4)	(4)	(2)	(3)	(3)	(0)
%	45	5	8.8	10	11.3	5	5	2.5	3.8	3.8	0
Alternative intervention group (n=40)	(1)	(20)	(16)	(3)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
%	2.5	50	40	7.5	0	0	0	0	0	0	0
Group with no intervention (n=40)	(2)	(22)	(13)	(3)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
%	5	55	32.5	7.5	0	0	0	0	0	0	0

Table 4.54 shows that the impact of pain on walking ability in participants in the intervention group was almost equal in percentage in 'not interfere', 'mildly interfere' (rating 1-4), 'moderately interfere' (rating 5-6) and 'severely interfere' (rating 7-10) at 22.5, 27.5, 21.3 and 28.9 percent respectively at day 1.

Table 4.54 The impact of pain *on walking ability* at day 1

	Day 1										
	Walking ability										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(18)	(4)	(4)	(6)	(8)	(10)	(7)	(5)	(10)	(1)	(7)
%	22.5	5	5	7.5	10	12.5	8.8	6.3	12.5	1.3	8.8
Alternative intervention group (n=40)	(1)	(7)	(10)	(8)	(6)	(4)	(0)	(2)	(1)	(1)	(0)
%	2.5	17.5	25	20	15	10	0	5	2.5	2.5	0
Group with no intervention (n=40)	(0)	(0)	(4)	(10)	(20)	(3)	(1)	(1)	(0)	(1)	(0)
%	0	0	10	25	50	7.5	2.5	2.5	0	2.5	0

Most participants in the alternative intervention group reported pain interference with

their walking ability as ‘mildly interfere’ at 77.5 percent at day 1. This was 85 percent in the group with no intervention.

At the end of the foot reflexology intervention (week 4), it was noticed that the percentage of pain interference with walking ability in participants in the intervention group was dramatically decreased compared to that at day 1. There was slightly decreased pain interference with walking ability in participants in the alternative intervention group in this week compared to day 1, and a similar percentage of pain interference with walking ability with day 1 in participants in the group with no intervention (Table 4.55).

Table 4.55 The impact of pain *on walking ability* at the end of the intervention (week 4)

	The end of the intervention (week 4)										
	Walking ability										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(47)	(5)	(4)	(3)	(3)	(5)	(4)	(4)	(3)	(1)	(1)
%	58.8	6.3	5	3.8	3.8	6.3	5	5	3.8	1.3	1.3
Alternative intervention group (n=40)	(0)	(0)	(2)	(20)	(14)	(1)	(3)	(0)	(0)	(0)	(0)
%	0	0	5	50	35	2.5	7.5	0	0	0	0
Group with no intervention (n=40)	(0)	(0)	(1)	(15)	(19)	(3)	(1)	(0)	(1)	(0)	(0)
%	0	0	2.5	37.5	47.5	7.5	2.5	0	2.5	0	0

At the end of the follow-up period (week 6), the interference of pain with walking ability in participants in the intervention group was slightly increased compared to that at the end of the intervention (week 4), but was lower than that at day 1. There was a similar percentage of pain interference with walking ability in participants in the alternative intervention group compared to that at the end of week 4, but a lower

percentage than that at day 1. Participants in the group with no intervention reported a slightly lower percentage of pain interference with walking ability compared to that at the end of week 4 and at day 1 (see Table 4.56).

Table 4.56 The impact of pain *on walking ability* at the end of the follow-up period (week 6)

	The end of the follow-up period (week 6)										
	Walking ability										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(37)	(0)	(4)	(7)	(8)	(1)	(8)	(3)	(9)	(2)	(1)
%	46.3	0	5	8.8	10	1.3	10	3.8	11.3	2.5	1.3
Alternative intervention group (n=40)	(0)	(0)	(2)	(21)	(14)	(2)	(1)	(0)	(0)	(0)	(0)
%	0	0	5	52.5	35	5	2.5	0	0	0	0
Group with no intervention (n=40)	(0)	(0)	(3)	(31)	(4)	(1)	(0)	(0)	(1)	(0)	(0)
%	0	0	7.5	77.5	10	2.5	0	0	2.5	0	0

Table 4.57 shows results for the impact of pain on normal work at day 1.

Table 4.57 The impact of pain *on normal work* at day 1

	Day 1										
	Normal work										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(11)	(2)	(9)	(6)	(3)	(9)	(10)	(6)	(14)	(5)	(5)
%	13.8	2.5	11.3	7.5	3.8	11.3	12.5	7.5	17.5	6.3	6.3
Alternative intervention group (n=40)	(1)	(8)	(11)	(9)	(3)	(4)	(2)	(1)	(0)	(0)	(1)
%	2.5	20	27.5	22.5	7.5	10	5	2.5	0	0	2.5
Group with no intervention (n=40)	(0)	(0)	(2)	(12)	(17)	(6)	(1)	(1)	(0)	(1)	(0)
%	0	0	5	30	42.5	15	2.5	2.5	0	2.5	0

The impact of pain on normal work in participants in the intervention group was reported as ‘mildly interfere’ (1-4) at 25.1 percent, ‘moderately interfere’ (5-6) at 23.8 percent, ‘severely interfere’ at 37.6 percent (7-10) and ‘not interfere’ at 13.8 percent. Most participants in both other groups reported their pain interference with normal work as ‘mildly interfere’ at 77.5 percent (Table 4.57).

At the end of the intervention (week 4), pain severity was dramatically decreased in participants in the intervention group compared to day 1. It can be seen from Table 4.58 that 57.5 percent of participants in this group reported they had ‘no pain interference’ with normal work. There was a slightly lower percentage of reported impact of pain severity on normal work in participants in the alternative intervention group at this phase compared to day 1. The percentage of impact of pain severity on normal work among participants in the group with no intervention at week 4 was similar to that at day 1.

Table 4.58 The impact of pain *on normal work* at the end of the intervention (week 4)

	Week 4										
	Normal work										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(46)	(3)	(3)	(3)	(3)	(3)	(4)	(4)	(5)	(5)	(1)
%	57.5	3.8	3.8	3.8	3.8	3.8	5	5	6.3	6.3	1.3
Alternative intervention group (n=40)	(0)	(1)	(3)	(17)	(15)	(1)	(3)	(0)	(0)	(0)	(0)
%	0	2.5	7.5	42.5	37.5	2.5	7.5	0	0	0	0
Group with no intervention (n=40)	(0)	(0)	(1)	(15)	(18)	(4)	(1)	(0)	(1)	(0)	(0)
%	0	0	2.5	37.5	45	10	2.5	0	2.5	0	0

Table 4.59 shows that at the end of the follow-up period (week 6), the impact of pain

severity on normal work in participants in the intervention group was slightly increased compared to at the end of the intervention (week 4), but was lower than at day 1. Similar percentages of the impact of pain severity on normal work were reported by participants in the alternative intervention group in this week compared to at the end of week 4, however these were lower than at day 1. In the group with no intervention, the impact of pain severity on normal work this week was slightly decreased compared to at the end of week 4 and at day 1.

Table 4.59 The impact of pain *on normal work* at the end of the follow-up period (week 6)

	Week 6										
	Normal work										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(40)	(1)	(7)	(10)	(4)	(3)	(5)	(2)	(3)	(2)	(3)
%	50	1.3	8.8	12.5	5	3.8	6.3	2.5	3.8	2.5	3.8
Alternative intervention group (n=40)	(0)	(1)	(4)	(18)	(14)	(2)	(1)	(0)	(0)	(0)	(0)
%	0	2.5	10	45	35	5	2.5	0	0	0	0
Group with no intervention (n=40)	(0)	(1)	(1)	(31)	(5)	(1)	(0)	(0)	(1)	(0)	(0)
%	0	2.5	2.5	77.5	12.5	2.5	0	0	2.5	0	0

As can be seen from Table 4.60, over half the participants (56.3 percent) in the intervention group reported they had ‘no pain interference’ with relations with other people at day 1, while only 22.5 percent of participants in the alternative intervention group reported no interference. Most participants in both the alternative intervention group and the group with no intervention reported the impact of pain severity on relations with other people as ‘mildly interfere’ (rating 1-4) at 75 and 90 percent respectively at day 1.

Table 4.60 The impact of pain *on relations with other people* at day 1

	Day 1										
	Relations with other people										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(45)	(2)	(10)	(1)	(2)	(4)	(2)	(3)	(5)	(3)	(3)
%	56.3	2.5	12.5	1.3	2.5	5	2.5	3.8	6.3	3.8	3.8
Alternative intervention group (n=40)	(9)	(15)	(7)	(6)	(2)	(0)	(0)	(1)	(0)	(0)	(0)
%	22.5	37.5	17.5	15	5	0	0	2.5	0	0	0
Group with no intervention (n=40)	(2)	(8)	(8)	(14)	(6)	(1)	(0)	(0)	(1)	(0)	(0)
%	5	20	20	35	15	2.5	0	0	2.5	0	0

At the end of the intervention (week 4), as shown in Table 4.61, there was a dramatic decrease in the impact of pain severity on relations compared to that at day 1 in the intervention group, with 85 percent reporting 'no pain interference' with relations with other people at this phase.

Table 4.61 The impact of pain *on relations with other people* at the end of the intervention (week 4)

	Week 4										
	Relations with other people										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(68)	(0)	(2)	(1)	(2)	(2)	(1)	(1)	(3)	(0)	(0)
%	85	0	2.5	1.3	2.5	2.5	1.3	1.3	3.8	0	0
Alternative intervention group (n=40)	(1)	(4)	(17)	(13)	(3)	(0)	(2)	(0)	(0)	(0)	(0)
%	2.5	10	42.5	32.5	7.5	0	5	0	0	0	0
Group with no intervention (n=40)	(3)	(7)	(12)	(11)	(6)	(0)	(1)	(0)	(0)	(0)	(0)
%	7.5	17.5	30	27.5	15	0	2.5	0	0	0	0

Participants in the alternative intervention group indicated a slightly increased impact

of pain severity on relations with other people in week 4 compared to the percentage at day 1. Participants in the group with no intervention reported a similar impact of pain severity on relations with other people as at day 1 (Table 4.61).

Table 4.62 shows that at the end of the follow-up period (week 6), there was a similar percentage of the impact of pain severity on relations with other people in participants in the intervention group compared to at the end of the intervention (week 4), but a lower percentage than at day 1. Impact of pain severity on relations with other people in participants in the alternative intervention group at the end of week 6 was similar to that at the end of week 4, but was lower than at day 1. In the group with no intervention, the impact of pain severity on relations with other people was similar to that at both the end of week 4 and at day 1.

Table 4.62 The impact of pain on *relations with other people* at the end of the follow-up period (week 6)

	Week 6										
	Relations with other people										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(64)	(0)	(2)	(5)	(1)	(1)	(1)	(2)	(2)	(2)	(0)
%	80	0	2.5	6.3	1.3	1.3	1.3	2.5	2.5	2.5	0
Alternative intervention group (n=40)	(2)	(9)	(19)	(10)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
%	5	22.5	47.5	25	0	0	0	0	0	0	0
Group with no intervention (n=40)	(0)	(11)	(23)	(5)	(0)	(1)	(0)	(0)	(0)	(0)	(0)
%	0	27.5	57.5	12.5	0	2.5	0	0	0	0	0

The impact of pain on sleep in participants in the intervention group at day 1 was reported as ‘severely interfere’ (rating 7-10) at 32.6 percent, ‘not interfere’ at 26.3 percent, ‘mildly interfere’ (rating 1-4) at 25.1 percent and ‘moderately interfere’

(rating 5-6) at 16.3 percent. Most participants in the other two groups reported the impact of their pain severity on sleep as 'mildly interfere' at 90 percent at day 1 (Table 4.63).

Table 4.63 The impact of pain *on sleep* at day 1

	Day 1										
	Sleep										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(21)	(1)	(7)	(8)	(4)	(8)	(5)	(11)	(6)	(4)	(5)
%	26.3	1.3	8.8	10	5	10	6.3	13.8	7.5	5	6.3
Alternative intervention group (n=40)	(2)	(17)	(11)	(4)	(4)	(0)	(1)	(1)	(0)	(0)	(0)
%	5	42.5	27.5	10	10	0	2.5	2.5	0	0	0
Group with no intervention (n=40)	(1)	(6)	(11)	(11)	(8)	(1)	(1)	(0)	(1)	(0)	(0)
%	2.5	15	27.5	27.5	20	2.5	2.5	0	2.5	0	0

At the end of the intervention (week 4), the impact of pain on sleep in participants in the intervention group was dramatically decreased compared to at day 1. In both the alternative intervention group and the group with no intervention there was a similar impact of pain severity on sleep at this phase as at day 1 (see Table 4.64).

As illustrated in Table 4.65, at the end of the follow-up period (week 6), the impact of pain on sleep in participants in the intervention group was slightly increased compared to at the end of the intervention (week 4), but was lower than at day 1. There was a similar impact of pain severity on sleep in participants in the other two groups at this phase compared to at the end of week 4 and at day 1.

Table 4.64 The impact of pain *on sleep* at the end of the intervention (week 4)

	Week 4										
	Sleep										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(52)	(5)	(3)	(2)	(2)	(3)	(5)	(5)	(1)	(2)	(0)
%	65	6.3	3.8	2.5	2.5	3.8	6.3	6.3	1.3	2.5	0
Alternative intervention group (n=40)	(0)	(3)	(14)	(14)	(6)	(2)	(1)	(0)	(0)	(0)	(0)
%	0	7.5	35	35	15	5	2.5	0	0	0	0
Group with no intervention (n=40)	(0)	(6)	(10)	(15)	(8)	(0)	(1)	(0)	(0)	(0)	(0)
%	0	15	25	37.5	20	0	2.5	0	0	0	0

Table 4.65 The impact of pain *on sleep* at the end of the follow-up period (week 6)

	Week 6										
	Sleep										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(47)	(1)	(1)	(6)	(3)	(4)	(2)	(1)	(8)	(4)	(3)
%	58.8	1.3	1.3	7.5	3.8	5	2.5	1.3	10	5	3.8
Alternative intervention group (n=40)	(1)	(7)	(19)	(10)	(3)	(0)	(0)	(0)	(0)	(0)	(0)
%	2.5	17.5	47.5	25	7.5	0	0	0	0	0	0
Group with no intervention (n=40)	(0)	(11)	(24)	(4)	(0)	(1)	(0)	(0)	(0)	(0)	(0)
%	0	27.5	60	10	0	2.5	0	0	0	0	0

The impact of pain on enjoyment of life at day 1 in the intervention group was described as ‘mildly interfere’ (rating 1-4) at 37.6 percent, ‘severely interfere’ (rating 1-7) at 25.2 percent, ‘moderately interfere’ (rating 5-6) at 21.3 percent and ‘not interfere’ at 16.3 percent. In both the alternative intervention group and the group with no intervention, most participants expressed the impact of pain on enjoyment of life as ‘mildly interfere’ at 87.5 and 77.5 percent respectively at day 1 (Table 4.66).

Table 4.66 The impact of pain *on enjoyment of life* at day 1

	Day 1										
	Enjoyment of life										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(13)	(2)	(7)	(8)	(13)	(12)	(5)	(11)	(7)	(1)	(1)
%	16.3	2.5	8.8	10	16.3	15	6.3	13.8	8.8	1.3	1.3
Alternative intervention group (n=40)	(1)	(10)	(15)	(6)	(4)	(2)	(1)	(1)	(0)	(0)	(0)
%	2.5	25	37.5	15	10	5	2.5	2.5	0	0	0
Group with no intervention (n=40)	(0)	(0)	(3)	(11)	(17)	(6)	(1)	(0)	(2)	(0)	(0)
%	0	0	7.5	27.5	42.5	15	2.5	0	5	0	0

At the end of the intervention (week 4), the impact of pain *on enjoyment of life* in participants in the intervention group was dramatically decreased from the impact at day 1 (Table 4.67). There was a similar impact of pain severity on enjoyment of life in participants in the other two groups at the end of week 4 compared to that at day 1 (Table 4.67).

Finally, as shown in Table 4.68, at the end of the follow-up period (week 6), the impact of pain on enjoyment of life was slightly increased in participants in the intervention group compared to at the end of the intervention (week 4), but it was still lower than at day 1. There was a similar impact of pain severity on enjoyment of life in participants in the alternative intervention group at this week compared to at the end of week 4 and at day 1. In the group with no intervention, the impact of pain severity on enjoyment of life had decreased slightly compared to at the end of week 4 and at day 1.

Table 4.67 The impact of pain *on enjoyment of life* at the end of the intervention (week 4)

	Week 4										
	Enjoyment of life										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(45)	(4)	(6)	(6)	(4)	(11)	(0)	(1)	(2)	(1)	(0)
%	56.3	5	7.5	7.5	5	13.8	0	1.3	2.5	1.3	0
Alternative intervention group (n=40)	(0)	(0)	(3)	(26)	(8)	(0)	(3)	(0)	(0)	(0)	(0)
%	0	0	7.5	65	20	0	7.5	0	0	0	0
Group with no intervention (n=40)	(0)	(0)	(1)	(13)	(19)	(5)	(1)	(0)	(1)	(0)	(0)
%	0	0	2.5	32.5	47.5	12.5	2.5	0	2.5	0	0

Table 4.68 The impact of pain *on enjoyment of life* at the end of the follow-up period (week 6)

	Week 6										
	Enjoyment of life										
	0	1	2	3	4	5	6	7	8	9	10
Intervention group (n=80)	(36)	(3)	(4)	(11)	(8)	(8)	(3)	(2)	(3)	(2)	(0)
%	45	3.8	5	13.8	10	10	3.8	2.5	3.8	2.5	0
Alternative intervention group (n=40)	(0)	(0)	(4)	(16)	(16)	(2)	(2)	(0)	(0)	(0)	(0)
%	0	0	10	40	40	5	5	0	0	0	0
Group with no intervention (n=40)	(0)	(0)	(0)	(33)	(5)	(1)	(1)	(0)	(1)	(0)	(0)
%	0	0	0	82.5	12.5	2.5	2.5	0	2.5	0	0

4.3 The Short-Form-36 Health Survey

Sections 4.3.1 to 4.3.11 present eleven questions from the Short-Form-36 Health Survey (SF-36) which was used to assess the participants' quality of life. Each section begins with the question, followed by textual explanation and tabular representation of the results.

4.3.1 Assessment of the participants' general health as shown in the SF-36 question 1 '*1 In general, would you say your health is*:'

Excellent	Very good	Good	Fair	Poor
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

Table 4.69 illustrates that most participants in the intervention group, the alternative intervention group and the group with no intervention viewed their general health as 'fair' at 68.8, 75 and 77.5 percent respectively. Participants in the intervention group reported higher percentages in the categories 'very good' and 'excellent' for their general health after receiving 8 sessions of foot reflexology (week 4). There was no difference in participants' perceptions of their general health at week 4 compared to percentages at day 1 in the other two groups. At the end of the follow-up period (week 6), participants in the intervention group rated their general health as similar to that at day 1, while participants in the other two groups reported slightly poorer general health at this week compared to at the end of week 4 and day 1.

Table 4.69 General health in each group at day 1, week 4 and week 6

General health	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Excellent	(0)	0	(0)	0	(0)	0
Very good	(0)	0	(1)	2.5	(0)	0
Good	(15)	18.8	(6)	15	(6)	15
Fair	(55)	68.8	(30)	75	(31)	77.5
Poor	(10)	12.5	(3)	7.5	(3)	7.5
Week 4						
Excellent	(3)	3.8	(0)	0	(0)	0
Very good	(7)	8.8	(0)	0	(0)	0
Good	(11)	13.8	(10)	25	(10)	25
Fair	(56)	70	(27)	67.5	(29)	72.5
Poor	(3)	3.8	(3)	7.5	(1)	2.5
Week 6						
Excellent	(2)	2.5	(0)	0	(0)	0
Very good	(1)	1.3	(0)	0	(0)	0
Good	(15)	18.8	(6)	15	(3)	7.5
Fair	(56)	70	(33)	82.5	(36)	90
Poor	(6)	7.5	(1)	2.5	(1)	2.5

4.3.2 Changes in participants' health evaluated by question 2; *'2. Compared to one year ago, how would you rate your health in general now?' This question is not counted in scoring the eight dimensions but is used to estimate changes in health from a cross-sectional administration of the SF-36.*

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

Table 4.70 shows that participants in the intervention group reported their recent health status compared to last year as 'somewhat worse now than one year ago' at 40 percent and as 'much worse now than one year ago' at 21.3 percent. This compares with reported health evaluation as 'about the same as one year ago' at 55 percent in participants from the alternative intervention group and 57.5 percent in the group with no intervention. Both of these groups evaluated their health as 'somewhat worse

now than one year ago' at 42.5 percent.

Table 4.70 Recent health status in all groups at day 1, week 4 and week 6 compared to last year

Recent health status compared to last year	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Much better now than one year ago	(8)	10	(1)	2.5	(0)	0
Somewhat better now than one year ago	(10)	12.5	(0)	0	(0)	0
About the same as one year ago	(13)	16.3	(22)	55	(23)	57.5
Somewhat worse now than one year ago	(32)	40	(15)	37.5	(15)	37.5
Much worse now than one year ago	(17)	21.3	(2)	5	(2)	5
Week 4						
Much better now than one year ago	(12)	15	(0)	0	(0)	0
Somewhat better now than one year ago	(15)	18.8	(0)	0	(0)	0
About the same as one year ago	(12)	15	(29)	72.5	(16)	40
Somewhat worse now than one year ago	(21)	26.3	(9)	22.5	(24)	60
Much worse now than one year ago	(20)	25	(2)	5	(0)	0
Week 6						
Much better now than one year ago	(13)	16.3	(0)	0	(0)	0
Somewhat better now than one year ago	(9)	11.3	(1)	2.5	(0)	0
About the same as one year ago	(12)	15	(23)	57.5	(16)	40
Somewhat worse now than one year ago	(26)	32.5	(15)	37.5	(23)	57.5
Much worse now than one year ago	(20)	25	(1)	2.5	(1)	2.5

4.3.3 Daily activities in the participants as per question 3 *'3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?'*

	Yes, limited a lot ▼	Yes, limited a little ▼	No, not limited at all ▼
a. *Vigorous activities*, such as running, lifting heavy objects, participating in strenuous sports	☐1	☐2	☐3
b. *Moderate activities*, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	☐1	☐2	☐3
c. Lifting or carrying groceries	☐1	☐2	☐3
d. Climbing *several* flights of stairs	☐1	☐2	☐3
e. Climbing *one* flight of stairs	☐1	☐2	☐3
f. Bending, kneeling, or stooping	☐1	☐2	☐3
g. Walking *more than a mile*	☐1	☐2	☐3
h. Walking *several blocks*	☐1	☐2	☐3
i. Walking *one block*	☐1	☐2	☐3
j. Bathing or dressing yourself	☐1	☐2	☐3

As shown in Table 4.71, 53.8 percent of participants in the intervention group reported that pain limited their vigorous activities such as running, lifting heavy objects and participating in strenuous sports a lot at day 1. Participants in the alternative intervention group (65%) and the group with no intervention (52.5%) reported pain limiting such activities a little. At the end of week 4 there was a decrease in limitation in vigorous activities in participants in the three groups compared to levels reported at day 1. Limitation in such activities at the end of the follow-up period (week 6) was similar to that at the end of week 4 in the intervention group, but lower than at day 1. Limitation in vigorous activities in participants in the alternative intervention group at week 6 was similar to that at the end of week 4, but had decreased from day 1. In the group with no intervention, limitation in such activities at week 6 had increased slightly from reported levels at the end of week 4, but had decreased slightly from levels at day 1.

Table 4.71 Limitation in activities according to health status in response to the question, *'Vigorous activities such as running, lifting heavy objects, participating in strenuous sports'*

Limitation in vigorous activities	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(43)	53.8	(8)	20	(10)	25
Yes, limited a little	(23)	28.8	(26)	65	(21)	52.5
No, not limited at all	(14)	17.5	(6)	15	(9)	22.5
Week 4						
Yes, limited a lot	(34)	42.5	(9)	22.5	(7)	17.5
Yes, limited a little	(25)	31.3	(19)	47.5	(20)	50
No, not limited at all	(21)	26.3	(12)	30	(13)	32.5
Week 6						
Yes, limited a lot	(33)	41.3	(5)	12.5	(4)	10
Yes, limited a little	(23)	28.8	(20)	50	(27)	67.5
No, not limited at all	(24)	30	(15)	37.5	(9)	22.5

Table 4.72 presents the results from the question about limitation of moderate activities such as moving a table, pushing a vacuum cleaner, bowling or playing golf. At day 1, half the participants in the intervention group reported they had no limitation in such activities and 37.5 percent reported only a little limitation. Most participants in the alternative intervention group and the group with no intervention reported a little limitation in doing these activities. At the end of the intervention (week 4), participants in the intervention group reported decreased limitation in moderate activities compared to limitations at day 1, while those in the other two groups reported slightly decreased limitation in these activities at week 4 compared to day 1. At the end of the follow-up period (week 6), participants in the intervention group reported decreased limitation in such activities from that at both the end of the intervention (week 4) and day 1. Limitation in these activities decreased slightly in both of the other groups at this phase compared to at the end of week 4 and day 1.

Table 4.72 Limitation in activities according to health status in the question, *'Moderate activities such as moving a table, pushing a vacuum cleaner, bowling, or playing golf'*

Limitation in moderate activities	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(10)	12.5	(7)	17.5	(9)	22.5
Yes, limited a little	(30)	37.5	(26)	65	(22)	55
No, not limited at all	(40)	50	(7)	17.5	(9)	22.5
Week 4						
Yes, limited a lot	(6)	7.5	(7)	17.5	(7)	17.5
Yes, limited a little	(20)	25	(20)	50	(20)	50
No, not limited at all	(54)	67.5	(13)	32.5	(13)	32.5
Week 6						
Yes, limited a lot	(6)	7.5	(3)	7.5	(2)	5
Yes, limited a little	(11)	13.8	(20)	50	(27)	67.5
No, not limited at all	(63)	78.8	(17)	42.5	(11)	27.5

Table 4.73 shows that fifty percent of participants in the intervention group reported no limitation in lifting or carrying groceries at day 1. Most participants in the alternative intervention group and the group with no intervention reported they had a little limitation in these activities at day 1. At the end of week 4, there was a decrease of limitation in lifting or carrying groceries in participants in all three groups compared to day 1. At the end of the follow-up period (week 6), there was a slight decrease in limitation in such activities in participants in the intervention group and in the alternative intervention group. Whilst there was a slightly increased limitation in these activities in participants in the group with no intervention compared to the end of week 4, they reported a slight decrease in limitation compared to day 1.

Table 4.73 Limitation in activities according to health status in the question, *'Lifting or carrying groceries'*

Limitation in Lifting or carrying groceries	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(17)	21.3	(3)	7.5	(6)	15
Yes, limited a little	(23)	28.8	(28)	70	(22)	55
No, not limited at all	(40)	50	(9)	22.5	(12)	30
Week 4						
Yes, limited a lot	(10)	12.5	(4)	10	(0)	0
Yes, limited a little	(8)	10	(12)	30	(12)	30
No, not limited at all	(62)	77.5	(24)	60	(28)	70
Week 6						
Yes, limited a lot	(5)	6.3	(0)	0	(1)	2.5
Yes, limited a little	(9)	11.3	(15)	37.5	(25)	62.5
No, not limited at all	(66)	82.5	(25)	62.5	(14)	35

The next table (Table 4.74) shows that almost 50 percent of participants in the intervention group reported they did not have a limitation in climbing several flights of stairs at day 1, while most of the participants in the other two groups reported

having a little limitation in this activity. At the end of the intervention (week 4), the intervention group reported a decrease in limitation in climbing several flights of stairs compared to day 1. The alternative intervention group reported an increase in limitation in such activity compared to day 1, while the group with no intervention reported a similar limitation to that at day 1. At the end of the follow-up period (week 6), the limitation in climbing several flights of stairs in participants in the intervention group was similar to that at the end of the intervention (week 4) but less than that at day 1. There was a slight decrease in this limitation in participants in the alternative intervention group compared to at the end of week 4, but it was similar to that at day 1. In the group with no intervention, there was an increase in this limitation at week 6 compared to at the end of week 4 and at day 1.

Table 4.74 Limitation in activities according to health status in the question, *'Climbing several flights of stairs'*

Limitation in Climbing several flights of stairs	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(15)	18.8	(7)	17.5	(9)	22.5
Yes, limited a little	(26)	32.5	(27)	67.5	(22)	55
No, not limited at all	(39)	48.8	(6)	15	(9)	22.5
Week 4						
Yes, limited a lot	(9)	11.3	(17)	42.5	(7)	17.5
Yes, limited a little	(19)	23.8	(19)	47.5	(27)	67.5
No, not limited at all	(52)	65	(4)	10	(6)	15
Week 6						
Yes, limited a lot	(7)	8.8	(10)	25	(28)	70
Yes, limited a little	(20)	25	(24)	60	(11)	27.5
No, not limited at all	(53)	66.3	(6)	15	(1)	2.5

As shown in Table 4.75, at day 1 61.3 percent of participants in the intervention group reported no limitation in climbing one flight of stairs, while most participants

in both of the other groups reported a little limitation in this activity. However, at the end of the intervention (week 4), there was a decrease in limitation in climbing one flight of stairs in participants in this group compared to at day 1. There was an increase in this limitation in participants in the alternative intervention group compared to the limitation at day 1, and a slight decrease in such limitation in participants in the group with no intervention compared to that reported at day 1. At the end of the follow-up period (week 6), 86.3 percent of participants in the intervention group reported 'no limitation' in this activity. This was a slight increase from the percentage at the end of the intervention (week 4) and a reasonable increase compared to day 1. There was a significantly lower limitation in climbing one flight of stairs in participants in the alternative intervention group at this phase compared to at the end of week 4 and at day 1. Over half the participants in the group with no intervention reported a lot of limitation in this activity at this phase compared to at the end of week 4 and at day 1.

Table 4.75 Limitation in activities according to health status in the question, *'Climbing one flight of stairs'*

Limitation in Climbing one flight of stairs	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(9)	11.3	(8)	20	(9)	22.5
Yes, limited a little	(22)	27.5	(25)	62.5	(22)	55
No, not limited at all	(49)	61.3	(7)	17.5	(9)	22.5
Week 4						
Yes, limited a lot	(1)	1.3	(17)	42.5	(5)	12.5
Yes, limited a little	(16)	20	(19)	47.5	(21)	52.5
No, not limited at all	(63)	78.8	(4)	10	(14)	35
Week 6						
Yes, limited a lot	(2)	2.5	(7)	17.5	(21)	52.5
Yes, limited a little	(9)	11.3	(18)	45	(13)	32.5
No, not limited at all	(69)	86.3	(15)	37.5	(6)	15

As shown in Table 4.76, at day 1 45 percent of the participants in the intervention group reported no limitation in bending, kneeling or stooping, and 30 percent reported a little limitation in these activities. Most participants in the alternative intervention group (67.5 percent) and the group with no intervention (52.5 percent) reported a little limitation in such activities at day 1. At the end of the intervention (week 4), a greater percentage of participants in the intervention group reported no limitation in those activities compared to levels at day 1. Participants in the alternative intervention group reported a limitation in bending, kneeling or stooping similar to day 1 in. There was a slightly decreased limitation in such activities in participants in the group with no intervention at week 4 compared to day 1.

Table 4.76 Limitation in activities according to health status in the question, '*Bending, kneeling or stooping*'

Limitation in Bending, kneeling, or stooping	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(20)	25	(8)	20	(9)	22.5
Yes, limited a little	(24)	30	(27)	67.5	(21)	52.5
No, not limited at all	(36)	45	(5)	12.5	(10)	25
Week 4						
Yes, limited a lot	(8)	10	(9)	22.5	(1)	2.5
Yes, limited a little	(21)	26.3	(28)	70	(34)	85
No, not limited at all	(51)	63.8	(3)	7.5	(5)	12.5
Week 6						
Yes, limited a lot	(12)	15	(3)	7.5	(9)	22.5
Yes, limited a little	(22)	27.5	(30)	75	(29)	72.5
No, not limited at all	(46)	57.5	(7)	17.5	(2)	5

At the end of the follow-up period (week 6), participants in the intervention group reported a similar limitation in bending, kneeling or stooping as at the end of the intervention (week 4), but this limitation was lower than at day 1. The alternative

intervention group was similar at week 6 to at the end of week 4 and day 1. In the group with no intervention, there was increased limitation in such activities at this phase compared to at the end of week 4 and at day 1.

The next table (Table 4.77) shows that some participants in the intervention group reported having a lot of limitation in walking more than a mile (38.8%) at day 1 and 36.3 percent reported no limitation at all in doing this activity. Most participants in the alternative intervention group and the group with no intervention reported they had a little limitation in such activity at 62.5 and 50 percent respectively at day 1.

Table 4.77 Limitation in activities according to health status in the question, '*Walking more than a mile*'

Limitation in Walking more than a mile	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(31)	38.8	(9)	22.5	(11)	27.5
Yes, limited a little	(20)	25	(25)	62.5	(20)	50
No, not limited at all	(29)	36.3	(6)	15	(9)	22.5
Week 4						
Yes, limited a lot	(20)	25	(26)	65	(23)	57.5
Yes, limited a little	(15)	18.8	(12)	30	(13)	32.5
No, not limited at all	(45)	56.3	(2)	5	(4)	10
Week 6						
Yes, limited a lot	(22)	27.5	(25)	62.5	(37)	92.5
Yes, limited a little	(10)	12.5	(15)	37.5	(3)	7.5
No, not limited at all	(48)	60	(0)	0	(0)	0

Compared to day 1, at the end of the intervention (week 4) there was a decrease in limitation in walking more than a mile in participants in the intervention group and an increase in limitation in doing this activity in both of the other groups. At the end of the follow-up period (week 6), there was similar limitation in walking more than a mile in participants in the intervention group compared to at the end of the

intervention (week 4), and a lower limitation than that at day 1. In contrast, while there was similar limitation in such activity in participants in the alternative intervention group in this week compared to at the end of week 4, it was higher in limitation than at day 1. In the group with no intervention, there was increased limitation in walking more than a mile in this week compared to at the end of week 4 and at day 1.

As shown in Table 4.78, over a half the participants in the intervention group reported that they had no limitation at all in walking several blocks at day 1. Most participants in both of the other groups reported that they had a little limitation in such activity at day 1. At the end of the intervention (week 4), there was a higher percentage of participants in the intervention group who reported ‘no limitation’ in walking several blocks than at day 1. There was increased limitation in doing this activity in both of the other groups at this phase compared to at day 1. At the end of the follow-up period (week 6), limitation in walking several blocks in participants in the intervention group was similar to that at the end of the intervention (week 4), but it was lower than at day 1. There was slightly decreased limitation in this activity in participants in the alternative intervention group at week 6 compared to at the end of week 4, but slightly increased limitation compared to that at day 1. Participants in the group with no intervention reported increased limitation in walking several blocks at week 6 compared to at the end of week 4 and at day 1.

Table 4.78 Limitation in activities according to health status in the question, *'Walking several blocks'*

Limitation in Walking several blocks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(13)	16.3	(9)	22.5	(10)	25
Yes, limited a little	(26)	32.5	(26)	65	(21)	52.5
No, not limited at all	(41)	51.3	(5)	12.5	(9)	22.5
Week 4						
Yes, limited a lot	(5)	6.3	(25)	62.5	(13)	32.5
Yes, limited a little	(13)	16.3	(12)	30	(19)	47.5
No, not limited at all	(62)	77.5	(3)	7.5	(8)	20
Week 6						
Yes, limited a lot	(7)	8.8	(15)	37.5	(26)	65
Yes, limited a little	(13)	16.3	(20)	50	(14)	35
No, not limited at all	(60)	75	(5)	12.5	(0)	0

It can be seen from Table 4.79 that at day 1, 70 percent of participants in the intervention group reported that they had no limitation at all in walking one block whereas most participants in both of the other groups reported a little limitation in this activity. At the end of the intervention (week 4), a greater percentage of participants in the intervention group reported no limitation at all in walking one block than at day 1. There was greater limitation in this activity in participants in the alternative intervention group at this phase in comparison to day 1, while there was less limitation in walking one block in participants in the group with no intervention at this phase in comparison to day 1. At the end of the follow-up period (week 6), participants in the intervention group reported a similar limitation in walking one block to that at the end of the intervention (week 4), but less limitation than at day 1. There was a decrease in limitation in walking one block in participants in the alternative intervention group at week 6 compared to at the end of week 4 and at day 1. In the group with no intervention, there was a slightly increased limitation in

walking one block at this phase compared to at the end of week 4 and at day 1.

Table 4.79 Limitation in activities according to health status in the question, '*Walking one block*'

Limitation in walking one block	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(4)	5	(5)	12.5	(9)	22.5
Yes, limited a little	(20)	25	(29)	72.5	(22)	55
No, not limited at all	(56)	70	(6)	15	(9)	22.5
Week 4						
Yes, limited a lot	(1)	1.3	(20)	50	(8)	20
Yes, limited a little	(8)	10	(16)	40	(18)	45
No, not limited at all	(71)	88.8	(4)	10	(14)	35
Week 6						
Yes, limited a lot	(0)	0	(5)	12.5	(8)	20
Yes, limited a little	(12)	15	(23)	57.5	(30)	75
No, not limited at all	(68)	85	(12)	30	(2)	5

For the question 'Bathing or dressing yourself', Table 4.80 shows that at day 1, 90 percent of participants in the intervention group reported that they had no limitation in bathing or dressing themselves, while 72.5 percent of participants in the alternative intervention group and 65 percent of participants in the group with no intervention reported they had a little limitation in doing this activity. At the end of the intervention (week 4), participants in the intervention group reported slightly less limitation in bathing or dressing themselves compared to day 1. There was less limitation in these activities in participants in both of the other groups at this phase compared to day 1. At the end of the follow-up period (week 6), participants in the intervention group reported slightly less limitation in bathing or dressing themselves compared to at the end of the intervention (week 4) and at day 1. There was less limitation in these activities in participants in the alternative intervention group at

this phase compared to at the end of week 4 and day 1. Participants in the group with no intervention reported similar limitation levels to those at the end of week 4, but lower levels than at day 1.

Table 4.80 Limitation in activities according to health status in the question, *'Bathing or dressing yourself'*

Limitation in Bathing or dressing yourself	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes, limited a lot	(1)	1.3	(1)	2.5	(1)	2.5
Yes, limited a little	(7)	8.8	(29)	72.5	(26)	65
No, not limited at all	(72)	90	(10)	25	(13)	32.5
Week 4						
Yes, limited a lot	(0)	0	(0)	0	(0)	0
Yes, limited a little	(4)	5	(10)	25	(13)	32.5
No, not limited at all	(76)	95	(30)	75	(27)	67.5
Week 6						
Yes, limited a lot	(0)	0	(1)	2.5	(0)	0
Yes, limited a little	(1)	1.3	(6)	15	(16)	40
No, not limited at all	(79)	98.8	(33)	82.5	(24)	60

4.3.4 During the *past 4 weeks*, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	Yes ▼	No ▼
a. Cut down on the *amount of time* you spent on work or other activities	☐1	☐2
b. *Accomplished less* than you would like	☐1	☐2
c. Were limited in the *kind* of work or other activities	☐1	☐2
d. Had *difficulty* performing the work or other activities (for example, it took extra effort)	☐1	☐2

It can be seen from Table 4.81 that most participants in the three study groups had to cut down on the amount of time they spent on work or other activities because of their physical health. At the end of week 4, the percentage of participants in the three study groups who had to cut down on the amount of time they spent on work or other

activities was similar to day 1. At the end of the follow-up period (week 6), the percentage of participants in the intervention group and in the alternative intervention group who had to cut down on the amount of time they spent on work or other activities was lower than at the end of week 4 and at day 1. The percentage of participants in the group with no intervention who had to cut down on the amount of time they spent on work or other activities was much higher than at the end of week 4 and at day 1.

Table 4.81 Problems with work or other regular daily activities as a result of physical health impacting on '*Cut down on the amount of time you spent on work or other activities*'

Cut down on the amount of time spent on work or other activities	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(49)	61.3	(28)	70	(29)	72.5
No	(31)	38.8	(12)	30	(11)	27.5
Week 4						
Yes	(51)	63.8	(31)	77.5	(26)	65
No	(29)	36.3	(9)	22.5	(14)	35
Week 6						
Yes	(42)	52.5	(26)	65	(36)	90
No	(38)	47.5	(14)	35	(4)	10

Table 4.82 shows that most participants in the three study groups accomplished their work or regular daily activities less than they would like. At the end of week 4, the percentage of participants in both the intervention group and the alternative intervention group who reported that they accomplished their work or regular daily activities less than they would like was similar to that at day 1. However, in the group with no intervention the percentage of participants who reported that they accomplished their work or regular daily activities less than they would like was lower at this phase than at day 1. At the end of the follow-up period (week 6), the

percentage of participants in the intervention group who reported that they accomplished their work or regular daily activities less than they would like was lower than at the end of the intervention (week 4) and at day 1. The percentage of participants in the alternative intervention group who reported that they accomplished their work or regular daily activities less than they would like was similar to that at the end of week 4 and at day 1. A higher percentage of participants in the group with no intervention reported that they accomplished their work or regular daily activities less than they would like compared with the end of week 4 and at day 1.

Table 4.82 Problems with work or other regular daily activities as a result of physical health impacting on '*Accomplished less than you would like*'

Accomplished less than one would like	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(57)	71.3	(29)	72.5	(28)	70
No	(23)	28.8	(11)	27.5	(12)	30
Week 4						
Yes	(55)	68.8	(30)	75	(34)	85
No	(25)	31.3	(10)	25	(6)	15
Week 6						
Yes	(46)	57.5	(29)	72.5	(38)	95
No	(34)	42.5	(11)	27.5	(2)	5

Most participants in the three study groups reported they had a limitation in doing particular kinds of work or activities at day 1 (see Table 4.83). At the end of the intervention (week 4), there was a slightly decreased percentage of participants in the intervention group who had a limitation in doing their regular kind of work or activities compared to that at day 1. The alternative intervention group reported a similar percentage of limitation in doing particular kinds of work or activities at both

this phase and at day 1, while a decreased percentage of the group with no intervention reported they had limitation in doing particular kinds of work or other activities at this phase compared to at day 1. At the end of the follow-up period (week 6), a higher percentage of participants in each group reported they had no limitation in doing their regular kind of work or activities compared to at the end of week 4 and at day 1 (Table 4.83).

Table 4.83 Problems with work or other regular daily activities as a result of physical health impacting on '*Were limited in the kind of work or other activities*'

Limitation in the kind of work or other activities	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(51)	63.8	(24)	60	(22)	55
No	(29)	36.3	(16)	40	(18)	45
Week 4						
Yes	(46)	57.5	(24)	60	(13)	32.5
No	(34)	42.5	(16)	40	(27)	67.5
Week 6						
Yes	(37)	46.3	(13)	32.5	(10)	25
No	(43)	53.8	(27)	67.5	(30)	75

Most participants in each of the three groups reported having difficulty in performing their work or other activities at day 1, as shown in Table 4.84. At the end of the intervention (week 4), participants in the intervention group reported a similar percentage of difficulty in performing their work or other activities as at day 1. There was an increased percentage of participants in both of the other groups who reported difficulty in performing their work or other activities at the end of week 4 compared to that at day 1. At the end of the follow-up period (week 6), there was a slightly lower percentage of participants in the intervention group who reported having difficulty in performing their work or other activities than at both the end of

intervention (week 4) and day 1. A similar percentage of participants in the alternative intervention group reported difficulty in performing their work or other activities at week 6 as at the end of week 4, but the week 6 level showed a slight increase from that at day 1. The group with no intervention reported a slight decrease in difficulty in performing their work or other activities in this week compared to at the end of week 4, but a slight increase compared to day 1.

Table 4.84 Problems with work or other regular daily activities as a result of physical health impacting on '*Had difficulty performing the work or other activities*'

Difficulty performing the work or other activities	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(61)	76.3	(29)	72.5	(26)	65
No	(19)	23.8	(11)	27.5	(14)	35
Week 4						
Yes	(59)	73.8	(35)	87.5	(36)	90
No	(21)	26.3	(5)	12.5	(4)	10
Week 6						
Yes	(53)	66.3	(32)	80	(32)	80
No	(27)	33.8	(8)	20	(8)	20

4.3.5 During the *past 4 weeks*, have you had any of the following problems with your work or other regular activities as a result of any emotional problems (such as feeling depressed or anxious)?

	Yes ▼	No ▼
a. Cut down on the *amount of time* you spent on work or other activities	☐1	☐2
b. *Accomplished less* than you would like	☐1	☐2
c. Did work or other activities *less carefully than usual*	☐1	☐2

It can be seen from Table 4.85 that most participants in each group had to cut down on the amount of time spent on their work or other activities due to emotional problems at day 1. At the end of the intervention (week 4), there was no change in

the percentage of participants in the intervention group who had to cut down on the amount of time spent on their work or other activities due to emotional problems compared to day 1. The alternative intervention group reported a slight decrease in the impact of emotional problems at this phase compared to at day 1, while participants in the group with no intervention reported a higher impact of emotional problems at this phase than at day 1. At the end of the follow-up period (week 6), the impact of emotional problems in participants in the intervention group was slightly decreased compared to at the end of the intervention (week 4), and was greatly decreased compared to that at day 1. In both of the other groups, emotional problems impacted less on participants' work or activities at this phase than at the end of week 4 and at day 1.

Table 4.85 Impact of problems with work or other regular activities as a result of any emotional problems on '*Cut down on the amount of time spent on work or other activities*'

Cut down on the amount of time spent on work or other activities	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(43)	53.8	(23)	57.5	(24)	60
No	(37)	46.3	(17)	42.5	(16)	40
Week 4						
Yes	(40)	50	(17)	42.5	(9)	22.5
No	(40)	50	(23)	57.5	(31)	77.5
Week 6						
Yes	(35)	43.8	(10)	25	(16)	40
No	(45)	56.3	(30)	75	(24)	60

Table 4.86 indicates that at day 1most participants in each group reported they accomplished their work or other regular activities less than they would like due to emotional problems. At the end of the intervention (week 4), there was a slightly decreased impact of emotional problems on work or other regular activities in

participants in the intervention group compared to that at day 1. There was a significant decrease in the impact of emotional problems on work or other regular activities in participants in both of the other groups this week compared to the impact at day 1. At the end of the follow-up period (week 6), there was a slight decrease in the impact of emotional problems on work or other regular activities in participants in the intervention group compared to at the end of the intervention (week 4), and a large decrease from the percentage reported at day 1. Participants in the alternative intervention group reported a similar impact of emotional problems on work or other regular activities in this week to that at the end of week 4, but a much decreased impact from that at day 1. In the group with no intervention, there was a slight increase in the impact of emotional problems on work or other regular activities in week 6 compared to at the end of week 4, but it was similar to the impact at day 1.

Table 4.86 Impact of problems with work or other regular activities as a result of any emotional problems on '*Accomplished less than one would like*'

Accomplished less than one would like	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(49)	61.3	(27)	67.5	(23)	57.5
No	(31)	38.8	(13)	32.5	(17)	42.5
Week 4						
Yes	(44)	55	(16)	40	(16)	40
No	(36)	45	(24)	60	(24)	60
Week 6						
Yes	(40)	50	(14)	35	(20)	50
No	(40)	50	(26)	65	(20)	50

Table 4.87 shows that most participants in the three groups reported emotional problems had caused them to work or perform other activities less carefully at day 1. At the end of the intervention (week 4), this impact had decreased slightly in

participants in the intervention group and significantly in participants in both of the other groups. At the end of the follow-up period (week 6), participants in the intervention group reported the impact as similar to that at the end of the intervention (week 4) but lower than at day 1. In both of the other groups, this impact was much lower at this phase than at the end of week 4 and at day 1.

Table 4.87 Impact of problems with work or other regular activities as a result of any emotional problems on '*Less carefully than usual*'

Did work or other activities less carefully than usual	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Yes	(48)	60	(25)	62.5	(20)	50
No	(32)	40	(14)	35	(20)	50
Week 4						
Yes	(44)	55	(14)	35	(12)	30
No	(36)	45	(26)	65	(28)	70
Week 6						
Yes	(41)	51.3	(7)	17.5	(3)	7.5
No	(39)	48.8	(33)	82.5	(37)	92.5

4.3.6 During the *past 4 weeks,* to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

Not at all	A little bit	Moderately	Quite a bit	Extremely
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

As shown in Table 4.88, all participants were asked about how much their physical health or emotional problems had interfered with their social activities in the past 4 weeks. It was found that at day 1, 60 percent of participants in the intervention group reported no interference with their social activities with family, friends, neighbours or groups, whereas 50 percent of participants in the alternative intervention group reported moderate interference. Over half the participants in the group with no

intervention reported a little bit of interference at day 1. At the end of the intervention (week 4), participants in the intervention group reported similar levels of interference to those at day 1, while both of the other groups reported less interference with such activities than at day 1. At the end of week 6, all three groups reported less interference than at the end of week 4 and at day 1.

Table 4.88 Extent to which physical health or emotional problems interfered with normal social activities with family, friends, neighbours, or groups

Interferences with normal social activities with family, friends, neighbours, or groups	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Not at all	(48)	60	(4)	10	(0)	0
A little bit	(10)	12.5	(8)	20	(21)	52.5
Moderately	(9)	11.3	(20)	50	(16)	40
Quite a bit	(5)	6.3	(8)	20	(3)	7.5
Extremely	(8)	10	(0)	0	(0)	0
Week 4						
Not at all	(41)	51.3	(1)	2.5	(9)	22.5
A little bit	(16)	20	(24)	60	(17)	42.5
Moderately	(12)	15	(14)	35	(14)	35
Quite a bit	(9)	11.3	(1)	2.5	(0)	0
Extremely	(2)	2.5	(0)	0	(0)	0
Week 6						
Not at all	(53)	66.3	(5)	12.5	(6)	15
A little bit	(12)	15	(21)	52.5	(25)	62.5
Moderately	(9)	11.3	(13)	32.5	(7)	17.5
Quite a bit	(3)	3.8	(1)	2.5	(1)	2.5
Extremely	(3)	3.8	(0)	0	(1)	2.5

4.3.7 How much *bodily* pain have you had during the *past 4 weeks*?

None ▼ ☐1 | Very mild ▼ ☐2 | Mild ▼ ☐3 | Moderate ▼ ☐4 | Severe ▼ ☐5 | Very severe ▼ ☐6

At day 1, as shown in Table 4.89, most participants in the intervention group, the alternative intervention group and the group with no intervention reported their

bodily pain during the *past 4 weeks* as moderate at 50, 70 and 65 percent respectively. The percentages of very mild to mild bodily pain during the *past 4 weeks* in participants in the intervention group, in the alternative intervention group and in the group with no intervention were reported at 21.5, 22.5 and 32.5 percent respectively. At the end of the intervention (week 4), the percentage of participants in the intervention group who reported their bodily pain during the *past 4 weeks* as very mild to mild, moderate, and severe to very severe was similar to that at day 1. Ten percent of these participants reported that they had no bodily pain in the *past 4 weeks.* More participants in the alternative intervention group reported their bodily pain during the *past 4 weeks* as very mild to mild at 52.5 percent, and as moderate at 45 percent at week 4. More participants in the group with no intervention reported their bodily pain during the *past 4 weeks* as very mild to mild at 50 percent, and as moderate at 45 percent at week 4. At the end of the follow-up period (week 6), a higher percentage of participants in the intervention group had no bodily pain during the *past 4 weeks* (16.3 percent) than at both week 4 and day 1 but reported similar percentages in other degrees of pain at all three time periods. Bodily pain during the *past 4 weeks* in participants in the alternative intervention group increased at week 6, with 65 percent of participants having moderate bodily pain and 35 percent having very mild to mild pain. Participants in the group with no intervention reported similar levels of bodily pain during the *past 4 weeks* to those at the end of week 4, but decreased levels compared to day 1.

Table 4.89 Bodily pain during the past 4 weeks

Bodily* pain during the *past 4 weeks	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Day 1						
None	(2)	2.5	(1)	2.5	(0)	0
Very mild	(11)	13.8	(4)	10	(5)	12.5
Mild	(9)	11.3	(5)	12.5	(8)	20
Moderate	(40)	50	(28)	70	(26)	65
Severe	(14)	17.5	(2)	5	(1)	2.5
Very severe	(4)	5	(0)	0	(0)	0
Week 4						
None	(8)	10	(0)	0	(0)	0
Very mild	(8)	10	(2)	5	(10)	25
Mild	(11)	13.8	(19)	47.5	(10)	25
Moderate	(35)	43.8	(18)	45	(18)	45
Severe	(15)	18.8	(1)	2.5	(2)	5
Very severe	(3)	3.8	(0)	0	(0)	0
Week 6						
None	(13)	16.3	(0)	0	(0)	0
Very mild	(9)	11.3	(2)	5	(4)	10
Mild	(12)	15	(12)	30	(14)	35
Moderate	(36)	45	(26)	65	(21)	52.5
Severe	(9)	11.3	(0)	0	(1)	2.5
Very severe	(1)	1.3	(0)	0	(0)	0

4.3.8 During the *past 4 weeks*, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

Table 4.90 presents the findings for the above question. At day 1, most participants in the three groups reported that pain had interfered a little bit to moderately with their normal work, both outside the home and housework, during *the past 4 weeks*. At the end of week 4, less impact of pain on normal work was found in the three groups compared to that at day 1. Twenty-five percent of participants in the intervention group reported having no pain interference with normal work, and 25

percent said they had a little bit of pain interference with such work. A higher percentage of having a little to moderate interference from pain was found in both of the other groups at week 4. At the end of the follow-up period (week 6), participants in the intervention group reported a higher percentage of having no impact from pain on normal work during the past 4 weeks, while impact of pain on normal work in both of the other groups was similar to at the end of week 4 but lower than at day 1.

Table 4.90 Pain Interference with normal work during the past 4 weeks

Pain Interference with normal work during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Not at all	(15)	18.8	(3)	7.5	(0)	0
A little bit	(25)	31.3	(7)	17.5	(8)	20
Moderately	(18)	22.5	(25)	62.5	(30)	75
Quite a bit	(13)	16.3	(5)	12.5	(2)	5
Extremely	(9)	11.3	(0)	0	(0)	0
Week 4						
Not at all	(20)	25	(1)	2.5	(0)	0
A little bit	(20)	25	(9)	22.5	(12)	30
Moderately	(14)	17.5	(29)	72.5	(25)	62.5
Quite a bit	(19)	23.8	(1)	2.5	(3)	7.5
Extremely	(7)	8.8	(0)	0	(0)	0
Week 6						
Not at all	(30)	37.5	(0)	0	(0)	0
A little bit	(12)	15	(4)	10	(10)	25
Moderately	(21)	26.3	(34)	85	(28)	70
Quite a bit	(11)	13.8	(1)	2.5	(2)	5
Extremely	(6)	7.5	(1)	2.5	(0)	0

4.3.9 These questions are about how you feel and how things have been with you during the *past 4 weeks*. For each question, please give the one answer that comes closest to the way you have been feeling for how much of the time during the *past 4 weeks*…

	All of the time ▼	Most of the time ▼	A good bit of the time ▼	Some of the time ▼	A little of the time ▼	None of the time ▼
a. Did you feel full of pep?	☐1	☐2	☐3	☐4	☐5	☐6
b. Have you been a very nervous person?	☐1	☐2	☐3	☐4	☐5	☐6
c. Have you felt so down in the dumps that nothing could cheer you up?	☐1	☐2	☐3	☐4	☐5	☐6
d. Have you felt calm and peaceful?	☐1	☐2	☐3	☐4	☐5	☐6
e. Did you have a lot of energy?	☐1	☐2	☐3	☐4	☐5	☐6
f. Have you felt downhearted and blue?	☐1	☐2	☐3	☐4	☐5	☐6
g. Did you feel worn out?	☐1	☐2	☐3	☐4	☐5	☐6
h. Have you been a happy person?	☐1	☐2	☐3	☐4	☐5	☐6
i. Did you feel tired?	☐1	☐2	☐3	☐4	☐5	☐6

Table 4.91 gives the results for ‘Did you feel full of pep?’ Most participants in the intervention group at day 1 said they felt full of pep during the *past 4 weeks* some of the time, most of the time and a little of the time, while participants in both of the other groups reported this feeling some of the time and a little of the time. At the end of the intervention (week 4), more participants in the intervention group reported they felt full of pep during the *past 4 weeks,* from a good bit of the time up to all of the time, than at day 1. The percentage of participants in both of the other groups feeling full of pep during the *past 4 weeks*, ranging from a good bit of the time down to a little of the time, was similar to that at day 1. At the end of the follow-up period (week 6), the feeling of full of pep during the *past 4 weeks* in participants in the intervention group was similar to that at the end of the intervention (week 4) but better than at day 1. There was little change in feeling full of pep during the *past 4*

weeks in participants in the alternative intervention group in this week compared to at the end of week 4 and at day 1. The feeling of being full of pep during the *past 4 weeks* decreased in participants in the group with no intervention in this week compared to at the end of week 4, but was better than at day 1.

Table 4.91 Feeling during the past 4 weeks for the question '*Did you feel full of pep?*'

'Did you feel full of pep?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(8)	10	(1)	2.5	(0)	0
Most of the time	(16)	20	(0)	0	(0)	0
A good bit of the time	(9)	11.3	(6)	15	(1)	2.5
Some of the time	(24)	30	(18)	45	(16)	40
A little of the time	(14)	17.5	(8)	20	(15)	37.5
None of the time	(9)	11.3	(7)	17.5	(8)	20
Week 4						
All of the time	(18)	22.5	(0)	0	(0)	0
Most of the time	(22)	27.5	(0)	0	(1)	2.5
A good bit of the time	(25)	31.3	(4)	10	(5)	12.5
Some of the time	(6)	7.5	(23)	57.5	(23)	57.5
A little of the time	(5)	6.3	(10)	25	(8)	20
None of the time	(4)	5	(3)	7.5	(3)	7.5
Week 6						
All of the time	(22)	27.5	(0)	0	(0)	0
Most of the time	(15)	18.8	(0)	0	(0)	0
A good bit of the time	(29)	36.3	(5)	12.5	(3)	7.5
Some of the time	(9)	11.3	(19)	47.5	(26)	65
A little of the time	(2)	2.5	(12)	30	(7)	17.5
None of the time	(3)	3.8	(4)	10	(4)	10

Table 4.92 shows results for the question 'Have you been a very nervous person?' At day 1, most participants in the intervention group reported being a very nervous person during the *past 4 weeks* from some of the time up to none of the time. Most participants in the other groups reported being a very nervous person during the *past*

4 weeks some of the time. At the end of the intervention (week 4), the feeling of having been a very nervous person was similar to that at day 1 for participants in the intervention group, while most participants in the other groups reported lower levels of being a very nervous person than at day 1. At the end of the follow-up period (week 6), all three groups reported the feeling of having been a very nervous person during the *past 4 weeks* as similar to that at the end of week 4 and at day 1.

Table 4.92 Feeling during the past 4 weeks for the question '*Have you been a very nervous person?*'

'Have you been a very nervous person?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(1)	1.3	(0)	0	(0)	0
Most of the time	(6)	7.5	(2)	5	(0)	0
A good bit of the time	(10)	12.5	(6)	15	(7)	17.5
Some of the time	(20)	25	(28)	70	(32)	80
A little of the time	(22)	27.5	(3)	7.5	(1)	2.5
None of the time	(21)	26.3	(1)	2.5	(0)	0
Week 4						
All of the time	(1)	1.3	(0)	0	(0)	0
Most of the time	(2)	2.5	(0)	0	(0)	0
A good bit of the time	(14)	17.5	(4)	10	(3)	7.5
Some of the time	(24)	30	(17)	42.5	(21)	52.5
A little of the time	(17)	21.3	(16)	40	(15)	37.5
None of the time	(22)	27.5	(3)	7.5	(1)	2.5
Week 6						
All of the time	(0)	0	(0)	0	(0)	0
Most of the time	(2)	2.5	(0)	0	(0)	0
A good bit of the time	(16)	20	(4)	10	(0)	0
Some of the time	(27)	33.8	(13)	32.5	(13)	32.5
A little of the time	(13)	16.3	(21)	52.5	(23)	57.5
None of the time	(22)	27.5	(2)	5	(4)	10

Table 4.93 shows results for participants' feeling of being down in the dumps. At day 1, most intervention group participants reported feeling so down nothing could cheer them up from some of the time up to none of the time during the *past 4 weeks*. Most

participants in the other groups reported feeling this way during the *past 4 weeks* some of the time. At the end of the intervention (week 4), participants in the intervention group gave a slightly better response to the feeling of being down and nothing could cheer them up than at day 1. Most participants in the other groups felt being down and nothing could cheer them up during the *past 4 weeks* less than at day 1. At the end of the follow-up period (week 6), participants in all three groups reported the feeling of being down and nothing could cheer them up during the *past 4 weeks* as similar to that at the end of week 4.

Table 4.93 Feeling during the past 4 weeks for the question '*Have you felt so down in the dumps that nothing could cheer you up?*'

'Have you felt so down in the dumps that nothing could cheer you up?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(2)	2.5	(0)	0	(0)	0
Most of the time	(3)	3.8	(2)	5	(0)	0
A good bit of the time	(8)	10	(3)	7.5	(7)	17.5
Some of the time	(10)	12.5	(26)	65	(29)	72.5
A little of the time	(20)	25	(6)	15	(3)	7.5
None of the time	(37)	46.3	(3)	7.5	(1)	2.5
Week 4						
All of the time	(0)	0	(0)	0	(0)	0
Most of the time	(2)	2.5	(0)	0	(0)	0
A good bit of the time	(11)	13.8	(7)	17.5	(5)	12.5
Some of the time	(11)	13.8	(12)	30	(15)	37.5
A little of the time	(15)	18.8	(17)	42.5	(19)	47.5
None of the time	(41)	51.3	(4)	10	(1)	2.5
Week 6						
All of the time	(0)	0	(0)	0	(0)	0
Most of the time	(3)	3.8	(0)	0	(0)	0
A good bit of the time	(5)	6.3	(4)	10	(1)	2.5
Some of the time	(13)	16.3	(14)	35	(13)	32.5
A little of the time	(16)	20	(19)	47.5	(22)	55
None of the time	(43)	53.8	(3)	7.5	(4)	10

As shown in Table 4.94, most participants in the intervention group reported that they felt calm and peaceful during the *past 4 weeks* a good bit of the time and some of the time at day 1. In both of the other groups, most participants reported that they felt calm and peaceful during the *past 4 weeks* some of the time and a little of the time at day 1.

Table 4.94 Feeling during the past 4 weeks for the question '*Have you felt calm and peaceful?*'

'Have you felt calm and peaceful?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(2)	2.5	(0)	0	(0)	0
Most of the time	(12)	15	(1)	2.5	(0)	0
A good bit of the time	(28)	35	(1)	2.5	(1)	2.5
Some of the time	(25)	31.3	(23)	57.5	(29)	72.5
A little of the time	(10)	12.5	(9)	22.5	(7)	17.5
None of the time	(3)	3.8	(6)	15	(3)	7.5
Week 4						
All of the time	(6)	7.5	(0)	0	(0)	0
Most of the time	(25)	31.3	(0)	0	(0)	0
A good bit of the time	(31)	38.8	(3)	7.5	(1)	2.5
Some of the time	(11)	13.8	(15)	37.5	(19)	47.5
A little of the time	(4)	5	(20)	50	(17)	42.5
None of the time	(3)	3.8	(2)	5	(3)	7.5
Week 6						
All of the time	(6)	7.5	(0)	0	(0)	0
Most of the time	(22)	27.5	(0)	0	(0)	0
A good bit of the time	(29)	36.3	(1)	2.5	(0)	0
Some of the time	(17)	21.3	(20)	50	(13)	32.5
A little of the time	(2)	2.5	(19)	47.5	(25)	62.5
None of the time	(4)	5	(0)	0	(2)	5

At the end of the intervention (week 4), most participants in the intervention group reported that they felt more calm and peaceful during the *past 4 weeks* a good bit of the time and most of the time than at day 1. Most participants in the alternative

intervention group reported that they felt less calm and peaceful during the *past 4 weeks* compared to how they felt at day 1, while participants in the group with no intervention reported a similar feeling of calm and peace during the *past 4 weeks* to that at day 1. At the end of the follow-up period (week 6), there was a slight decrease in the feeling of calm and peace during the *past 4 weeks* in participants in the intervention group compared to that at the end of the intervention (week 4), but it was higher than at day 1. The feeling of calm and peace during the *past 4 weeks* in participants in both of the other groups was similar to that at the end of week 4 but lower than at day 1.

Results for the question about having a lot of energy during the *past 4 weeks* are presented in Table 4.95. At day 1, most participants in the intervention group reported this as some of the time up to all of the time, while most participants in both of the other groups rated this feeling as some of the time down to a little of the time. At the end of the intervention (week 4), most participants in the intervention group reported higher levels of having a lot of energy during the *past 4 weeks* compared to those at day 1, whereas participants in both of the other groups reported similar levels of having a lot of energy during the *past 4 weeks* to those at day 1. At the end of the follow-up period (week 6), there was a slight decrease in having a lot of energy during the *past 4 weeks* in most participants in the intervention group compared to at the end of the intervention (week 4), but this was higher than at day 1. Participants in both of the other groups reported similar levels of having a lot of energy during the *past 4 weeks* to those at both the end of week 4 and day 1.

Table 4.95 Feeling during the past 4 weeks for the question '*Did you have a lot of energy?*'

'Did you have a lot of energy?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(6)	7.5	(0)	0	(0)	0
Most of the time	(17)	21.3	(0)	0	(0)	0
A good bit of the time	(18)	22.5	(5)	12.5	(0)	0
Some of the time	(19)	23.8	(17)	42.5	(19)	47.5
A little of the time	(13)	16.3	(12)	30	(15)	37.5
None of the time	(7)	8.8	(6)	15	(6)	15
Week 4						
All of the time	(15)	18.8	(0)	0	(0)	0
Most of the time	(19)	23.8	(0)	0	(0)	0
A good bit of the time	(31)	38.8	(6)	15	(4)	10
Some of the time	(8)	10	(17)	42.5	(20)	50
A little of the time	(6)	7.5	(16)	40	(15)	37.5
None of the time	(1)	1.3	(1)	2.5	(1)	2.5
Week 6						
All of the time	(17)	21.3	(0)	0	(0)	0
Most of the time	(16)	20	(0)	0	(0)	0
A good bit of the time	(27)	33.8	(4)	10	(2)	5
Some of the time	(12)	15	(17)	42.5	(26)	65
A little of the time	(8)	10	(18)	45	(9)	22.5
None of the time	(0)	0	(1)	2.5	(3)	7.5

In Table 4.96, the feeling of being downhearted and blue during the *past 4 weeks* in most participants in the intervention group is shown to range from some of the time up to none of the time, while this feeling in most participants in both of the other groups is at some of the time at day 1. At the end of the intervention (week 4), most participants in the intervention group reported similar ratings in feeling downhearted and blue during the *past 4 weeks* to those at day 1, whereas participants in both of the other groups reported lesser feelings of being downhearted and blue during the *past 4 weeks* than at day 1. At the end of the follow-up period (week 6), there was a slight increase in feeling downhearted and blue during the *past 4 weeks* in most participants

in the intervention group compared to at the end of the intervention (week 4), but the level was similar to that at day 1. Participants in both of the other groups reported a little decrease in feeling downhearted during the *past 4 weeks* compared to at the end of week 4 and day 1.

Table 4.96 Feeling during the past 4 weeks for the question '*Did you feel downhearted and blue?*'

'Have you felt downhearted and blue?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(1)	1.3	(0)	0	(0)	0
Most of the time	(5)	6.3	(1)	2.5	(0)	0
A good bit of the time	(8)	10	(4)	10	(2)	5
Some of the time	(12)	15	(28)	70	(36)	90
A little of the time	(16)	20	(5)	12.5	(2)	5
None of the time	(38)	47.5	(2)	5	(0)	0
Week 4						
All of the time	(1)	1.3	(0)	0	(0)	0
Most of the time	(4)	5	(0)	0	(0)	0
A good bit of the time	(12)	15	(6)	15	(2)	5
Some of the time	(12)	15	(22)	55	(22)	55
A little of the time	(16)	20	(9)	22.5	(15)	37.5
None of the time	(35)	43.8	(3)	7.5	(1)	2.5
Week 6						
All of the time	(0)	0	(0)	0	(0)	0
Most of the time	(4)	5	(0)	0	(0)	0
A good bit of the time	(9)	11.3	(2)	5	(1)	2.5
Some of the time	(21)	26.3	(26)	65	(12)	30
A little of the time	(11)	13.8	(10)	25	(20)	50
None of the time	(35)	43.8	(2)	5	(7)	17.5

Table 4.97 shows that most participants in the intervention group rated the feeling of being worn out during the *past 4 weeks* as 'a good bit of the time up to none of the time at day 1. Most participants in both of the other groups rated this feeling as a good bit of the time to some of the time at this phase. At the end of the intervention

(week 4), there was a decrease in the feeling of being worn out during the *past 4 weeks* in participants in the intervention group compared to the levels at day 1, whereas the feeling of being worn out during the *past 4 weeks* in participants in both of the other groups was similar to that at day 1.

Table 4.97 Feeling during the past 4 weeks for the question '*Did you feel worn out?*'

'Did you feel worn out?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(1)	1.3	(0)	0	(0)	0
Most of the time	(8)	10	(3)	7.5	(1)	2.5
A good bit of the time	(24)	30	(13)	32.5	(16)	40
Some of the time	(23)	28.8	(21)	52.5	(19)	47.5
A little of the time	(12)	15	(3)	7.5	(4)	10
None of the time	(12)	15	(0)	0	(0)	0
Week 4						
All of the time	(3)	3.8	(0)	0	(0)	0
Most of the time	(8)	10	(0)	0	(0)	0
A good bit of the time	(10)	12.5	(16)	40	(12)	30
Some of the time	(24)	30	(20)	50	(24)	60
A little of the time	(20)	25	(4)	10	(4)	10
None of the time	(15)	18.8	(0)	0	(0)	0
Week 6						
All of the time	(0)	0	(0)	0	(0)	0
Most of the time	(8)	10	(0)	0	(0)	0
A good bit of the time	(17)	21.3	(7)	17.5	(6)	15
Some of the time	(22)	27.5	(25)	62.5	(28)	70
A little of the time	(16)	20	(7)	17.5	(6)	15
None of the time	(17)	21.3	(1)	2.5	(0)	0

At the end of the follow-up period (week 6), the feeling of being worn out during the *past 4 weeks* in participants in the intervention group was slightly better than at the end of the intervention (week 4) and considerably better than at day 1. Participants in the alternative intervention group reported a decrease in the feeling of being worn out during the *past 4 weeks* compared to at both the end of week 4 and day 1.

Participants in the group with no intervention reported a slight decrease in the feeling of being worn out during the *past 4 weeks* from that at both the end of week 4 and day 1.

Table 4.98 presents results for the feeling of being a happy person during the *past 4 weeks*.

Table 4.98 Feeling during the past 4 weeks for the question '*Have you been a happy person?*'

'Have you been a happy person?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(13)	16.3	(0)	0	(0)	0
Most of the time	(19)	23.8	(1)	2.5	(0)	0
A good bit of the time	(19)	23.8	(4)	10	(0)	0
Some of the time	(13)	16.3	(18)	45	(22)	55
A little of the time	(13)	16.3	(11)	27.5	(16)	40
None of the time	(3)	3.8	(6)	15	(2)	5
Week 4						
All of the time	(17)	21.3	(0)	0	(0)	0
Most of the time	(30)	37.5	(0)	0	(0)	0
A good bit of the time	(20)	25	(5)	12.5	(5)	12.5
Some of the time	(5)	6.3	(22)	55	(26)	65
A little of the time	(3)	3.8	(12)	30	(9)	22.5
None of the time	(5)	6.3	(1)	2.5	(0)	0
Week 6						
All of the time	(23)	28.8	(0)	0	(0)	0
Most of the time	(18)	22.5	(0)	0	(0)	0
A good bit of the time	(26)	32.5	(3)	7.5	(1)	2.5
Some of the time	(4)	5	(21)	52.5	(22)	55
A little of the time	(4)	5	(16)	40	(16)	40
None of the time	(5)	6.3	(0)	0	(1)	2.5

At day 1, responses from participants in the intervention group were scattered from a little of the time up to all of the time, while this feeling in most participants in both of the other groups was rated from a little of the time to some of the time. At the end of

week 4, there was an increase in the feeling of being a happy person during the *past 4 weeks* in participants in all three groups compared to day 1. At the end of the follow-up period (week 6), the feeling of being a happy person during the *past 4 weeks* in participants in the intervention group was slightly lower than at the end of the intervention (week 4) but was better than at day 1. Participants in both of the other groups at week 6 reported a decrease in the feeling of being a happy person during the *past 4 weeks* from that at the end of week 4 and at day 1.

It can be seen from Table 4.99 that at day 1, most participants in the intervention group rated feeling tired during the *past 4 weeks* from a good bit of the time up to none of the time, while most participants in both of the other groups rated this feeling from a good bit of the time to some of the time. At the end of the intervention (week 4), the tired feeling during the *past 4 weeks* in participants in the intervention group was similar to that at day 1, while this feeling in participants in both of the other groups was decreased from day 1. At the end of the follow-up period (week 6), the tired feeling during the *past 4 weeks* in participants in the intervention group was similar to that at both the end of the intervention (week 4) and day 1. For participants in the alternative intervention group, there was a slight increase in the tired feeling during the *past 4 weeks* compared to that at the end of week 4, but the feeling was lower than at day 1. Participants in the group with no intervention reported similar levels of feeling tired at week 6 to those reported at week 4, but lesser levels of feeling tired than at day 1.

Table 4.99 Feeling during the past 4 weeks for the question '*Did you feel tired?*'

'Did you feel tried?' during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(3)	3.8	(0)	0	(0)	0
Most of the time	(6)	7.5	(1)	2.5	(0)	0
A good bit of the time	(12)	15	(7)	17.5	(8)	20
Some of the time	(17)	21.3	(26)	65	(29)	72.5
A little of the time	(16)	20	(5)	12.5	(3)	7.5
None of the time	(26)	32.5	(1)	2.5	(0)	0
Week 4						
All of the time	(3)	3.8	(0)	0	(0)	0
Most of the time	(8)	10	(0)	0	(0)	0
A good bit of the time	(9)	11.3	(4)	10	(4)	10
Some of the time	(19)	23.8	(22)	55	(22)	55
A little of the time	(9)	11.3	(9)	22.5	(14)	35
None of the time	(32)	40	(5)	12.5	(0)	0
Week 6						
All of the time	(3)	3.8	(0)	0	(0)	0
Most of the time	(3)	3.8	(0)	0	(0)	0
A good bit of the time	(13)	16.3	(2)	5	(3)	7.5
Some of the time	(17)	21.3	(26)	65	(21)	52.5
A little of the time	(15)	18.8	(11)	27.5	(16)	40
None of the time	(29)	36.3	(1)	2.5	(0)	0

4.3.10 During the *past 4 weeks*, how much of the time has your *physical health or emotional problems* interfered with your social activities (like visiting friends, relatives, etc.)?

All of the time ▼ ☐1 | Most of the time ▼ ☐2 | Some of the time ▼ ☐3 | A little of the time ▼ ☐4 | None of the time ▼ ☐5

Table 4.100 shows that at day 1, during the *past 4 weeks* physical health or emotional problems interfered with social activities in most participants in the intervention group from none of the time to some of the time, and impacted such activities in most participants in both of the other groups from a little of the time to some of the time. At the end of week 4, less interference with social activities during the *past 4*

weeks was found in participants in all three groups than at day 1. A greater percentage of participants in the intervention group and the group with no intervention reported they had no interference with social activities during the *past 4 weeks* from their physical health or emotional problems in this week compared to the percentage at day 1. At the end of the follow-up period (week 6), less interference with social activities from physical health or emotional problems during the *past 4 weeks* was found in participants in all three groups compared to at the end of week 4 and at day 1.

Table 4.100 Physical health or emotional problems' interference with social activities during the *past 4 weeks*

Interferences with social activities during the past 4 weeks	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
All of the time	(5)	6.3	(0)	0	(0)	0
Most of the time	(4)	5	(1)	2.5	(0)	0
Some of the time	(16)	20	(28)	70	(22)	55
A little of the time	(19)	23.8	(8)	20	(17)	42.5
None of the time	(36)	45	(3)	7.5	(1)	2.5
Week 4						
All of the time	(1)	1.3	(0)	0	(0)	0
Most of the time	(6)	7.5	(1)	2.5	(0)	0
Some of the time	(17)	21.3	(12)	30	(4)	10
A little of the time	(13)	16.3	(20)	50	(22)	55
None of the time	(43)	53.8	(7)	17.5	(14)	35
Week 6						
All of the time	(0)	0	(0)	0	(0)	0
Most of the time	(3)	3.8	(0)	0	(0)	0
Some of the time	(18)	22.5	(10)	25	(2)	5
A little of the time	(10)	12.5	(17)	42.5	(18)	45
None of the time	(49)	61.3	(13)	32.5	(20)	50

4.3.11 How TRUE or FALSE is *each* of the following statements for you?

	Definitely true ▼	Mostly true ▼	Don't know ▼	Mostly false ▼	Definitely false ▼
a. I seem to get sick a little easier than other people	☐1	☐2	☐3	☐4	☐5
b. I am as healthy as anybody I know	☐1	☐2	☐3	☐4	☐5
c. I expect my health to get worse	☐1	☐2	☐3	☐4	☐5
d. My health is excellent	☐1	☐2	☐3	☐4	☐5

As can be seen from Table 4.101, the percentage of participants who said it was mostly true or definitely true to get sick a little easier than other people was similar in all three groups at day 1. Over half the participants in the intervention group reported it was mostly false or definitely false to get sick a little easier than other people. There were 27.5 and 57.5 percent of participants in the alternative intervention group and the group with no intervention respectively who said they did not know that they seemed to get sick a little easier than other people. At the end of the intervention (week 4), positive thinking about one's health was evident in the intervention group and the group with no intervention, but not in the alternative intervention group. More participants in the intervention group and in the group with no intervention said it was mostly false or definitely false to get sick a little easier than other people compared to the results from day 1. At the end of the follow-up period (week 6), all three groups indicated a decrease in positive thinking about one's health compared to at the end of week 4. The intervention group at this final phase showed an increase in positive thinking from the percentage at day 1, while the alternative intervention group and the group with no intervention had a decrease in percentage of positive thinking compared to that at day 1.

Table 4.101 True or false responses for the question '*I seem to get sick a little easier than other people*'

'I seem to get sick a little easier than other people'	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Definitely true	(10)	12.5	(8)	20	(9)	22.5
Mostly true	(24)	30	(15)	37.5	(8)	20
Don't know	(5)	6.3	(11)	27.5	(23)	57.5
Mostly false	(16)	20	(2)	5	(0)	0
Definitely false	(25)	31.3	(4)	10	(0)	0
Week 4						
Definitely true	(6)	7.5	(11)	27.5	(9)	22.5
Mostly true	(12)	15	(11)	27.5	(14)	35
Don't know	(5)	6.3	(12)	30	(11)	27.5
Mostly false	(26)	32.5	(4)	10	(6)	15
Definitely false	(31)	38.8	(2)	5	(0)	0
Week 6						
Definitely true	(8)	10	(8)	20	(4)	10
Mostly true	(22)	27.5	(17)	42.5	(20)	50
Don't know	(1)	1.3	(12)	30	(13)	32.5
Mostly false	(16)	20	(1)	2.5	(3)	7.5
Definitely false	(33)	41.3	(2)	5	(0)	0

Results for the question about participants being as healthy as anybody they know are presented in Table 4.102. It shows that most participants in the intervention group said they felt it was mostly true or definitely true that they felt as healthy as anybody they knew, while most participants in both of the other groups said they did not know about how healthy they were at day 1. At the end of the intervention (week 4), a slight increase of positive thinking about one's health was found in participants in the intervention group compared to day 1. There was a similarity to day 1 in thinking about one's health in participants in the alternative intervention group, while there was a decrease from day 1 in positive thinking about one's health in participants in the group with no intervention. At the end of the follow-up period (week 6), there

was a slight decrease in positive thinking about one's health in participants in the intervention group compared to at the end of the intervention (week 4), and a similar level to that at day 1. A decrease from levels at the end of week 4 and at day 1was found at week 6 in positive thinking about one's health in participants in the alternative intervention group. The group with no intervention showed similar thinking about one's health at this phase compared to that at the end of week 4, but a decrease in positive thinking about one's health compared to that at day 1.

Table 4.102 True or false responses for the question '*I am as healthy as anybody I know*'

'I am as healthy as anybody I know'	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Definitely true	(19)	23.8	(0)	0	(0)	0
Mostly true	(31)	38.8	(2)	5	(0)	0
Don't know	(5)	6.3	(24)	60	(30)	75
Mostly false	(19)	23.8	(5)	12.5	(4)	10
Definitely false	(6)	7.5	(9)	22.5	(6)	15
Week 4						
Definitely true	(30)	37.5	(0)	0	(0)	0
Mostly true	(26)	32.5	(4)	10	(3)	7.5
Don't know	(5)	6.3	(23)	57.5	(16)	40
Mostly false	(16)	20	(8)	20	(17)	42.5
Definitely false	(3)	3.8	(5)	12.5	(4)	10
Week 6						
Definitely true	(29)	36.3	(0)	0	(0)	0
Mostly true	(24)	30	(4)	10	(5)	12.5
Don't know	(2)	2.5	(19)	47.5	(19)	47.5
Mostly false	(19)	23.8	(12)	30	(13)	32.5
Definitely false	(6)	7.5	(5)	12.5	(3)	7.5

Table 4.103 gives results for 'I expect my health to get worse'. It shows that at day 1 most participants in the intervention group answered mostly true or definitely true to this question, while participants in both of the other groups did not know whether

their health would get worse. At the end of the intervention (week 4), participants in the intervention group held a similar belief that their health would get worse to that at day 1, while participants in both of the other groups had a lower expectation of their health getting worse than they had at day 1. At the end of the follow-up period (week 6), there was a higher expectation of health getting worse in participants in the intervention group compared to that at the end of the intervention (week 4), but it was similar to that at day 1. Participants in the alternative intervention group also reported a higher expectation of health getting worse than at the end of week 4, but it was slightly decreased from that at day 1. The group with no intervention reported similar expectations of health getting worse as at the end of week 4, but these were lower than at day 1.

Table 4.103 True or false responses for the question '*I expect my health to get worse*'

'I expect my health to get worse'	**Intervention group**		**Alternative intervention group**		**Group with no intervention**	
	(n = 80)	**%**	**(n = 40)**	**%**	**(n = 40)**	**%**
Day 1						
Definitely true	(9)	11.3	(0)	0	(0)	0
Mostly true	(35)	43.8	(9)	22.5	(4)	10
Don't know	(16)	20	(28)	70	(36)	90
Mostly false	(9)	11.3	(1)	2.5	(0)	0
Definitely false	(11)	13.8	(2)	5	(0)	0
Week 4						
Definitely true	(5)	6.3	(0)	0	(0)	0
Mostly true	(33)	41.3	(1)	2.5	(6)	15
Don't know	(20)	25	(24)	60	(24)	60
Mostly false	(9)	11.3	(10)	25	(10)	25
Definitely false	(13)	16.3	(5)	12.5	(0)	0
Week 6						
Definitely true	(9)	11.3	(0)	0	(0)	0
Mostly true	(35)	43.8	(5)	12.5	(7)	17.5
Don't know	(21)	26.3	(31)	77.5	(25)	62.5
Mostly false	(6)	7.5	(4)	10	(8)	20
Definitely false	(9)	11.3	(0)	0	(0)	0

Table 4.104 represents participant responses to the question about participants' feelings about health excellence. It shows that at day 1 most participants in the intervention group thought it was mostly true or definitely true that they had excellent health, while most participants in both of the other groups said they did not know whether their health was excellent and some in these groups considered their health as poor.

Table 4.104 True or false responses for the question '*My health is excellent*'

'My health is excellent'	Intervention group		Alternative intervention group		Group with no intervention	
	(n = 80)	%	(n = 40)	%	(n = 40)	%
Day 1						
Definitely true	(18)	22.5	(0)	0	(0)	0
Mostly true	(32)	40	(1)	2.5	(0)	0
Don't know	(5)	6.3	(27)	67.5	(30)	75
Mostly false	(16)	20	(6)	15	(6)	15
Definitely false	(9)	11.3	(6)	15	(4)	10
Week 4						
Definitely true	(26)	32.5	(0)	0	(0)	0
Mostly true	(33)	41.3	(0)	0	(0)	0
Don't know	(5)	6.3	(16)	40	(23)	57.5
Mostly false	(14)	17.5	(16)	40	(16)	40
Definitely false	(2)	2.5	(8)	20	(1)	2.5
Week 6						
Definitely true	(23)	28.8	(0)	0	(0)	0
Mostly true	(41)	51.3	(0)	0	(0)	0
Don't know	(2)	2.5	(30)	75	(25)	62.5
Mostly false	(14)	17.5	(10)	25	(14)	35
Definitely false	(0)	0	(0)	0	(1)	2.5

At the end of the intervention (week 4), more participants in the intervention group thought their health was excellent compared to day 1, whereas more participants in both of the other groups rated their health as poor compared to day 1. At the end of the follow-up period (week 6), there was a slightly increased percentage of

participants in the intervention group who rated their health as excellent compared to the percentage at the end of intervention (week 4), and this percentage was a dramatic increase from that at day 1. A higher percentage of participants in the alternative intervention group said they did not know whether their health was excellent at this time compared to at the end of week 4, but this percentage was similar to how they rated their health at day 1. In the group with no intervention at week 6, participants rated their health similarly to their rating at the end of week 4, but this was a lower rating of their health as excellent than that at day 1.

4.4 Baseline results and outcomes

Baseline results consisting of pain scores from the Brief Pain Inventory questions 3-6 and 14A-14G, and quality of life scores from the Short-Form 36 in all dimensions before receiving the interventions were analysed using mean and standard error of mean in the three groups. Post-intervention outcomes for the same questions from both questionnaires were measured after four and six weeks of the intervention using Analysis of Variance (ANOVA) and Analysis of Co-variance (ANCOVA).

4.4.1 Baseline results for pain scores from the Brief Pain Inventory (BPI)

Table 4.105 presents the baseline results of pain scores from the BPI for all three groups of study participants.

4.4.1.1 The intervention group and the alternative intervention group

Table 4.105 shows there were slight differences in the means of *Pain at its least, Pain on average* and *Pain right now* between these two groups before the interventions. The data have shown that most participants in both groups experienced mild pain (scores of 1-4) for *Pain at its least, Pain on average* and *Pain right now* (see Tables 4.18, 4.21, 4.24). There was a slight difference between both groups in

the means of *Pain at its worst*. Data have shown that most participants in the intervention group had moderate pain (scores of 5-6) whereas those in the alternative intervention group had mild pain (scores of 3-4) (see Table 4.15). There were somewhat different means between these two groups in pain interference with *general activity, mood, walking ability, normal work, social relations, sleep* and *enjoyment of life*.

4.4.1.2 The intervention group and the group with no intervention

There were slight differences in the means of *Pain at its least*, and somewhat different means of *Pain on average* and *Pain right now* between the two groups. The data presented in Tables 4.21 and 4.24 show that most participants in both groups experienced mild pain (scores of 1-4) for *Pain at its least, Pain on average* and *Pain right now* prior to the intervention period. There was a small degree of difference in the means of *Pain at its worst* between the two groups, as shown in Table 4.105. Similar to the comparison between the intervention group and the alternative intervention group, the data presented in Table 4.15 show that most participants in the intervention group had moderate pain (scores of 5-6) whereas those in the group with no intervention had mild pain (scores of 3-4). There were slightly different means of pain interference with *general activity, mood, walking ability, normal work, social relations, sleep* and *enjoyment of life* between these two groups.

4.4.1.3 The alternative intervention group and the group with no intervention

As shown in Table 4.105, there were slightly different means of *Pain at its worst, Pain at its least, Pain on average* and *Pain right now* between these groups at day 1. Most participants in both groups had mild pain. There was a little difference between the two groups in means of pain interference with *general activity, mood, walking ability, normal work, social relations, sleep* and *enjoyment of life* at baseline.

Table 4.105 Baseline results of pain scores from the Brief Pain Inventory (BPI)

Outcomes	Intervention group (n = 80)		Alternative intervention group (n = 40)		Group with no intervention (n = 40)	
	Mean	SEM[1]	Mean	SEM[1]	Mean	SEM[1]
BPI dimension						
Pain at its worst	6.31	0.286	4.33	0.321	3.95	0.221
Pain at its least	2.29	0.174	2.50	0.273	1.98	0.236
Pain on average	4.34	0.194	3.43	0.286	3.28	0.175
Pain right now	3.16	0.269	2.93	0.278	2.83	0.237
Interference of pain with:						
General activity	5.25	0.346	3.83	0.312	4.15	0.184
Mood	4.29	0.348	2.00	0.263	2.80	0.233
Walking ability	4.35	0.368	3.15	0.321	3.88	0.206
Normal work	5.05	0.351	2.95	0.314	4.00	0.203
Social relations	2.29	0.366	1.55	0.229	2.58	0.234
Sleep	4.20	0.373	2.00	0.235	2.80	0.238
Enjoyment of life	4.18	0.299	2.43	0.237	3.98	0.204

SEM[1] = Standard Error of Mean

4.4.2 Baseline results for quality of life

Table 4.106 presents the means for these results.

4.4.2.1 The intervention group and the alternative intervention group

Table 4.106 illustrates slight differences in the means of the quality of life in two dimensions including *Role-physical and Bodily pain* between these two groups. On the other hand, it shows marked differences in means of the quality of life in other dimensions including *Physical function, Social functioning, Mental health, Role-emotional, Vitality and General health* between the two groups.

4.4.2.2 The intervention group and the group with no intervention

As can be seen in Table 4.106, there were slightly different means of the quality of life between these two groups in three dimensions including *Role-physical, Bodily pain and Role-emotional*, whereas there were marked differences in means of the

quality of life in other dimensions including *Physical function, Social functioning, Mental health, Vitality and General health.*

4.4.2.3 The alternative intervention group and the group with no intervention

The findings presented in Table 4.106 show slightly different means between these two groups for the quality of life in most dimensions, including *Physical function, Role-physical, Bodily pain, Mental health, Vitality and General health,* while there were marked differences in means of the quality of life in the two dimensions of *Social functioning and Role-emotional*.

Table 4.106 Baseline results of the quality of life

Outcomes	**Intervention group (n = 80)**		**Alternative intervention group (n = 40)**		**Group with no intervention (n = 40)**	
	Mean	SEM[1]	Mean	SEM[1]	Mean	SEM[1]
Dimension						
Physical function	65.81	2.92	50.88	3.89	51.88	5.00
Role – physical	31.88	4.12	30.00	6.34	34.38	6.56
Bodily pain	46.75	2.46	46.95	2.39	47.35	1.96
Social functioning	75.31	3.14	56.25	2.76	61.56	2.02
Mental health	67.15	2.10	49.00	1.75	48.00	0.95
Role – emotional	41.67	5.25	37.50	7.18	44.17	7.49
Vitality	56.50	2.44	43.38	2.17	40.50	1.79
General health	50.19	2.44	38.10	2.69	38.18	1.86

[1] SEM = Standard Error of Mean

4.4.3 Post-intervention results of pain scores from the Brief Pain Inventory

4.4.3.1 Post-intervention results of pain scores between the three groups at week 4

It is apparent from Table 4.107 that there were significant differences in *Pain on average* and *Pain right now* both in unadjusted means (ANOVA) and adjusted means (ANCOVA) between the three groups at the end of week 4. Further statistical testing (Pairwise Comparisons as shown in Appendix 8, Table 11) revealed significant differences in *Pain on average* between the intervention group and the alternative

intervention group (*P=0.003*), and between the intervention group and the group with no intervention (*P=0.016*). Pairwise Comparison (Appendix 8, Table 12) also shows significant differences in *Pain right now* between the intervention group and the alternative intervention group (*P=0.000*), between the intervention group and the group with no intervention (*P=0.039*), and also between the alternative intervention group and the group with no intervention (*P=0.044*).

Table 4.107 illustrates significant differences in Interference of pain during the past week with General activity, Mood, Walking ability, Normal work, Social relations, Sleep and Enjoyment of life in both the unadjusted mean (ANOVA) and adjusted mean (ANCOVA) between the three groups at the end of week 4. Pairwise Comparison (Appendix 8, Tables 13-19) shows significant differences between the intervention group and the alternative intervention group in *Interference of pain during the past week* with *General activity* (P=0.000), *Mood* (P=0.000), *Walking ability* (P=0.000), *Normal work* (P=0.000), *Social relations* (P=0.001), *Sleep* (P=0.000), and *Enjoyment of life* (P=0.000) at the end of week 4.

In addition, at the end of week 4 the same test (Appendix 8, Tables 13-19) resulted in significant differences between the intervention group and the group with no intervention in *Interference of pain during the past week* with *General activity* (*P=0.000*), *Mood* (*P=0.000*), *Walking ability* (*P=0.000*), *Normal work* (*P=0.000*), *Social relations* (*P=0.000*), *Sleep* (*P=0.000*), and *Enjoyment of life* (*P=0.001*).

Table 4.107 Post-intervention results of pain scores from the Brief Pain Inventory (BPI) between the three groups at the end of intervention (week 4)

Outcomes	Intervention group (n = 80)		Alternative intervention group (n = 40)		Group with no intervention (n = 40)		Unadjusted Significance	Adjusted Significance
	Mean	SEM[1]	Mean	SEM[1]	Mean	SEM[1]		
BPI dimension								
Pain at its worst	3.45	0.361	3.53	0.175	3.05	0.156	0.447	0.127
Pain at its least	1.30	0.201	1.93	0.207	1.38	0.234	0.093	0.175
Pain on average	2.54	0.270	3.23	0.174	2.98	0.150	*0.048*	*0.005*
Pain right now	1.50	0.260	2.98	0.188	2.13	0.241	*0.000*	*0.000*
Interference of pain with:								
General activity	6.69	0.466	3.58	0.147	3.73	0.148	*0.000*	*0.000*
Mood	6.14	0.500	2.28	0.134	2.00	0.160	*0.000*	*0.000*
Walking ability	6.19	0.507	3.58	0.147	3.80	0.161	*0.000*	*0.000*
Normal work	6.66	0.492	3.53	0.164	3.83	0.164	*0.000*	*0.000*
Social relations	5.04	0.576	2.53	0.186	2.35	0.204	*0.000*	*0.000*
Sleep	5.90	0.528	2.83	0.175	2.73	0.175	*0.000*	*0.000*
Enjoyment of life	5.98	0.499	3.35	0.146	3.90	0.163	*0.000*	*0.000*

[1] SEM = Standard Error of Mean

4.4.3.2 Post-intervention results of pain scores between the three groups at week 6

As Table 4.108 shows, there was a significant difference in unadjusted mean (ANOVA, *P=0.000*) in *Pain at its worst* between the three groups at the follow-up phase (week 6). Further statistical tests with Multiple Comparisons (Appendix 8, Table 3) revealed significant differences in *Pain at its worst* between the intervention group and the alternative intervention group (*P=0.041*), and between the intervention group and the group with no intervention (*P=0.002*). However, there was no significant difference in adjusted mean (ANCOVA, *P=0.322*) in this domain between the three groups at this phase (Table 4.108). For other BPI domains, including *Pain at its least, Pain on average* and *Pain right now,* there were no significant differences in unadjusted mean (ANOVA) and adjusted mean (ANCOVA) between the three groups at the follow-up phase (week 6).

The findings from Table 4.108 indicate significant differences remained in unadjusted mean (ANOVA) and adjusted mean (ANCOVA) at the follow-up phase (week 6) in *Interference of pain during the past week* with *General activity* (*P=0.000*), *Mood* (*P=0.000*), *Walking ability* (*P=0.000*), *Normal work* (*P=0.000*), *Social relations* (*P=0.000*), *Sleep* (*P=0.000*), and *Enjoyment of life* (*P=0.000*). Further analysis for unadjusted mean with Multiple Comparisons (Appendix 8, Tables 3-10) showed significant differences between the intervention group and the alternative intervention group in *Interference of pain during the past week* with *General activity* (*P=0.000), Mood* (*P=0.000), Walking ability* (*P=0.000), Normal work* (*P=0.000), Social relations* (*P=0.000), Social relations* (*P=0.000), Sleep* (*P=0.000* and *Enjoyment of life* (*P=0.000),* and between the intervention group and the group with no intervention in *Interference of pain during the past week* with *General activity* (*P=0.000*), *Mood* (*P=0.000*), *Walking ability* (*P=0.000*), *Normal work* (*P=0.000*), *Social relations* (*P=0.000*), *Sleep* (*P=0.000*) and *Enjoyment of life* (*P=0.000*). The Multiple Comparisons (Appendix 8, Tables 3-10) showed no significant difference in *Interference of pain during the past week* between the alternative intervention group and the group with no intervention at this phase.

The Pairwise Comparison for adjusted mean (Appendix 8, Tables 20-26) confirmed significant differences at the end of the follow-up phase (week 6) in *Interference of pain during the past week* with *General activity* (*P=0.000, 0.000*), *Mood* (*P=0.000, 0.000*), *Walking ability* (*P=0.000, 0.000*), *Normal work* (*P=0.012, 0.001*), *Social relations* (*P=0.003, 0.001*), *Sleep* (*P=0.000, 0.000*) and *Enjoyment of life* (*P=0.005, 0.000*) between the intervention group and the alternative intervention group, and the intervention group and the group with no intervention respectively. The same test (Appendix 8, Tables 20-26) indicated no significant difference in *Interference of*

pain during the past week between the alternative intervention group and the group with no intervention at this phase.

Table 4.108 Post-intervention results of pain scores from the Brief Pain Inventory (BPI) between three groups at the end of the follow-up period (week 6)

Outcomes	Intervention group (n = 80)		Alternative intervention group (n = 40)		Group with no intervention (n = 40)		Unadjusted Significance	Adjusted Significance
	Mean	SEM[1]	Mean	SEM[1]	Mean	SEM[1]		
BPI dimension								
Pain at its worst	3.99	0.360	3.00	0.164	2.63	0.132	*0.000*	0.322
Pain at its least	1.33	0.180	1.15	0.137	1.35	0.158	0.676	0.611
Pain on average	2.86	0.265	2.70	0.120	2.48	0.113	0.333	0.847
Pain right now	1.95	0.278	2.28	0.175	2.20	0.161	0.492	0.493
Interference of pain with:								
General activity	6.15	0.431	3.38	0.111	3.10	0.159	*0.000*	*0.000*
Mood	5.64	0.468	1.53	0.107	1.43	0.113	*0.000*	*0.000*
Walking ability	6.24	0.453	3.48	0.124	3.20	0.148	*0.000*	*0.000*
Normal work	5.70	0.486	3.38	0.146	3.23	0.154	*0.000*	*0.000*
Social relations	4.33	0.552	1.93	0.131	1.93	0.126	*0.000*	*0.000*
Sleep	5.83	0.512	2.18	0.143	1.90	0.123	*0.000*	*0.000*
Enjoyment of life	5.68	0.459	3.55	0.147	3.25	0.100	*0.000*	*0.000*

[1] SEM = Standard Error of Mean

4.4.4 Post-intervention results for quality of life

4.4.4.1 Post-intervention results of the quality of life scores between the three groups at week 4

Table 4.109 presents the results from the unadjusted mean (ANOVA) and adjusted mean (ANCOVA) of the quality of life scores between the three groups at week 4. There were significant differences in unadjusted mean of six out of eight dimensions of the SF-36 including *Physical functioning* (*P=0.000*), *Social functioning* (*P=0.015*), *Mental health* (*P=0.000*), *Role-emotion* (*P=0.021*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*). However, adjusted mean in the same table shows only five dimensions of the SF-36: *Physical functioning* (*P=0.000*); *Mental health*

(*P=0.017*); *Role-emotion* (*P=0.026*); *Vitality* (*P=0.000*); and *General health* (*P=0.000*).

Further analysis with Multiple Comparisons (Appendix 9, Tables 1-3, 5, 6) showed significant differences in unadjusted mean between the intervention group and the alternative intervention group at the end of week 4 in *Physical functioning* (*P=0.000*), *Social functioning* (*P=0.026*), *Mental health* (*P=0.000*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*). In addition, the same test (Appendix 9, Tables 1, 3-6) resulted in significant differences in unadjusted mean between the intervention group and the group with no intervention at the end of week 4 in *Physical functioning* (*P=0.000*), *Mental health* (*P=0.000*), *Role-emotion* (*P=0.015*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*). Appendix 9, Tables 1 and 2, also reveals significant differences in unadjusted mean between the alternative intervention group and the group with no intervention at the end of week 4 in *Physical functioning* (*P=0.046*) and *Social functioning* (*P=0.013*).

Additional statistical tests with Pairwise Comparisons (Appendix 9, Tables 15, 16, 18, 19) confirmed the significant differences in adjusted mean between the intervention group and the alternative intervention group at the end of week 4. There were significant differences in adjusted mean between the intervention group and the alternative intervention group in *Physical functioning* (*P=0.000*), *Mental health* (*P=0.026*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*). The same test (Appendix 9, Tables 15, 17-19) confirmed significant differences in adjusted mean between the intervention group and the group with no intervention at the end of week 4 in *Physical functioning* (*P=0.000*), *Role-emotion* (*P=0.034*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*). In addition, there were significant differences in

adjusted mean between the alternative intervention group and the group with no intervention at this stage in *Physical functioning* (*P=0.021*), as shown in Appendix 9, Table 15.

Table 4.109 Post-intervention results of the quality of life from the Short-Form-36 at the end of intervention (week 4)

Outcomes	Intervention group (n = 80)		Alternative intervention group (n = 40)		Group with no intervention (n = 40)		Unadjusted Significance	Adjusted Significance
	Mean	SEM[1]	Mean	SEM[1]	Mean	SEM[1]		
Dimension								
Physical function	78.94	2.31	45.63	3.78	57.63	3.49	*0.000*	*0.000*
Role – physical	34.06	4.75	25.00	5.06	31.88	4.10	0.365	0.449
Bodily pain	49.61	2.78	49.65	1.78	51.05	2.36	0.899	0.938
Social functioning	77.50	2.89	68.13	2.00	76.56	2.06	*0.015*	0.296
Mental health	71.60	2.09	53.50	1.78	53.90	1.33	*0.000*	*0.017*
Role – emotional	46.67	5.45	60.83	7.25	69.17	5.65	*0.021*	*0.026*
Vitality	66.81	2.20	47.38	1.74	47.75	1.60	*0.000*	*0.000*
General health	59.08	2.02	39.88	1.75	38.88	1.90	*0.000*	*0.000*

[1] SEM = Standard Error of Mean

4.4.4.2 Post-intervention results of the quality of life scores between the three groups at week 6

Table 4.110 shows significant differences in unadjusted mean of all dimensions of the SF-36, including *Physical functioning* (*P=0.000*), *Role-physical* (*P=0.*016), *Bodily pain* (*P=0.001*), Social *functioning* (*P=0.004*), *Mental health* (*P=0.000*), *Role-emotion* (*P=0.005*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*). However, adjusted mean confirmed significance in seven dimensions of the SF-36 at the follow-up phase (week 6): *Physical functioning* (*P=0.000*); *Role-Physical* (*P=0.033*); *Bodily pain* (*P=0.008*); *Mental health* (*P=0.017*); *Role-emotion* (*P=0.011*); *Vitality* (*P=0.000*); and *General health* (*P=0.000*).

Multiple Comparisons (Appendix 9, Tables 7, 9-14) showed significant differences in unadjusted mean between the intervention group and the alternative intervention

group at the follow-up phase (week 6) in *Physical functioning* (*P=0.000*), *Bodily pain* (*P=0.004*), *Social functioning* (*P=0.007*), *Mental health* (*P=0.000*), *Role-emotion* (*P=0.014*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*). In addition, the same test (Appendix 9, Tables 7-8, 11,13-14) identified significant differences in unadjusted mean between the intervention group and the group with no intervention at this phase (week 6) in *Physical functioning* (*P=0.000*), *Role-physical* (*P=0.013*), *Mental health* (*P=0.000*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*). Multiple Comparisons (Appendix 9, Table 7) also revealed a significant difference in unadjusted mean between the alternative intervention group and the group with no intervention at this phase for *Physical functioning* (*P=0.002*).

Adjusted mean was further analysed using Pairwise Comparisons to identify which groups showed significant differences. Appendix 9, Tables 20, 22-26 show significant differences in adjusted mean of the SF-36 for *Physical functioning* (*P=0.000*), *Bodily pain* (*P=0.011*), *Mental health* (*P=0.014*), *Role-emotion* (*P=0.015*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*) between the intervention group and the alternative intervention group at the follow-up phase (week 6). The same test (Appendix 9, Tables 20-21, 25-26) revealed significant differences in adjusted mean of the SF-36 for *Physical functioning* (*P=0.000*), *Role-physical* (*P=0.028*), *Vitality* (*P=0.000*) and *General health* (*P=0.000*) between the intervention group and the group with no intervention at this phase. Moreover, Pairwise Comparisons (Appendix 9, Table 20) confirmed there was a significant difference in adjusted mean of the SF-36 between the alternative intervention group and the group with no intervention at this period for *Physical functioning* (*P=0.000*).

Table 4.110 Post-intervention results of the quality of life from the Short-Form 36 at the end of the follow-up period (week 6)

Outcomes	Intervention group (n = 80)		Alternative intervention group (n = 40)		Group with no intervention (n = 40)		Unadjusted Significance	Adjusted Significance
	Mean	SEM[1]	Mean	SEM[1]	Mean	SEM[1]		
Dimension								
Physical function	80.13	2.24	57.63	3.57	41.63	2.78	*0.000*	*0.000*
Role – physical	44.38	4.97	37.50	4.29	27.50	2.94	*0.016*	*0.033*
Bodily pain	56.55	2.90	45.70	1.49	48.93	1.91	*0.001*	*0.008*
Social functioning	83.59	2.53	72.81	2.32	78.75	2.16	*0.004*	0.367
Mental health	71.50	1.96	54.30	1.50	56.70	1.31	*0.000*	*0.017*
Role – emotional	51.67	5.37	74.17	5.66	67.50	4.85	*0.005*	*0.011*
Vitality	67.56	2.12	47.75	1.75	48.50	1.51	*0.000*	*0.000*
General health	55.15	2.23	38.80	1.75	38.65	1.90	*0.000*	*0.000*

[1] SEM = Standard Error of Mean

4.5 Summary

The results presented in this chapter indicate that foot reflexology can play a role in pain relief for older Thai people by reducing the intensity of pain temporarily at the end of week 4. Results for the BPI show significant differences in *Pain on average* and *Pain right now* between the intervention group and the other two groups at this time, however no significant differences are apparent in pain intensity among the three groups at the follow-up period (week 6). The results derived from this questionnaire also indicate that foot reflexology helped reduce pain severity in older Thai people at the end of the intervention (week 4) and at the follow-up period (week 6), linked to a reduction in the impact of pain on *general activity, mood, walking ability, normal work, social relations, sleep* and *enjoyment of life* in the intervention group compared to the impact of pain on the other two groups.

Results from the SF-36 reveal that the quality of life for participants in the intervention group was better than that for participants in both of the other groups at

the end of week 4 and also at the follow-up period (week 6).

The next chapter discusses the results presented here, and the benefits and limitations of the study method and design.

5 Discussion

5.1 Introduction

This chapter discusses the benefits and/or limitations of the method and study design, including participants, masseurs, interviewers and the intervention applied. It also discusses the study results in relation to previous studies and the research hypotheses.

5.2 Benefits and/or limitations of the method and study design

This section discusses the benefits and/or limitations of methods, participants, masseurs, interviewers and the foot reflexology applied in the study.

5.2.1 Method

This study applied a quasi-experimental design because such a design was deemed more suitable than others in this community setting and for this particular population group. As stated in Chapter 3, a RCT was not suitable for this study or its context (Lamsompung community setting), including location, people and culture. In addition, pain is not a symptom that makes every client seek primary health care because pain medications such as analgesics and non-steroidal inflammatory drugs are easy to get from the groceries near clients' houses. Also, participants were likely to come from different rural settings.

The limitation of having a quasi-experimental design in this study was that the foot reflexology intervention group and the other two groups (alternative intervention and no intervention) were slightly different at the pre-test, raising concerns about confounding variables differing between groups. Therefore, caution must be applied in interpreting the results, as these may not be transferable to other population groups

or settings.

5.2.2 Participants

More than 70 percent of participants in each of the three study groups reported that they had mild pain before the intervention, indicating that the study findings are representative of older Thai people with mild pain. Therefore, inferences cannot be made to people with chronic or severe pain.

5.2.3 Masseurs

It was not possible for one researcher alone to give foot reflexology intervention eight times per person to 160 participants. Therefore, six masseurs were asked to be involved in the foot reflexology intervention. Although the researcher explained the procedures to all masseurs, it is possible that differences in findings may have occurred due to differences in masseurs. In an attempt to prevent such differences, the researcher let all masseurs practise until they were able to perform very well within the timeframe of 50 minutes per session. 'If the session is too short, insufficient stimulus is provided for the body to mobilise its own healing powers…' (Dougans 2002, p. 126). All masseurs had to give a few sessions of foot reflexology to the researcher to ensure they put pressure on the right reflex spots, and did so in accordance with the client's preferences. All masseurs were taught to observe the client's face and listen to the client's complaints if too much or too little pressure was applied to the client's feet.

Two of the six participating masseurs had experience of doing traditional Thai massage. They were used to giving harsh body massage and thought the harder the pressure they used, the better the clients would benefit from the massage. The researcher corrected that idea and asked them to be aware of a client's preferences,

which should be the first consideration. In addition, during intervention sessions, the researcher organised appointments for participants to make sure that each participant received an equal amount of foot reflexology from each of the six masseurs. The researcher also put a clock where masseurs could see the time clearly in order to control the time per session, and she stayed with masseurs most of the time while they were giving foot reflexology to the participants to ensure she could correct procedures if necessary.

5.2.4 Interviewers

Four interviewers took part in the interview process, which had the potential for introducing interviewer bias into the study. Although two major interviewers performed most of the interviews (one interviewed participants in the intervention group and another interviewed participants in both of the other groups), they may have influenced the participants' responses through their tone of voice and social position. It is also possible that the interviewers may have taken control of an interview, which would lead to the participants giving specific answers to please them. Steps were taken to avoid these risks of bias, including reading the questionnaires to participants and making questions clear to participants from the interviewers' point of view before beginning the project.

The benefit of having many interviewers in this study was that it helped the process of data collection. Interviewers could build good relationships with clients and understand their feelings, which would put clients at ease and keep them interested in the project. Building relationships made it easier to hold interviews with illiterate participants in the study who needed help to complete the questionnaires.

A strategy the researcher used to minimise differences in participant responses

arising from differences in interviewers was to select only persons who had graduated with a bachelor's degree. This ensured all interviewers had experienced how to do research as part of their course. The researcher also chose interviewers who lived continuously in the village so they would be aware of special events as well as ordinary village activities, and understood the background of people in the village and the community setting. Furthermore, the researcher asked all interviewers to read the questionnaires and clarify any unclear questions.

5.2.5 Foot reflexology

It has been difficult to ascertain the real benefit of foot reflexology in relieving symptoms for pain because papers on the benefits of foot reflexology have concentrated on different symptoms. Launso, Brendstrup and Arnberg (1999), Stephenson, Weinrich and Tavakoli (2000), Panyim (2000), Stephenson, Dalton and Carlson (2003) and Pongpiyapiboon (2005) have shown the benefits of foot reflexology for pain relief but others, including Evans *et al.* (1998) and Tovey (2002), have shown no benefit.

This study used foot reflexology as the main intervention for older people with pain to add to the current research by establishing whether foot reflexology could relieve acute pain and if so, for how long. The foot reflexology intervention applied in this study was developed by Eunice Ingham, a founder of foot reflexology. The techniques applied in the Ingham method use only the masseurs' thumb and fingers on the reflex points of clients' feet. It is not a harmful procedure. The principle behind the Ingham method is '…not to cause unnecessary discomfort' (Byers 2001, p. 32). According to this principle, the masseur must observe the client's face and interpret whether the client is comfortable with the pressure applied. The masseur

must adjust the pressure as necessary according to the client's reaction to the reflexology. Farnsworth (1995, p. 41), a mentor from the Australian College of Tactile Therapies, believed that 'a relaxed body is a healing body…with the relaxation from a reflexology treatment, the body is more able to start a healing process'. Differences in pressure can result in either a negative or positive outcome of massage; pressure is beneficial only if it fulfils the client's need. Too much pressure for the client's preference will cause discomfort and induce bodily stress. Too light a pressure for the client's preference will make the client unsatisfied with the treatment and the masseurs. Byers (2001, p. 161) stated that 'the more sensitive the individual, the lighter the pressure'.

The foot reflexology sessions in the study lasted for 50 minutes per session and were applied twice a week for four weeks to each participant in the foot reflexology intervention group. This timeframe was selected because Byers (2001) and Dougans (2002) recommend it as the best way of achieving optimum results.

5.3 Demographic factors – impact on pain and quality of life

The present study was designed to determine the effect of foot reflexology on pain reduction in older Thai people. The following section will describe the differences in pain level and quality of life found in the older Thai people participating in the study, as influenced by demographic factors such as gender, age, marital status, education, occupation, financial difficulty and co-morbidities.

5.3.1 Gender and pain

The findings presented in Appendix 7, Tables 1-4, show that there is no significant difference in means for pain intensity, including *Pain at its worst*, *Pain at its least*, *Pain on average* and *Pain right now* between male and female participants.

However, the study found significant difference between the genders in the means for pain interference with *General activity, Mood, Walking ability, Normal work, Relations with other people, Sleep* and *Enjoyment of life*. As shown in Appendix 7, Tables 6-12, the means in *General activity*, *Mood*, *Walking ability*, *Normal work, Relations with other people*, *Sleep* and *Enjoyment of life* were higher for the female participants than for their male counterparts. Thus, although mean pain intensity levels were not significantly different for the females and the males, the results indicate that mean pain interference was greater for older Thai females than males. This finding is in agreement with a study by Sheffield *et al.* (2000) in the USA on pain in adults aged 20-73 years, which found that women tend to report greater sensitivity to pain and painful stimuli than men, and exhibit lower pain thresholds and tolerance than men.

5.3.2 Gender and quality of life

There was significant difference in the means for three dimensions of quality of life - *Role-Physical*, *General Health* and *Social Functioning* (see Appendix 7, Tables 14, 16 and 18). The means in *Role-Physical*, *General Health* and *Social Functioning* were higher in males than in their female counterparts, indicating that the quality of life in older Thai females was lower than that of their male counterparts in relation to doing work or other daily activities, due to physical health. Furthermore, older Thai females evaluated their personal health as poorer than the males and believed their health was likely to get worse. They also thought pain interfered with *normal social activities* due to physical or emotional problems more extremely and frequently than did the males.

There was no significant difference between the genders in means for quality of life

in *Physical Functioning*, *Bodily Pain*, *Vitality*, *Role-Emotional*, *Mental Health*, *Physical Component Summary* and *Mental Component Summary* (Appendix 7, Tables 13, 15, 17 and 19-22). This finding indicates there were no differences in limitations between the genders in performing all physical activities, including bathing or dressing, due to *Health*, *Pain* or *Feelings of pep and energy* or *Tired and worn out*. Nor were there any differences in *Working or Doing daily activities as a result of emotional problems*, or in *Feelings of nervousness and depression* or *Peaceful, happy and calm* between older Thai female and male participants.

These findings further support Hellstrom, Persson and Hallberg's research (2004), which found that older women had a poorer quality of life than their male counterparts. The current findings show some similarity to a finding by Ong and Jordan (1997), in that older men with an increasing age had better quality of life scores than older women (aged 75 years and over) in physical functioning (mean = 51.7 for men and 36.2 for women; $P = 0.01$) and social functioning (mean = 70.1 for men and 56.4 for women; $P = 0.05$). However, the current study's results also show some differences from Ong and Jordan's (1997) study, in which British older men had better scores for quality of life (SF-36) than their women counterparts (aged 65-74 years), particularly in role limitation due to emotional problems (mean = 77.2 for men and 65.1 for women; $P = 0.05$) and mental health (mean = 77.7 for men and 67.7 for women; $P = 0.01$). Nor do the current results support previous research by Gerstle, All and Wallace (2001), who reported that better quality of life was associated with women who had chronic pain.

Compared to other Thai studies, the current findings seem consistent with research by Chinuntuya (1993), Gorin (1993), Kumarnjan (2000), Panichacheewakul (1994)

and Somchock (1997), which found that older Thai men had a better quality of life than women. Possible explanations for this finding may be that the older women, in comparison to older men, had less self-care and were more dependent on caregivers; had less social support, especially from their partners; and had more anxiety and poorer coping with disease.

5.3.3 Age and pain

The findings presented in Appendix 7, Tables 23-26 show that there were no significant differences in means for pain intensity, including *Pain at its worst*, *Pain at its least*, *Pain on average* and *Pain right now*, among the three age groups – the early old age group (60-74 years), the middle old age group (75-84 years) and the late old age group (85 years and over). The findings showed no significant differences between the three age groups (see Appendix 7, Tables 28-34) in means for pain interference in *General activity*, *Mood*, *Walking ability*, *Normal work*, *Relations with other people*, *Sleep* and *Enjoyment of life*. A possible explanation for this is that the majority of participants (138 out of 160) were in the early old aged group.

5.3.4 Age and quality of life

No significant differences were found in the means of quality of life in eight dimensions between the three age groups as shown in Appendix 7, Tables 35-42. However, there were significant differences between the three groups (*P = 0.47)* in the mean for *Physical Component Summary (PCS)*, which included *Physical Functioning*, *Role-Physical*, *Bodily Pain* and *General Health*, as shown in Appendix 7, Table 43. The mean for *Physical Component Summary (PCS)* in the early old age group was higher than that in the middle and late old age groups. This indicates that

these latter two groups, in comparison to the early old age group, had greater limitation in performing all physical activities, including *Bathing or dressing due to health*; more *Problems with work or other daily activities as a result of physical health*; more limiting pain; evaluated their health as *poorer;* and believed their health *is likely to get worse*.

These findings provide a contrast to earlier findings by Gerstle, All and Wallace (2001), and Udomsappayakul (1992), which showed that better quality of life was associated with the older age group. However, the study's finding related to age and quality of life are similar to those of an earlier study by Hellstrom, Persson and Hallberg (2004), which showed that quality of life was better among younger old age persons than in their older old aged counterparts. The current finding is also consistent with earlier Thai studies that show younger old age people have lower dependency and a greater ability to perform self-care (Khumpheng 1997; Panawattanakul, 1991), and that the ability to perform self-care has a positive correlation with quality of life (Panawattanakul, 1991). Consequently, a younger old age person has a better quality of life than an older old age person (Chawarangkool 1995; Chikeaw 1994; Chinuntuya, 1993; Karnjanavorawong 1997; Khumpheng 1997; Kumarnjan 2000; Panichacheewakul, 1994; Visetkamin 2002; Wivatvanit 2002).

5.3.5 Marital status and pain

The findings related to marital status and pain (Appendix 7, Tables 45-48) show that there were no significant differences among the three demographics of marital status – single, couple, divorced/separated/widowed – in the means for pain intensity including *Pain at its worst*, *Pain at its least*, *Pain on average* and *Pain right now*.

They also show no significant differences among the three marital status demographics in means for pain interference, including interference with *General activity*, *Mood*, *Walking ability*, *Normal work*, *Relations with other people*, *Sleep* and *Enjoyment of life* (Appendix 7, Tables 50-56).

5.3.6 Marital status and quality of life

There were no significant differences in means for all dimensions of quality of life - *Physical Functioning*, *Role-Physical*, *Bodily Pain*, *General Health*, *Vitality*, *Social Functioning*, *Role-Emotional* and *Mental Health* – among the three different marital status demographics studied (Appendix 7, Tables 57-64). Furthermore, there were no significant differences in the *Physical and Mental Component Summaries* (PCS and MCS) among these demographics groupings, as shown in Appendix 7, Tables 65-66.

These results mean that this study has been unable to demonstrate that the older Thai adults with couple status had a better quality of life than older adults with divorced/separated/widowed or single status. A possible explanation is that the older Thai adults' children cared for them. Wongsit and Siriboon (1998 cited in Sasat 2006, p. 277) state that in the past, 70.9 percent of older people lived with their partners, children and grandchildren, getting social support including basic needs, respect, love and mental support from their family members (Khumpheng 1997; Visetkamin 2002; Wongsit & Siriboon 2006). It has also been shown that older people in Thai rural areas still have respect from their family members, which gives them high self-esteem and a better quality of life (Nanthamongkolchai *et al.* 2007). This situation is encouraged by the Thai culture's emphasis on the idea of nurturing older people; children are expected to take care of their parents (Othaganont, Sinthuvorakan & Jensupakarn 2002). Also, psychosocial support from family

members has been shown to improve the quality of life in individuals with pain (Mannix *et al*. 1999; Mantovani *et al*. 1996). All of these factors can help explain why there was no significant difference in the means for pain and quality of life among participants with couple status and participants with divorced/separated/widowed or single status in this study.

The current findings are in contrast to earlier findings by Thai researchers, including Udomsappayakul (1992), Chinuntuya (1993), Grueggultorn (1993), Panichacheewakul (1994), Chawarangkool (1995), Karnjanavorawong (1997), Khumpheng (1997), Plianbumroong (1997), Somchock (1997), Tuanwong (1997) and Visetkamin (2002), that older Thai couples had a better quality of life than those with single, divorced, widowed or separated status. These researchers found that having a partner was seen as the best source of social support for older people because they had spent a longer time living together, experienced many life events together and were similar in age (Khumpheng 1997; Visetkamin 2002). Older couples had not only a better quality of life than non-couples but also higher self-care ability (Rattana-amornchai 1992), and married status had a positive relationship with self-care and health in older Thai people (Vittayachokekittikun 1991). Those who were single, divorced, widowed or separated were more depressed than older people living as couples (Tansiri 1992). The differences between the results of these previous studies and the current study might be due to most previous studies being undertaken in city areas whereas the current study was carried out in a rural area of Thailand where older people with single or divorced, widowed or separated status were looked after mainly by their children.

5.3.7 Education and pain

The findings for the influence of education on reported pain, as presented in Appendix 7, Tables 67-70, show there were no significant differences in the means for pain intensity, including *Pain at its worst*, *Pain at its least*, *Pain on average* and *Pain right now* among the three education levels studied - no education, primary school and high school. There were significant differences in the means for pain interference with *General activity* and *Relations with other people*, as shown in Appendix 7, Tables 72 and 76. However, there were no significant differences in the means for *Mood*, *Walking ability*, *Normal work*, *Sleep* and *Enjoyment of life* among the different education levels (see Appendix 7, Tables 73-75 and 77-78).

These findings do not support previous research by Reyes-Gibby, Aday and Cleeland (2002) who found that older adults with low education had a higher prevalence of pain than their younger counterparts. It is possible that the current results are due to most participants across the three groups (114 out of 160) having primary school level education.

5.3.8 Education and quality of life

There was significant difference in seven dimensions of means for quality of life in *Physical Functioning*, *Role-Physical*, *Bodily Pain*, *General Health*, *Vitality*, *Social Functioning*, and *Mental Health* among the three education levels – no education, primary school and high school – as shown in Appendix 7, Tables 79-84 and 86. There were significant differences in both *Physical and Mental Component Summaries* (PCS and MCS) among the different education levels (see Appendix 7, Tables 87-88). It was shown that participants with high school education had higher means for quality of life than those with primary school education and no education.

There was no significant difference in means for *Role-Emotional* among the three education levels, as shown in Appendix 7, Table 85.

These finding are in agreement with Allison *et al*. (1998), who showed that lower educational level and older age tend to increase the impact of pain on quality of life. Low education seems to exacerbate the impact of chronic medical morbidity on mental health in older persons (Kempen *et al*. 1999). Similar to earlier Thai studies by Panawattanakul (1991), Somboonsit (1992), Chinuntuya (1993), Panichacheewakul (1994), Chawarangkool (1995), Karnjanavorawong (1997), Somchock (1997), Tuanwong (1997), Visetkamin (2002) and Wivatvanit (2002), this study found that older people with high levels of education had a better quality of life than those with low levels of, or no education.

5.3.9 Occupation and pain

Tables 90 and 92 (Appendix 7) show the findings that there were significantly higher means for *Pain at its least* and *Pain right now* in participants with no career compared to those hired by government or private business, and those who owned their own business. In this study, most participants hired by the government or private business were workers who used a lot of physical activity in doing their jobs. There were no significant differences in means for pain intensity for *Pain at its worst* and *Pain on average* among the three designated occupational groupings, as shown in Appendix 7, Tables 89 and 91. Tables 94, 96 and 98 (Appendix 7) show significantly higher means for pain interference in *General activity, Walking ability* and *Relations with other people* in participants with no career than in those hired by government or private business and those who owned their own business. There were also significantly higher means for pain interference in *Mood, Normal work, Sleep*

and *Enjoyment of life* in participants hired by government or private business than in those with no career and those who owned the business, as shown in Appendix 7, Tables 95, 97 and 99-100. One reason why pain interfered most with *General activity*, *Walking ability* and *Relations with other people* in participants with no career could be that these participants were older and/or had co-morbidities related to walking ability. In addition, they did not have the social network that comes from work, and therefore they reported they had less relations with other people. As identified by Khumpheng (1997) and Visetkamin (2002), working made older people feel independent and proud, and gave them better self-esteem.

5.3.10 Occupation and quality of life

Means for quality of life in *Physical Functioning*, *General Health*, *Vitality*, *Mental Health*, and *Physical Component Summary* (PCS) were significantly higher in participants who owned the business than in those hired by government or private business, and those with no career (Appendix 7, Tables 101, 104-105 and 108-109).

The findings support previous research by Riise, Moen and Nortvedt (2003) who found that those in occupations such as legislators, senior officials and managers had a better quality of life in both physical and mental components than those in occupations such as drivers, agriculturists and fishery workers who had a poor quality of life, especially in mental health. Riise et al. (2003) also identified that physical health problems from work, stress at work, financial difficulty and family problems may impact the poor quality of life in the latter groups.

5.3.11 Financial difficulty and pain

The findings in Appendix 7, Tables 111-114, show significantly higher means for *Pain at its worst* in participants with financial difficulty than in those without

financial problems. There were no significant differences in *Pain at its least*, *Pain on average* and *Pain right now* between participants with financial difficulty and those without. The findings showed significantly higher means for pain interference with *sleep* in participants with financial difficulty than in those without financial problems (see Appendix 7, Table 121). There were no significant differences in means for pain interference with *General activity*, *Mood*, *Walking ability*, *Normal work*, *Relations with other people* and *Enjoyment of life* between those with, and those without financial difficulties, as shown in Appendix 7, Tables 116-120 and 122.

It is possible the higher mean for *Pain at its worst* was associated with having financial difficulty because pain can lead to a number of visits to the doctor, and this costs patients financially (Reyes-Gibby, Aday & Cleeland 2002; Woo *et al.* 1994). Although older Thai people receive free health services from primary health care centres or government hospitals, they have to spend money travelling to these health services and also lose money from not working on the day they have to go to see a doctor or health officers. Anderson *et al*. (1999) also mention that socioeconomic level affects the prevalence of pain symptoms.

5.3.12 Financial difficulty and quality of life

Participants with financial difficulty had a significantly lower mean in *Role-Physical* than those without financial problems, as shown in Appendix 7, Table 124. There were also significantly lower means in quality of life in *General Health*, *Vitality* and *Role-Emotional* in participants with financial difficulty than in those without financial problems (see Appendix 7, Tables 126-127 and 129). Participants with financial difficulty evaluated their personal health as *poorer* and believed it was *likely to get worse*. These people felt more tired and worn out all the time than those

without financial problems. In addition, older people with financial difficulty had more problems with *Work or other daily activities* as a result of emotional problems than those without financial problems. There were no significant differences between these two groups in means for quality of life in *Physical Functioning*, *Bodily Pain*, *Social Functioning*, *Mental Health*, *Physical Component Summary* and *Mental Component Summary* (PCS and MCS) (Appendix 7, Table 123, 125, 128, and 130).

Participants who reported having financial difficulty did not have enough money to spend for daily living. Some spent more money than they earned, and some worked hard for very low payment.

This study's results corroborate the findings of previous work in this field. For example, Gerstle, All and Wallace (2001) reported that a better quality of life for people with chronic pain was associated with high income, whereas poor quality of life was associated with a low income. In earlier Thai research, older Thai people who worked and earned higher wages from their careers were found to have a better quality of life than those with no job and no income (Chawarangkool 1995; Chinuntuya 1993; Grueggultorn 1993; Karnjanavorawong 1997; Khumpheng 1997; Kumarnjan 2000; Panawattanakul 1991; Panichacheewakul 1994; Somboonsit 1992; Tuanwong 1997; Visetkamin 2002; Wangsa-ard 1987; Wivatvanit 2002). Most studies of older Thai people found a positive relationship between income and quality of life in people with chronic diseases (Chiaree 1990; Chikeaw 1994; Somchock 1997). However, the findings of the current study do not support a previous study by Aree-ue (1997) who found that income had no correlation with quality of life in older Thai people.

5.3.13 Co-morbidities and pain

The findings in Appendix 7, Tables 157, 178, 199 and 262 show significantly higher means for *Pain on average* in participants who had heart disease, diabetes mellitus, hypertension and musculoskeletal and joint problems than in those without these diseases. There was a significantly higher mean for *Pain at its worst* in participants having allergies than in those without allergies, as shown in Appendix 7, Table 218. There was also a significantly higher mean for *Pain right now* between participants having sciatica and those without sciatica, as shown in Appendix 7, Table 305. These findings support previous research by Reyes-Gibby, Aday and Cleeland (2002) who found that co-morbidities in older people, such as arthritis, heart disease and diabetes, cause a higher prevalence of pain.

There was a significantly lower mean for *Pain at its worst* and *Pain on average* in participants with a peptic ulcer than in those without this disease (see Appendix 7, Tables 281 and 283). There was also a significantly lower mean for *Pain at its least* and *Pain right now* in participants who had an allergy than in those who did not, as shown in Appendix 7, Tables 219 and 221.

The findings presented in Appendix 7, Tables 183, 185, 246 and 248 show significantly higher means for pain interference with *Normal work* and *Sleep* in participants with diabetes mellitus and dyslipidaemia than in those without these diseases. There was a significantly higher mean for *Enjoyment of life* in participants with allergy than in those without this disease, as shown in Appendix 7, Table 228. However, there was no significant difference in interference from pain between participants with heart disease, hypertension, musculoskeletal and joint problems, peptic ulcer and sciatica and those without these diseases, as shown in Appendix 7,

Tables 159-165, 201-207, 264-270, 285-291 and 306-312.

5.3.14 Co-morbidities and quality of life

There were significantly lower means for quality of life in *Role-Physical*, *Role-Emotional* and *Physical Component Summary* (PCS) in participants with diabetes mellitus than in those without this disease (Appendix 7, Tables 188, 193 and 195). This means older Thai adults with diabetes mellitus had more problems with work or other daily activities as a result of physical health and emotional problems than those without the disease. Participants with hypertension had a significantly lower means for quality of life in *Role-Physical* and *Physical Component Summary* (PCS) than those without the disease, as shown in Appendix 7, Tables 209 and 216). This means that older Thai adults with hypertension had more problems with work or other daily activities due to physical health than those without the disease.

There were significant lower means for quality of life in *Role-Physical* and *Role-Emotional* in participants with dyslipidaemia than in those without the disease (see Appendix 7, Tables 251 and 256). Therefore, older Thai adults with dyslipidaemia had more problems with work or other daily activities as a result of physical health and emotional problems than those without the disease. Similarly, there were significantly lower means for quality of life in *Role-Physical* and *Role-Emotional* in participants with musculoskeletal and joint problems than in those without the disease, as shown in Appendix 7, Tables 272 and 277. This means that older Thai adults with musculoskeletal and joint problems had more problems with work or other daily activities as a result of physical health and emotional problems than those without the disease. As with other co-morbidities, participants with peptic ulcer had a significantly lower mean for quality of life in *Role-Emotional* than those without the

disease (Appendix 7, Table 298). This means that older Thai adults with peptic ulcer had more problems with work or other daily activities as a result of emotional problems than those without the disease.

There were significantly lower means for quality of life in *Bodily Pain* and *Role-Emotional* in participants with sciatica than in those without the disease (Appendix 7, Tables 315 and 319), resulting in older Thai adults with sciatica having more severe and extremely limiting pain, and more problems with work or other daily activities as a result of emotional problems than those without the disease. Conversely, participants with allergy had a significantly higher means for quality of life in Vitality than those without the disease (Appendix 7, Table 233). This means participants with allergy felt full of pep and energy more of the time than those without the disease. It seems possible that this result is due to those with allergy having lower *Pain right now* and those without allergy having *Pain at its least*.

These findings are in agreement with Kempen *et al*. (1999) and Reyes-Gibby, Aday and Cleeland (2002) who showed that chronic medical health problems substantially affected quality of life in older people. Long-term co-morbidity and its intensity induced poor quality of life in the older Thai people in one study (Karnjanavorawong 1997), while Wivatvanit (2002) found that morbidity was higher among older females, uneducated older people, older people with insufficient income and older people in rural areas. Thus, older people's health was related to life satisfaction or quality of life. As found in the current study, other studies found that older Thai people with good health had better life satisfaction or quality of life than those with co-morbidities (Chinuntuya 1993; Nuchsangplee 1989; Sinchai 1989; Sukamwang 1997). Nanthamongkolchai *et al.* (2007) also found that older Thai people who can

help themselves in their routine daily activities, housework and other hobbies do not feel they are a burden to their offspring, which results in them having higher self-esteem and a better quality of life.

5.4 Impact of foot reflexology on pain reduction and improvement of quality of life

There are two hypotheses in this study: a primary hypothesis related to pain and a secondary hypothesis related to quality of life. Each of these consists of two hypotheses - a null hypothesis and an alternative hypothesis. This section discusses the study's findings in terms of these hypotheses.

5.4.1 Primary hypothesis

As stated in Chapter 3, there are two primary hypotheses: the null hypothesis and the alternative hypothesis.

Null hypothesis: There is no difference in mean pain scores between the intervention (foot reflexology) group and the alternative intervention (home-based interview talking about pain) group, or between the intervention (foot reflexology) group and the no intervention group (group with no intervention) at the end of the intervention (week 4) and the end of the follow-up period (week 6).

Alternative hypothesis: There is a difference in mean pain scores between the intervention (foot reflexology) group and the alternative intervention (home-based interview talking about pain) group, or between the intervention (foot reflexology) group and the no intervention group (group with no intervention) at the end of the intervention (week 4) and the end of the follow-up period (week 6).

Pain levels in all participants were measured at the end of the intervention (week 4)

and at the end of the follow-up period (week 6). The findings of the two stages are discussed below. The study found that the alternative primary hypothesis was accepted at the end of week 4, which meant the foot reflexology intervention temporarily reduced pain levels in the older Thai people immediately after its application but not at the end of the follow-up period (week 6). In addition, foot reflexology significantly decreased pain interference in participants' lives at both stages.

5.4.1.1 End of intervention (week 4)

No significant differences in the means for *Pain at its worst* and *pain at its least* arose from using ANOVA (unadjusted mean) and ANCOVA (adjusted mean). However, there were significant differences in the means for *Pain on average, Pain right now* and interference of pain with *General activity, Mood, Walking ability, Normal work, Relations with other people, Sleep* and *Enjoyment of life* among the three groups in the study both in unadjusted mean (ANOVA) and adjusted mean (ANCOVA), as shown below:

Pain on average at the end of intervention (week 4)

Data analysis using the unadjusted mean (ANOVA) indicated a significant difference in *Pain on average* among the three groups (*P=0.048)* as shown in Table 4.107, however Post-Hoc tests (Multiple Comparisons) showed no significant difference in any compared groups (Appendix 8, Table 1). A possible explanation for this is that a *P* value of 0.048 might be considered as *P=0.05,* which means no significant difference between groups. After careful adjustment for confounding variables, using adjusted mean (ANCOVA), the finding confirmed that there was a significant difference in the mean for *Pain on average* among the three groups in the study (*P=0.005)* (see Table 4.107). The additional Pairwise Comparisons test (Appendix 8,

Table 11) revealed a significant difference in the mean for *Pain on average* between the intervention group and the alternative intervention group (*P=0.003*), and between the intervention group and the group with no intervention (*P=0.016*).

Pain right now at the end of intervention (week 4)

The unadjusted mean (ANOVA) (Table 4.107) showed there was significant difference in the mean for *Pain right now* among the three groups at the end of week 4 (*P=0.000)*. A Post-Hoc analysis test with Multiple Comparisons (Appendix 8, Table 2) confirmed significant differences in mean for *Pain right now* between the intervention group and the alternative intervention group (*P=0.000*), and between the alternative intervention group and the group with no intervention (*P=0.020*). The findings using adjusted mean (ANCOVA) (Table 4.107) show that there were significant differences in the mean for *Pain right now* among the three groups in the study at the end of week 4 (*P=0.000)*. The Pairwise Comparison test (Appendix 8, Table 12) indicated significant differences in the mean for *Pain right now* between the intervention group and the alternative intervention group (*P=0.000*), the intervention group and the group with no intervention (*P=0.039*), and the alternative intervention group and the group with no intervention (*P=0.044*).

These results indicate that foot reflexology helped reduce pain levels in the older Thai people immediately after its application. This finding corroborates those of previous research in this field by Stephenson, Dalton and Carlson (2003), Stephenson, Weinrich and Tavakoli (2000), Evans *et al* (1998), and Launso, Brendstrup and Arnberg (1999).

Stephenson, Dalton and Carlson (2003) explored the effects of foot reflexology on pain in 36 patients with metastasised cancer. Their results showed that foot

reflexology significantly decreased the pain score immediately after treatment in the treatment group. Similarities between that study and the current study include using the Ingham method for foot reflexology and measuring pain levels immediately after treatment. The differences between these two studies, which add to the reliability of the current study, were that

- the sample size in the previous study was much smaller;
- the intervention in the previous study was carried out for only 30 minutes per session for two days whereas 50-minute foot reflexology sessions were given twice a week for four weeks in the current study; and
- pain measurement after treatment was applied at three hours and 24 hours in the previous study while the current study measured pain levels at the end of the foot reflexology intervention (week 4) and at the post-intervention follow-up period (week 6).

The current study's finding that foot reflexology helped reduce pain levels in the older Thai people immediately after its application was also consistent with Stephenson, Weinrich and Tavakoli's (2000) study into pain levels in 23 patients with breast or lung cancer (13 with breast cancer and 10 with lung cancer). These researchers reported that pain decreased significantly in patients with breast cancer immediately after receiving foot reflexology treatment. Calculations for those with lung cancer could not be done because only two patients with lung cancer reported pain. Both that study and the current study used the Ingham method of foot reflexology. However, differences between the two studies include a smaller sample size in Stephenson *et al*.'s (2000) study, and the reflexology intervention was carried out for only one 30-minute session in that study compared to 50-minutes foot reflexology sessions given twice a week for four weeks in this study.

Evans *et al.* (1998) studied pain reduction with foot reflexology in 29 patients who had knee replacement surgery. Participants included a control group who received no intervention (9 participants), a foot reflexology group (7 participants) who received foot reflexology treatment within 24 hours of surgery and three times a week until discharge, and a placebo group (13 participants) who received foot reflexology but without pressing the areas affecting healing of the knee. Findings were that there was significantly higher morphine consumption in the control group than in the treatment group or placebo group; however, there was no difference in morphine consumption between the treatment group and the placebo group. A possible explanation for this is that placebo foot reflexology, while not directly affecting healing of the knee, may provide pressure on surrounding areas that may improve the function of organs related to pain control.

Despite differences between Evans *et al.*'s (1998) study and the current study in the type of participants and the interventions used, the current study confirmed Evans *et al.*'s finding that foot reflexology was associated with pain reduction. It also confirmed Launso, Brendstrup and Arnberg's (1999) similar finding. Launso *et al.* applied foot reflexology for six months to 220 patients with migraine and/or tension headache (they did not say how long each treatment session was). Patients recorded a headache diary for one month before treatment and during treatment, and participated in qualitative interviews at the end of the study. Results showed that foot reflexology helped decrease headache in 81 percent of patients – 19 percent of these no longer took medication.

One study with which the current findings disagree is Tovey's (2002) investigation of a reduction of abdominal pain in patients with irritable bowel syndrome using a

30-minute foot reflexology session (19 participants) and foot massage without pressing specific areas on the feet (15 participants). Treatments were given once a week for four weeks and then once a fortnight for two sessions. Abdominal pain was measured using a Health Assessment Sheet (Whorwell 1984) before the first intervention, during the intervention, after the intervention and at the three-month follow-up. Results showed no significant difference between the two groups in improvement of abdominal pain in any measurement period. It seems possible that this result is due to foot massage helping to release endorphins (Kaada & Torsteinbø 1989), which are considered to be pain relievers (Bender *et al* 2007). Moreover, research prior to Tovey's (Hulme, Waterman & Hillier 1999) showed that foot massage could reduce pain levels over time.

In comparison with Tovey's (2002) study, which had only 34 participants, the current study had 160 participants and foot reflexology was applied twice a week for four weeks. The greater sample size and more intense intervention initially may partly explain the differences in the findings between the two studies.

Interference of pain at the end of the intervention (week 4)

Interference of pain at the end of week 4 with *General activity, Mood, Walking ability, Normal work, Relations with other people, Sleep*, and *Enjoyment of life* was significantly different among three groups in the study, as shown in Table 4.107. All items presented a *P* value at *0.000*. The comparisons between each set of two groups showed a significant difference between the intervention group and the alternative intervention group, and between the intervention group and the group with no intervention (see Appendix 8, Tables 13-26). However, there was no evidence from the previous literature to reveal whether foot reflexology helped decrease the

interference of pain with *General activity, Mood, Walking ability*, *Normal work, Relations with other people, Sleep*, and *Enjoyment of life*. This new discovery suggests that there is a connection between pain relief and these activities.

The current finding is in contrast to an earlier finding by Williamson *et al.* (2002) that foot reflexology treatment did not improve sleep in 76 British menopausal women. The researchers applied a 45-minute foot reflexology session to 39 participants and non-specific foot massage to 37 participants. Both groups received nine sessions of either foot reflexology or non-specific foot massage once a week for six weeks followed by once a month for three months. The Women's Health Questionnaire (Hunter 1992) and a visual analogue scale (McDowell & Newell 1996) were used to measure the severity and frequency of anxiety and depression, as well as physiological symptoms such as flushes, night sweats and sleep problems. Both groups in Williamson et *al.*'s study (2002) reported similar results. This may have been because participants in the control group benefited from foot massage, which has been shown to encourage sleep (Ejindu 2007) and reduce anxiety (Dunn *et al* 1995) - a factor known to cause poor sleep (Arriaga *et al.* 1995; Mayers *et al.* 2009).

The new finding from the current study - that foot reflexology reduced the interference of pain in older Thai people immediately after the intervention sessions - may be related to a reduction of pain level, leading to a reduction of pain interference. Literature reviews show that pain affects sleep and fatigue (Ferrell, BA, Ferrell, BR & Osterweil, D 1990; Woo *et al.* 1994; Feine & Lund 1997; Gagliese & Melzack 1997; The American Geriatrics Society 2002; Nikolaus & Zeyfang 2004; Tsai *et al.* 2004; Weiner 2007), impairs activities of daily living or mobility, and

decreases activities (Williamson & Schulz 1992; Hitchcock, Ferrell & McCaffery 1994; Won *et al*. 1999; Morrow, Saxton & Rodriguez 2002; The American Geriatrics Society 2002; Thomas *et al.* 2004; Tsai *et al.* 2004; Weiner 2007).

Pain has also been shown to affect the patient's mood, personality and social relationships (The American Geriatrics Society 2002; Won *et al*. 1999; Woolf & Mannion 1999; Weiner 2007); depression (Asghari, Ghaderi & Ashory 2006; Feine & Lund 1997; Hitchcock, Ferrell & McCaffery 1994; Ferrell, BA, Ferrell, BR & Osterweil, D 1990; Magni *et al.* 1990; Magni *et al.* 1993, 1994; Morrow, Saxton & Rodriguez 2002; Nikolaus & Zeyfang 2004; Parmelee, Katz & Lawton 1991; Rudy *et al* 2007; The American Geriatrics Society 2002; Weiner 2007; Williamson & Schulz 1992; Woo *et al.* 1994; Won *et al*. 1999); and feelings of hopelessness (Hitchcock, Ferrell & McCaffery 1994).

Pain can affect doing a job and loss of income (Fifield, Reisine & Grady 1991), induce an increase in health care use and costs (Federman, Litke & Morrison 2006; Ferrell, Ferrell & Osterweil 1990; Nikolaus & Zeyfang 2004; The American Geriatrics Society 2002), affect personal relationships (Hitchcock, Ferrell & McCaffery 1994), and impact recreational and social activities (Ferrell, Ferrell & Osterweil 1990; Hicks 2000; Nikolaus & Zeyfang 2004; Rudy *et al* 2007; The American Geriatrics Society 2002).

These explanations of the impact of pain on a person's life provide evidence for the assumption that a decrease of pain level will correlate with the interference of pain.

5.4.1.2 End of the follow-up period (week 6)

Data analysis by unadjusted mean (ANOVA) showed a significant difference in the mean for *Pain at its worst* among the three groups in the study (*P=0.000*) at the end

of the follow-up period, but no significant difference was shown from analysis by adjusted mean (ANCOVA) (*P=0.322*) (see Table 4.108). There were no significant differences in the means for *Pain at its least, Pain on average* and *Pain right now* using unadjusted mean (ANOVA) and adjusted mean (ANCOVA), as shown in Table 4.108. The findings from this stage confirm that without the foot reflexology intervention pain level was similar in all three groups.

Interestingly, there were significant differences between the three groups in the mean for Interference of pain with *General activity, Mood, Walking ability, Normal work, Relations with other people, Sleep* and *Enjoyment of life* when using unadjusted mean (ANOVA) and adjusted mean (ANCOVA). As shown in Table 4.108, all items presented a *P* value of *0.000*. The comparisons between each set of two groups showed a significant difference between the intervention group and the alternative intervention group, and between the intervention group and the group with no intervention (Appendix 8, Tables 4-10 and 20-26).

5.4.2 Secondary hypothesis

As stated in Chapter 3, the study aimed to confirm or discount two secondary hypotheses, parallel to the primary hypotheses but related to quality of life; a null hypothesis and an alternative hypothesis.

> *Null hypothesis*: There was no difference in the mean for quality of life scores between the intervention (foot reflexology) group and the alternative intervention (home-based interview talking about pain) group, or between the intervention (foot reflexology) group and the no intervention group (group with no intervention) at the end of the intervention (week 4) and the end of the follow-up period (week 6).

Alternative hypothesis: There was a difference in the mean for quality of life scores between the intervention (foot reflexology) group and the alternative intervention (home-based interview talking about pain) group, or between the intervention (foot reflexology) group and the no intervention group (group with no intervention) at the end of the intervention (week 4) and the end of the follow-up period (week 6).

Quality of life was analysed in eight general areas including *Physical Functioning, Role Limitations because of Physical Health Problems (Role-Physical), Bodily Pain, Social Functioning, Mental Health, Role Limitations because of Emotional Problems (Role-Emotional), Vitality* and *General Health* at the end of intervention (week 4) and at the end of the follow-up period (week 6) compared to baseline.

5.4.2.1 End of intervention (week 4)

In this study, foot reflexology was found to improve the quality of life in the participants in the intervention group at the end of the intervention (week 4). Areas improved by the intervention included *Physical Functioning* (*P=0.000, P=0.000*), *Mental Health* (*P=0.000, P=0.017*), *Role-Emotional* (*P=0.021, P=0.026*), *Vitality* (*P=0.000, P=0.000*) and *General Health* (*P=0.000, P=0.000*), which were analysed using both unadjusted mean (ANOVA) and adjusted mean (ANCOVA) respectively, as shown in Table 4.109. The comparisons test confirmed the significant difference between the intervention group and the alternative intervention group, and between the intervention group and the group with no intervention, as shown in Appendix 9, Tables 1, 3-6 and 15-19.

This finding further supports Park and Cho's (2004) research, which found that foot reflexology improves the quality of life in patients with hypertension. It also supports findings by Gambles, Crooke and Wilkinson (2002), who demonstrated that such treatment improves the quality of life in patients with cancer. Even though different

tools were used in the current study to measure the quality of life, the larger sample size helps make the finding more reliable. The improvement in physical functioning in the intervention group at the end of the intervention (week 4) in things such as running, lifting or moving objects, climbing stairs, bending, kneeling, walking and bathing may be explained by a number of different factors.

First, it is likely that pain relief resulting from the intervention is linked to improved physical functioning. As mentioned in the literature review, pain affects daily activities and causes immobility (Williamson & Schulz 1992; Hitchcock, Ferrell & McCaffery 1994; Won *et al*. 1999; Morrow, Saxton & Rodriguez 2002; The American Geriatrics Society 2002; Thomas *et al.* 2004; Tsai *et al.* 2004; Weiner 2007). Pain also encourages fatigue (Ferrell, Ferrell & Osterweil 1990; Woo *et al.* 1994; Feine & Lund 1997; Gagliese & Melzack 1997; The American Geriatrics Society 2002; Nikolaus & Zeyfang 2004; Tsai *et al.* 2004; Weiner 2007).

Second, foot reflexology itself is claimed to free the energy flow, improve blood and lymph flow, and return the body to a state of equilibrium (Mackereth & Tiran 2002). Such intervention may help produce endorphins, known as the body's painkillers (Dougans 2002; Mackereth & Tiran 2002). In addition, the touch or contact from reflexology can deviate brain perceptions away from pain (Mackereth & Tiran 2002). And when the pain level decreased, the ability to do things improved.

The improvement of *Mental Health*, *Role-Emotional*, *Vitality* and *General Health* due to foot reflexology at this phase seemed to result from a decrease in pain level. It has been well established that pain affects the patient's mood, personality and social relationships (Won *et al*. 1999; Woolf & Mannion 1999; The American Geriatrics Society 2002; Weiner 2007), encourages feelings of hopelessness (Hitchcock, Ferrell

& McCaffery 1994) and causes depression (Ferrell, Ferrell & Osterweil 1990; Magni *et al.* 1990; Parmelee, Katz & Lawton 1991; Williamson & Schulz 1992; Magni *et al.* 1993, 1994; Hitchcock, Ferrell & McCaffery 1994; Woo *et al.* 1994; Feine & Lund 1997; Won *et al*. 1999; Morrow, Saxton & Rodriguez 2002; The American Geriatrics Society 2002; Nikolaus & Zeyfang 2004; Asghari, Ghaderi & Ashory 2006; Rudy *et al* 2007; Weiner 2007). Depression has been shown to lead to cognitive impairment, poor judgement and decision-making, poor compliance with medications, and increased morbidity and mortality (Morrow, Saxton & Rodriguez 2002; Rudy *et al.* 2007).

Pain has been shown to decrease a person's ability to do their job, resulting in lost income (Fifield, Reisine & Grady 1991); to increase health care use and costs (Ferrell, Ferrell & Osterweil 1990; The American Geriatrics Society 2002; Nikolaus & Zeyfang 2004; Federman, Litke & Morrison 2006); to affect personal relationships (Hitchcock, Ferrell & McCaffery 1994); to impact recreational and social activities (Ferrell, Ferrell & Osterweil 1990; Hicks 2000; The American Geriatrics Society 2002; Nikolaus & Zeyfang 2004; Rudy *et al* 2007); and to impact overall quality of life (Hicks 2000; Rudy *et al* 2007). When pain is relieved, patients' psychological and social aspects have been shown to improve.

The quality of life in the current study in the areas of *Role-Physical, Bodily Pain* and *Social Functioning* did not differ in the three groups at this phase. As seen from the SF-36 questionnaire (Appendix 5), these items relate most strongly to physical pain and physical activities. Questions in these areas asked the participants about their perceptions or feelings about their body during the past four weeks - the period covering the first intervention until the last day of intervention (week 4). The

participants' perception was that their pain still had not been relieved.

5.4.2.2 End of the follow-up period (week 6)

In this phase, foot reflexology was found to improve the quality of life in participants in the intervention group in most areas, including *Physical Functioning* (*P=0.000, P=0.000*), *Role-Physical* (*P=0.016, P=0.033*), *Bodily Pain* (*P=0.001, P=0.008*), *Mental Health* (*P=0.000, P=0.017*), *Role-Emotional* (*P=0.005, P=0.011*), *Vitality* (*P=0.000, P=0.000*) and *General Health* (*P=0.000, P=0.000*), analysed using unadjusted mean (ANOVA) and adjusted mean (ANCOVA) respectively, as shown in Table 4.110. The comparisons test confirmed the significant difference between the intervention group and the alternative intervention group, and between the intervention group and the group with no intervention (Appendix 9, Tables 7-9, 11-14 and 20-26).

At this stage, *Role-Physical* and *Bodily Pain* appeared to be significantly different among the three groups. The participants' perception of their pain had improved, even though foot reflexology was no longer given. It seems possible that participants in the intervention group had a better perception or feeling about their body pain during the past four weeks, which included the last two weeks of the foot reflexology intervention and the two weeks of the follow-up period (week 6).

5.5 Limitations of the study

The final section of this chapter summarises the study's limitations as identified by the researcher.

1. *Different interviewers:* Identified limitations due to the number of interviewers have been discussed at the beginning of the chapter. The main issues were the possibility of interviewer bias and influence over participants' responses.
2. *Different therapists:* The limitations of using six different therapists have also been discussed at the beginning of this chapter. The main issue was the possibility of inconsistent results due to slight variations in technique and uneven numbers of interventions with each therapist.
3. *Other treatment received by participants:* Participants continued their medication and/or their complementary therapies while the intervention was given. Lifestyle modifications and/or life events might happen during the study, which could limit the outcomes related to the study interventions.
4. *Thai culture:* We asked the participants to pick a label and allocated them to groups accordingly. We could not tell them whether they had been put in the intervention group or one of the other groups. Everyone wanted to get into the intervention group because they believed the foot reflexology intervention would help them get better. No Thai people wanted to be in the other groups because they saw this as being like a mouse in an experiment. We had to say that if they had number two, they had to wait because no masseur was available 'right now'. We also had to say that they would be visited by a health officer while they were waiting and we would let them know when a masseur was available. If they had number three, we told them they had to wait because no masseur was available right now and we would let them know when a masseur was available. We got some complaints about making them wait and only 22 participants from the non-reflexology groups were interested in having foot reflexology after week 6 of the study.

5. *Participants' occupation and the rainy season:* The intervention was carried out during the rainy season in Thailand and most participants were farmers. Most of the participants in the three groups who did not turn up said it was because they were too busy doing their jobs. It became time and cost consuming for the project because it required replacing 17 participants in the intervention group who dropped out for this reason. Some said they dropped out because they were sick or their relatives were sick.
6. *Setting and population:* The study took place in the rural area of Thailand and in older Thai people. Therefore, the findings might only be representative of this population.

The next chapter presents a brief summary of the findings, makes recommendations for the use of foot reflexology and suggests directions for future research.

6. Conclusion, recommendations and future research

6.1 Conclusion

This study has investigated the effect of foot reflexology on reducing pain in older Thai people. Returning to the hypothesis posed at the beginning of this study, it is now possible to state that foot reflexology helps reduce pain levels in the older Thai population immediately after its use. However, the study does not show any long-term effects of foot reflexology on pain management. The second major finding is that foot reflexology helps improve the quality of life in this population. One of the significant findings to emerge from this study is that talking about pain did not play a role in reducing pain in the older Thai population studied.

Taken together, these results suggest that foot reflexology can be applied to older Thai adults with mild pain to help reduce pain intensity and pain interferences, and to help improve their quality of life. The study's findings add substantially to the current understanding of the benefits of foot reflexology and will serve as a base for future studies.

The project was limited in several ways. First, different interviewers were used. This presented the possibility of interviewer bias and influence over participants' responses. Second, the project used six different therapists, which may have caused inconsistent results due to slight variations in technique and uneven numbers of foot reflexology interventions with each therapist. Third, participants continued their medication and/or their complementary therapies while receiving the intervention. Fourth, lifestyle modifications and/or life events beyond the study's control may have occurred. These need consideration because they have the potential to limit the outcomes of the study interventions. Fifth, the intervention was carried out during the

rainy season in Thailand and most participants were farmers. Most of the participants in the three groups who did not turn up said it was because they were too busy doing their jobs. This was time and cost consuming for the project. Sixth, the study took place in older Thai people in a rural area of Thailand only. Therefore, the findings might only be representative of this particular population.

6.2 Recommendations

Despite the identified limitations of this study, the positive outcomes for the intervention group indicate that foot reflexology should be recommended to patients with pain, or provided in clinical care settings such as hospitals or in the community. The current findings add to a growing body of literature on the benefits of foot reflexology in reducing pain for short time periods. This study also assists in understanding the role of foot reflexology in managing pain. However, caution must be applied to transferring these findings to other populations and other settings. Due to limitations in setting and population, the findings might not be transferable to other groups within, or outside the general Thai population.

6.3 Future research directions

A cross-national study involving older Thai people with pain in the urban areas, other adult age groups with pain, older people with other health problems and comparison between foot reflexology and Thai foot massage as intervention strategies is needed. Assessing the effects of foot reflexology using qualitative research methods to get more details of participants' feelings, interactions, attitudes, cultural influences and satisfaction after the intervention, including masseurs keeping a short journal about their observations and reactions, would be useful.

Effect of foot reflexology on pain reduction in older Thai people

Jeranut Somchock M.Sc, M.N.S, Dip. Science (Nurs)

Volume 2

A thesis submitted in total fulfilment of the requirements for the

Doctor of Philosophy

School of Nursing and Midwifery

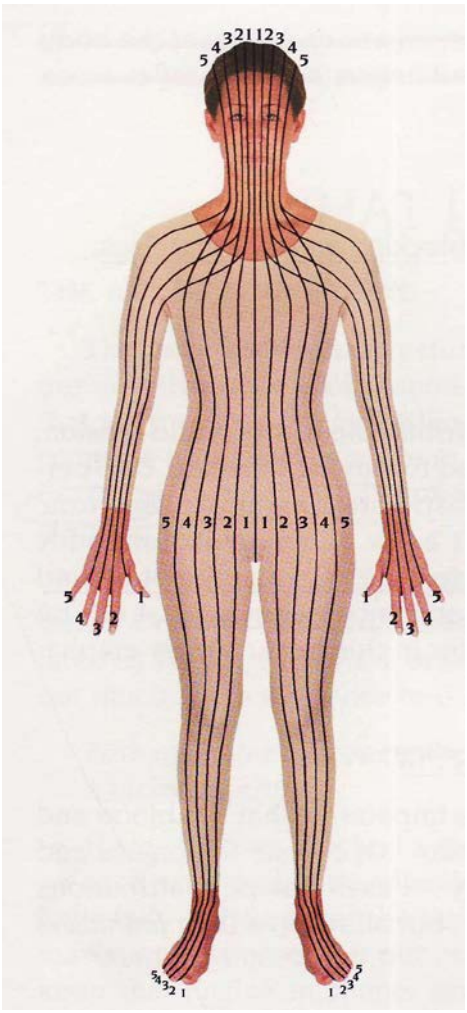
Flinders University

Adelaide, Australia

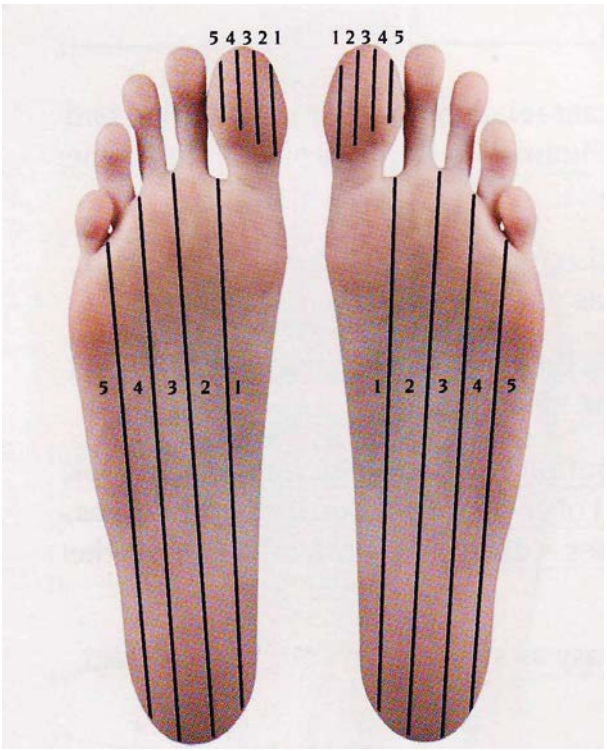
December 2012

7. Appendices

Appendix 1 Diagrams



zones of the body



zones of the feet

Diagram 1 Zones of the body and feet

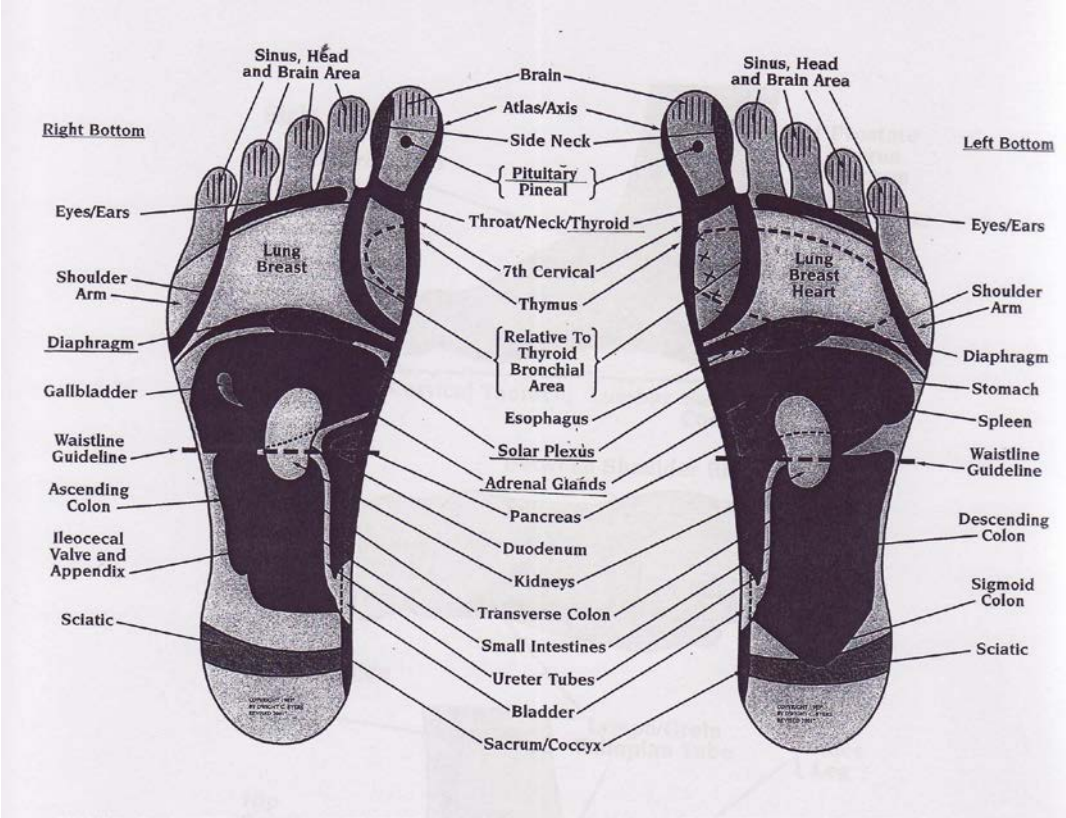


Diagram 2 Reflex points on feet

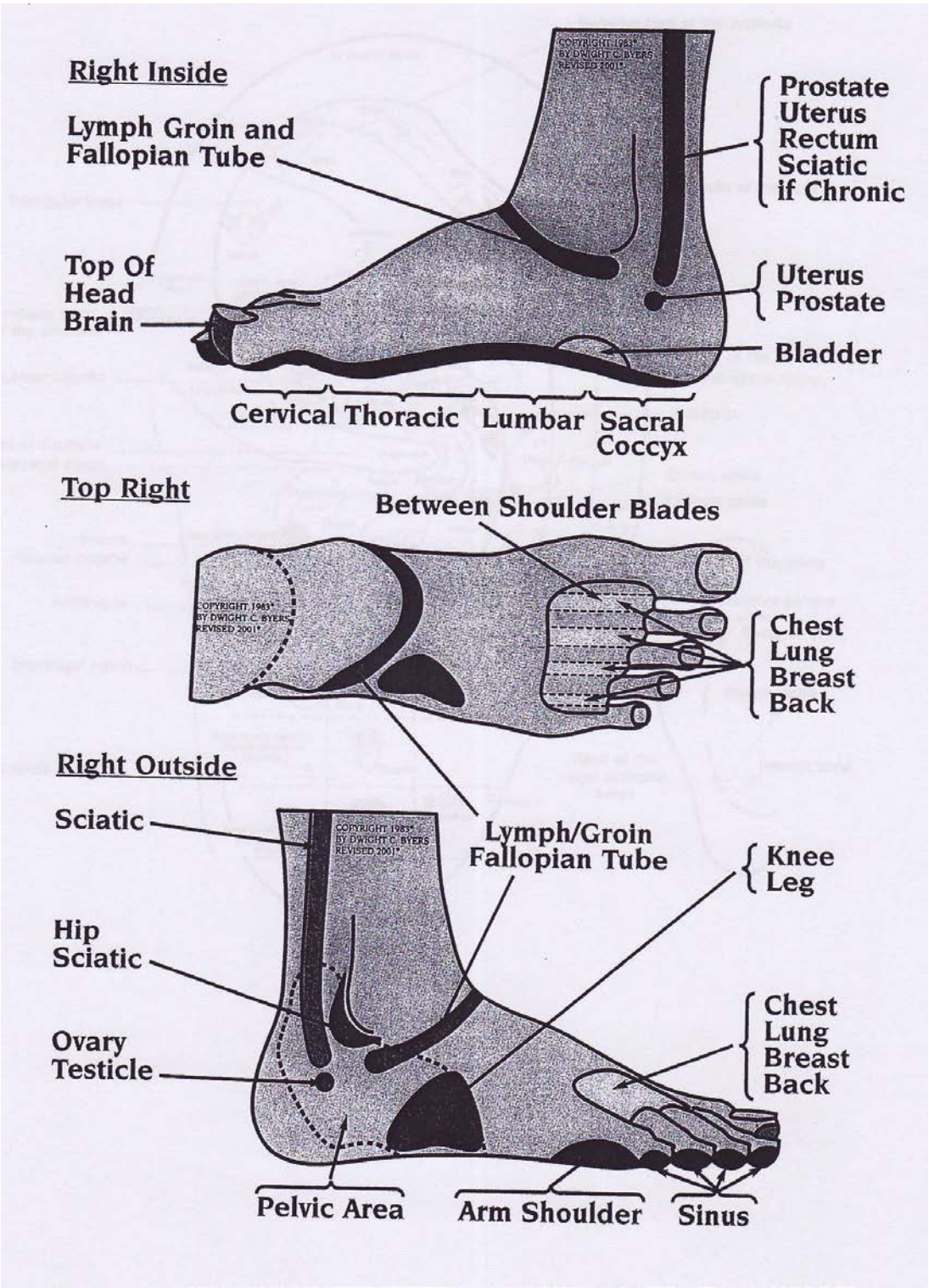


Diagram 2 (continued) **Reflex points on feet**

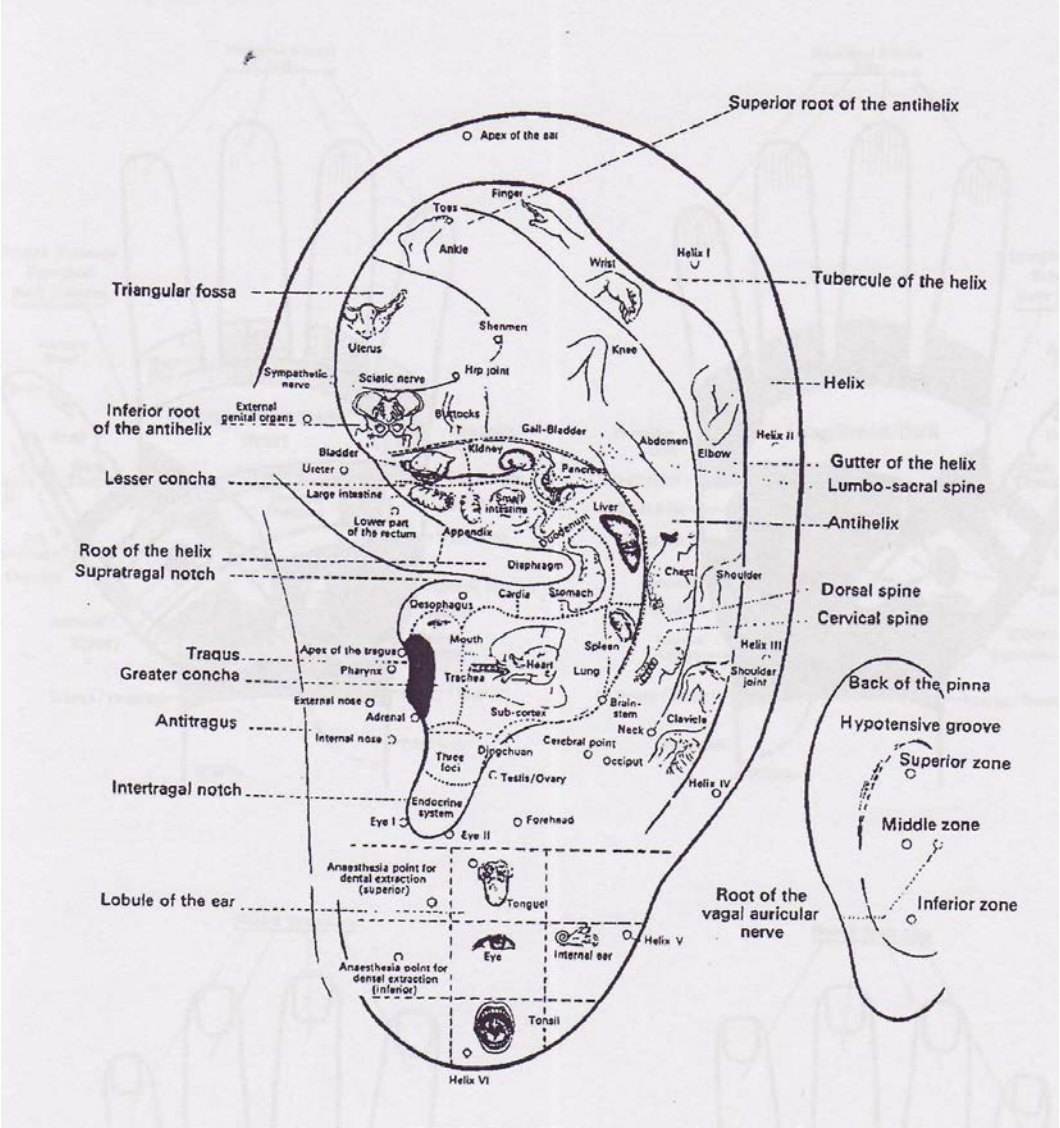


Diagram 3 Reflex points on ears

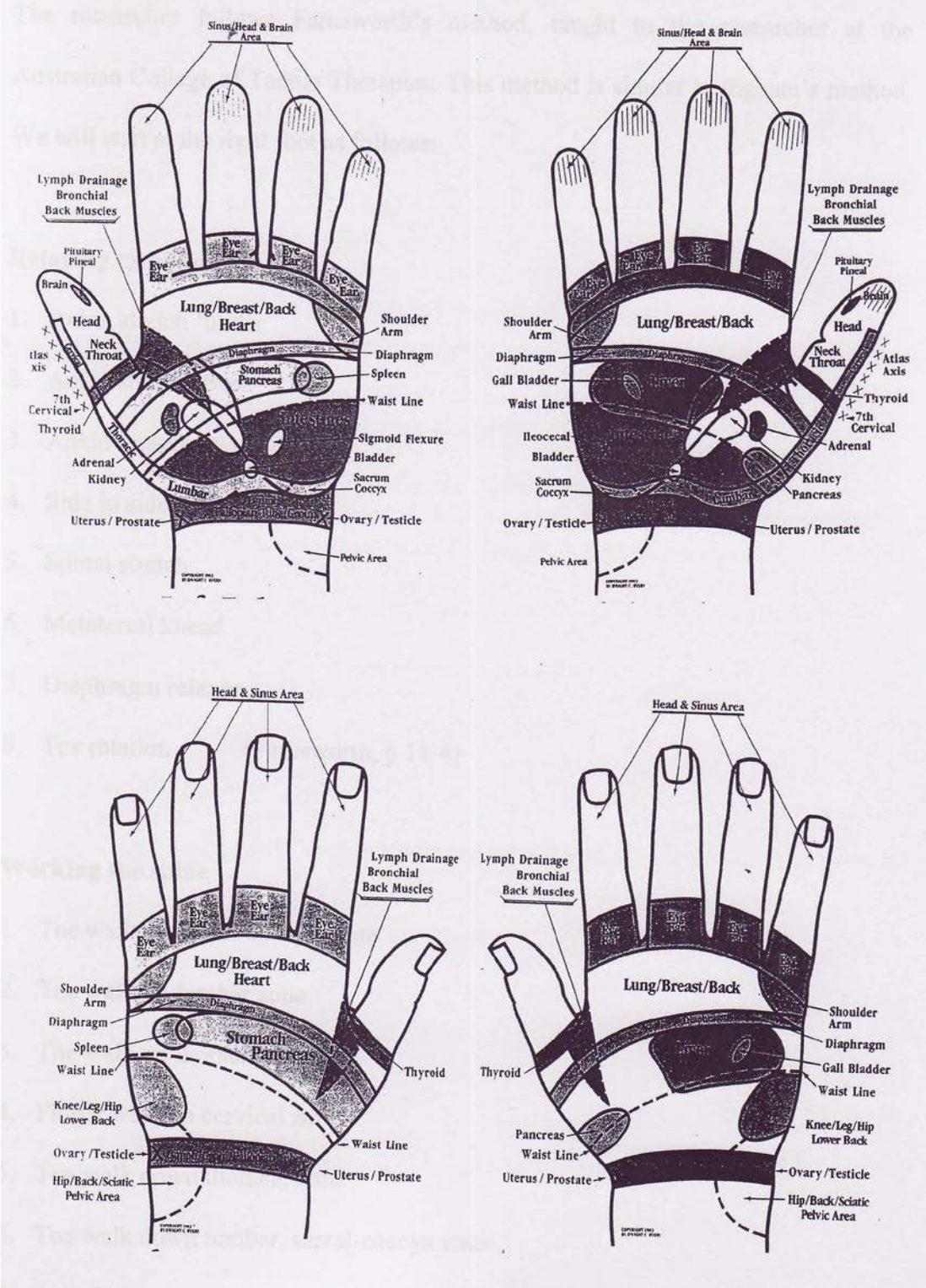


Diagram 4 Reflex points on hands

Appendix 2 Foot reflexology procedures

Reflexology sequence outline

The researcher follows Farnsworth's method, taught to the researcher at the Australian College of Tactile Therapies. This method is similar to Ingham's method. We will start at the right foot as follows:

Relaxing techniques

1. Ankle stretch 'under'
2. Ankle stretch 'over'
3. Ankle loosening
4. Side to side
5. Spinal stretch
6. Metatarsal knead
7. Diaphragm relaxer
8. Toe rotation (Farnsworth, p 11-4)

Working the spine

1. Toe walk up sacral-coccyx zone
2. Toe walk up lumbar zone
3. Toe walk up thoracic zone
4. Finger walk up cervical zone
5. Toe walk down thoracic zone
6. Toe walk down lumbar, sacral-coccyx zone
7. Spinal stretch and metatarsal knead (Farnsworth, p 11-4)

Working the lungs

1. Diaphragm relaxer then toe walk from medial metatarsal upwards from diaphragm to base of toes
2. Do five plantar zones in between metatarsals, repeat other hand, back to start metatarsal knead
3. Finger walk dorsal five zones in between metatarsals with thumb in fist medial to lateral
4. Change hands, repeat lateral to medial

Working the toes

5. Toe walk sideways over throat-thyroid reflex both ways
6. Finger walk cervical while stretching toe with holding fingers
7. Toe walk down large toe plantar side latched onto fingers, work medial to lateral all toes latched onto fingers, work medial to lateral all toes to their roots
8. Repeat other coming back to start (use other hand)
9. Hook in and back up on pituitary with medial thumb
10. Working the brain
11. Toe walk the ridge (eye and ear reflexes) both ways using lateral aspect or edge of thumbs pulling down padding
12. Side to side relaxer
13. Metatarsal knead (Farnsworth, p 11-4 – 11-5)

Working the digestive system

1. Toe walk waistline to diaphragm, cross hatch in both direction with foot in dorsiflexion
2. Wring out with thumbs
3. Toe walk waistline to heel line, cross hatch in both directions with foot in dorsiflexion and wring out with thumb
4. Work the adrenal gland
5. Work the ileocecal valve reflex hook in and back up right foot
6. If on left foot cross hatch plantar heel zone working the sigmoid flexor three ways with thumb then hook in and back up
7. Side to side relaxer (Farnsworth, p 11-5)

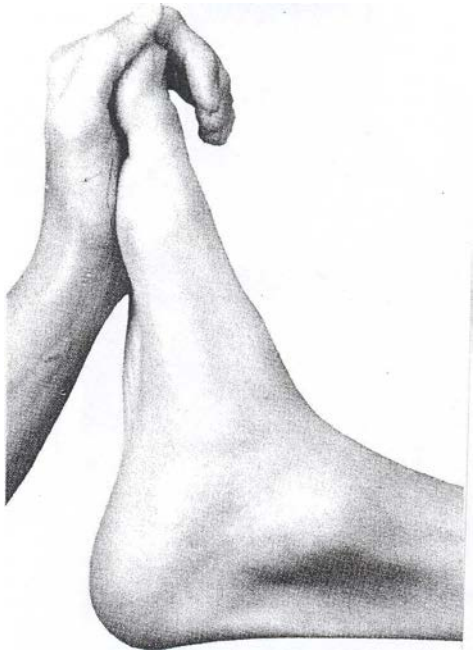
Working the lateral and medial heel areas

1. Finger walk lateral hip, knee, leg reflex zone
2. Change hands and finger walk same reflex from dorsal side to plantar side
3. Finger walk hip, sciatic reflex around external malleolus
4. Change hands and finger walk same reflex going opposite direction underneath
5. Change hands pin point…with index finger rotate clockwise on lateral reproductive reflex
6. Ankle loosening
7. Dorsiflex foot, toe walk medial Achilles tendon three times
8. Reflex rotate using thumb as a fulcrum on medial reproductive reflex
9. Ankle loosening
10. Finger walk across ankle medial to lateral and lateral to medial
11. Finish with full range of relaxing techniques (Farnsworth, p 11-5)

Details of each procedure are described below. Before using the procedures, the reflexologist has to understand how to hold the client's foot and how to use thumb and fingers effectively.

Basic holding technique

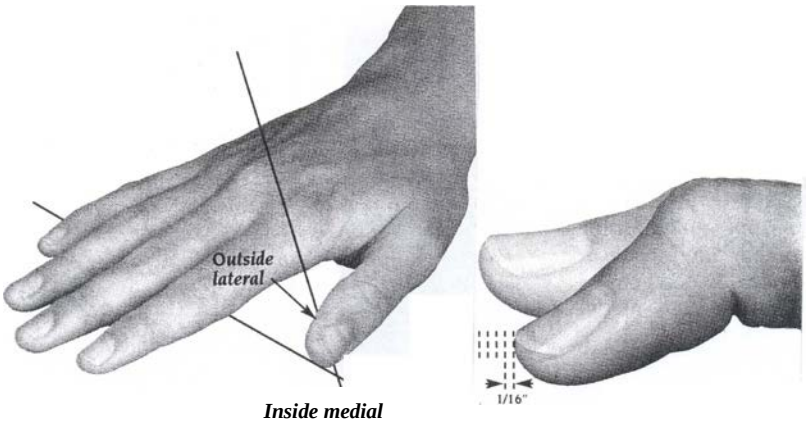
> The heel of the holding hand will be placed firmly on the metatarsal pad of the foot with the fingers relaxed over the toes and the thumb on the medial edge of the great toe or the small toe…drop the wrist slightly to relax the longitudinal tendon of the foot, this gives you control over the foot and allows you to push the foot back or to bring it forward using the natural spring of the ankle joint (Byers 2001, p 27).



Picture 1 Basic holding technique

Basic thumb technique

The inside (medial) edge of the thumb is the used part, '…walk the thumb by slightly bending and unbending the 1st joint…it will "creep" forward in this natural position…taking tiny bites…like a snail who leaves a steady, even trail…' (Byers 2001, pp 28-29).



Picture 2 Position for the basic thumb technique **Picture 3 Basic thumb walking technique**

Leverage

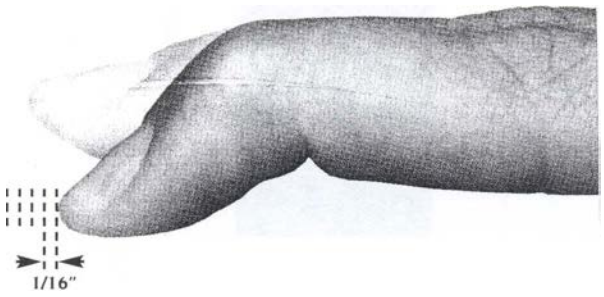
This technique helps you to put effective pressure on each area of the foot.

'…place the fingers of your working hand firmly underneath [each area] for leverage in opposition to your thumb and do the walking motion with your thumb, letting the fingers follow along as you move (Byers 2001, p 28).

Picture 4 Leverage

Basic finger technique

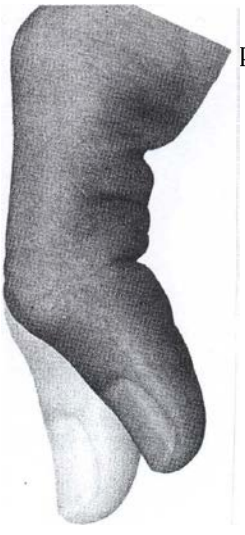
The same as the thumb technique, taking creeping motions by smaller and smaller bites and exerting a constant and steady forward pressure…the finger always moves in a forward direction, never backwards or sideways…the index, third and fourth fingers can walk individually or together…we use …[this technique] to work certain areas which could not be worked as effectively by using the thumbs (Byers 2001, p 30).



Picture 5 Basic finger walking technique

Hook-in, back-up technique or bumblebee action

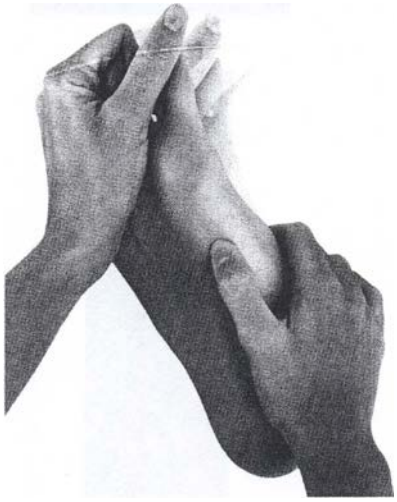
Using the thumb technique…bend the 1st joint of the thumb slightly and exert pressure with the medial (inside) corner of the thumb…on the reflex point, push in and bend the thumb to approximately a 90° angle as you drop the wrist…(Byers 2001, p 31).



Picture 6 Hook-in, back-up

Pivot point technique

> [This] technique is a valuable aid in working particularly tender areas…use the basic holding position with the holding hand and flex the foot slowly onto the thumb, flex several times; this gives increased pressure at the reflex point…(Byers 2001, p 32).



Picture 7 Pivot point technique

Relaxing Techniques

Ankle stretch ‘under’

> Support the right heel with the left hand with your thumb around the outside of the ankle, just below the ankle bone…grasp the top of the foot in your other hand and gently rotate it a few times in one direction, then a few in the other (Lidell 1984, p 137).

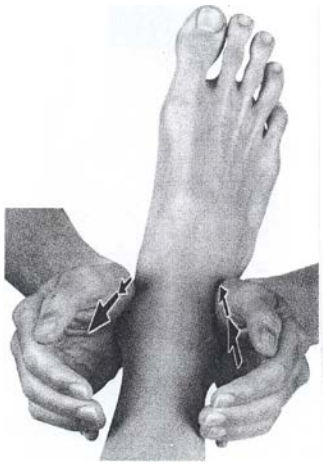
Picture 8 Ankle stretch ‘under’

Ankle stretch ‘over’

> Place the …[right] hand with the fingers together over the dorsal side of the foot with the webbing between the thumb and fingers over the ankle joint where the foot is joined onto the leg; the rest of the fingers are wrapped around the leg, place the heel of the…[left] hand on the plantar surface of the foot…push the foot back firmly with the heel of the hand and let it return, in a slight oval motion, via its own natural spring (Byers 2001, p 35).

Ankle loosening

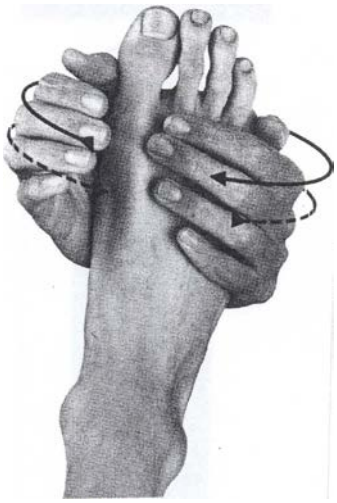
Place the heel of the hands below the anklebone, one on the medial side and one on the lateral side, then move the hands rapidly back and forth, the hands will be going in the opposite direction from each other, the foot will shake from side to side (Byers 2001, p 34).



Picture 9 Ankle loosening

Side-to-side (back and forth)

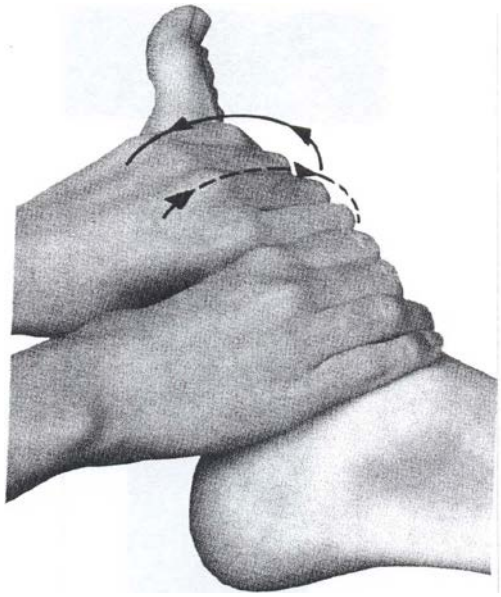
Place the center of the palms of the hands, one on the medial side on the 1st metatarsal head and one on the lateral side on the 5th metatarsal head, with the fingers relaxed, and then move the hands rapidly back and forth (Byers 2001, p 33).



Picture 10 Side-to-side

Spinal twist/stretch

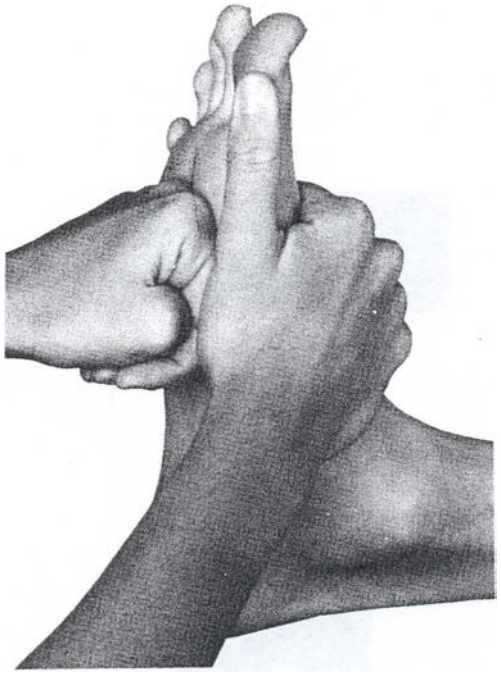
Place the hands together with the palms facing down and index fingers touching each other; the thumbs will also be down, with the foot tipped out, place the hands as a unit firmly around the foot, with the webbing between the thumbs and fingers placed in the spinal reflex area and the thumbs on the plantar surface of the foot, the center of the two hands will be placed on or slightly above the pelvic guideline, keeping your arms straight and then drop your wrists, the hand should be used as a unit keeping all the fingers together and the hands touching at all times, the hand closest to the heel will remain stationary and firmly support the foot, while the other hand will twist slowly and smoothly back and forth as far as possible in each direction, after several movements, slide the two hands together gradually inching toward the toes and continue the twisting movement …keep the hand toward the heel stationary and firm at all times, continue this process until the hand nearest the toes is over the great toe (Byers 2001, p 34).



Picture 11 Spinal twist

Metatarsal kneading

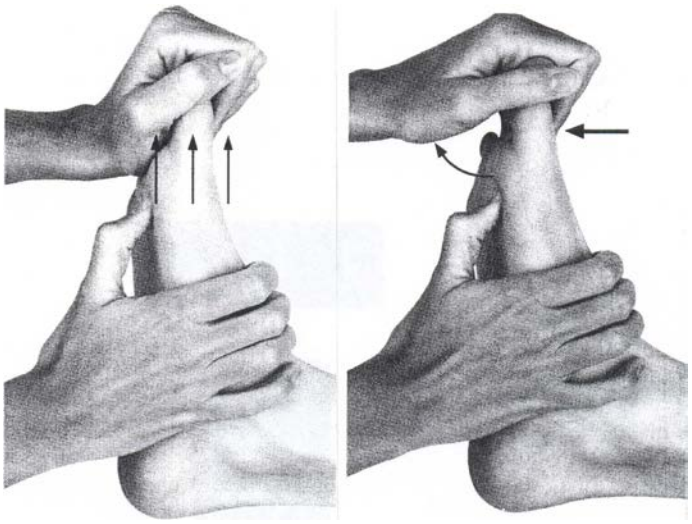
Place the fingers of the right hand (holding hand) on the dorsum of the foot from the medial side, with the index finger placed just below the base of the toes and the thumb in a vertical position resting in the medial edge of the foot…with the left hand make a fist with the flat part placed against the plantar surface of the foot (metatarsal area) directly opposite the right hand, first push the fist against the metatarsal pad, then …knead with the holding hand release a little pressure with the fist…keep both hands in contact with the foot at all times…[and] repeat several times. (Byers 2001, p 33).



Picture 12 Metatarsal kneading

Diaphragm/solar plexus tension relaxer

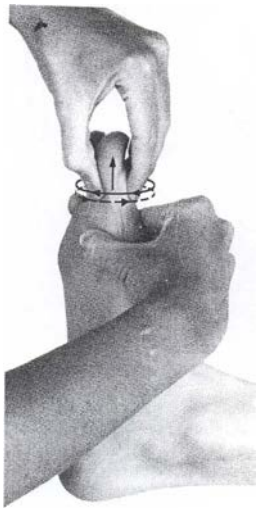
Starting on the medial side of the foot, place the slightly bent working thumb on the base of the metatarsal head, grasp the foot at the base of the toes with the holding hand, making sure the thumb and index finger are placed around the great toe; it is important that the holding hand is placed squarely over the toes and not to the side, lift the foot with the holding hand and then pull the metatarsals onto the thumb (applying extra pressure with the thumb); the pressure of pulling fingers should be on the dorsum of the foot at the base of the toes; when pulling the toes onto the thumb, the heel of the holding hand should come slightly away from the plantar surface, be careful not to bend the toes while doing this; the thumb should then take one small sideways step toward the lateral side and continue this process across the entire diaphragm/solar plexus reflex, repeat the process several times, continue until you reach the lateral edge (Byers 2001, p 38).



Picture 13 Diaphragm/solar plexus tension relaxation process

Toe rotation

Hold the base of the toe you wish to rotate firmly with the thumb and fingers of the holding hand, the thumb on the plantar surface and the fingers on the dorsal surface, take the thumb and 1st two fingers of your working hand and place them over the toe all the way to its base, with a slight lift, rotate each toe, first in one direction several times, and repeat in the opposite direction (Byers 2001, p 37).

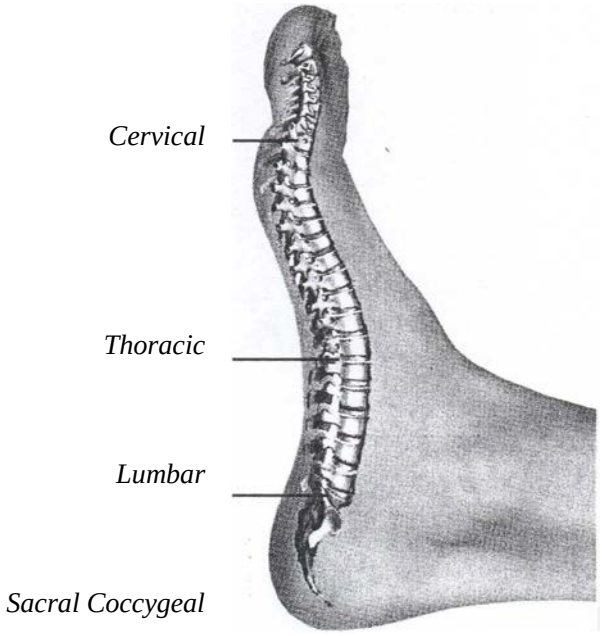


Picture 14 Toe rotation

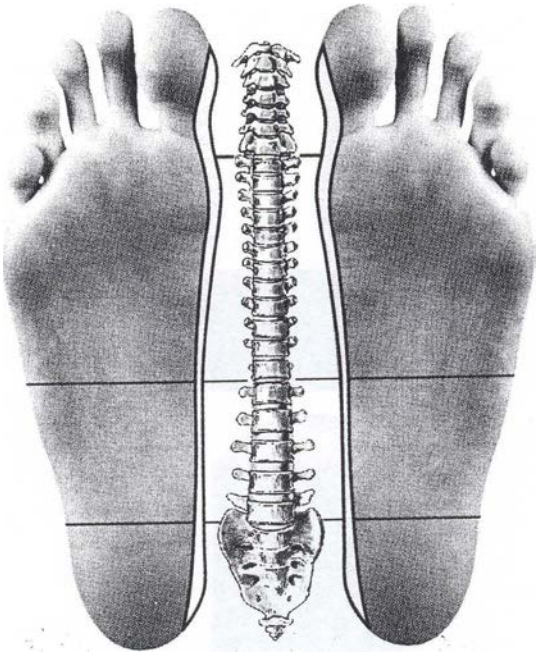
Working the spinal reflex

Start by working the sacral/coccyx area, roll the thumb over the edge of the heel (often a callused area) and walk up approximately one half inch towards the leg…then start by using the right thumb and begin to walk up the sacral/coccyx reflex from the base of the heel to approximately the pelvic guideline or as far as the hand can reach, repeat several times on a slightly different path, covering all sides of the reflex and never losing contact with the foot, work the lumbar reflex by placing the fingers over the top of the foot and the thumb remains approximately on the pelvic guideline, walk up the lumbar reflex to the waistline guideline and then continue walking the thoracic reflex until reaching the 7th cervical reflex, located

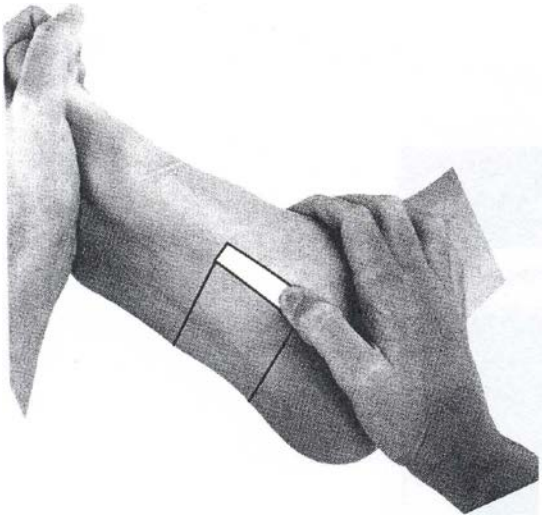
below the base of the great toe…repeat several times…use the index finger when working the cervical reflex for an extra fine treatment, start by supporting the foot with the fingers of the left hand which are placed over the toes and hold the great toe firmly with the thumb and index finger, the working hand then supports the foot with the thumb and the 3rd, 4th and 5th fingers while the index finger walks from the base of the great toe to the base of the nail, repeat this several times…[after that] working down the spinal reflex by supporting the foot on the metatarsal pad with the fingers pointing upwards and bent at the knuckle joints, use the thumb of the working hand to walk all the way down the spinal reflex, repeat several times using a slightly different path each time (Byers 2001, p 53-55).



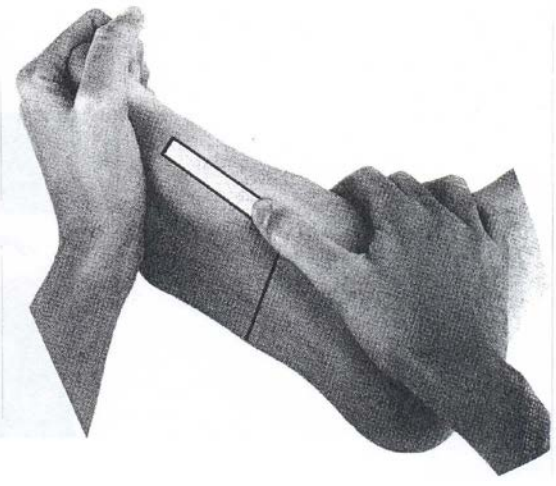
Picture 15 Curves of the spine and foot



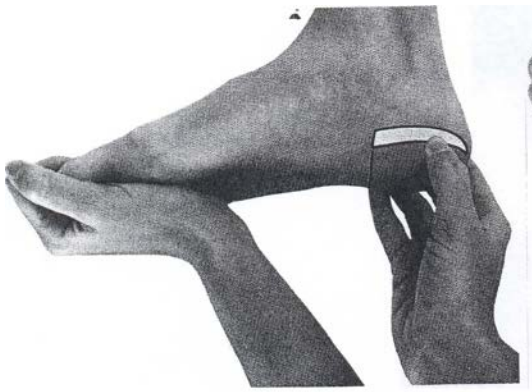
Picture 16 The spinal reflex compared to the spinal vertebrae



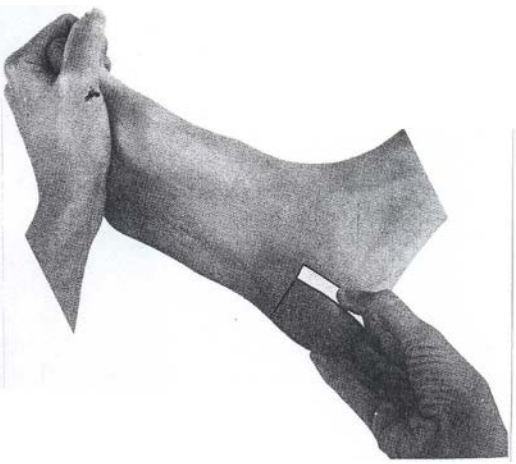
Picture 17 Working across the sacral~coccyx reflex



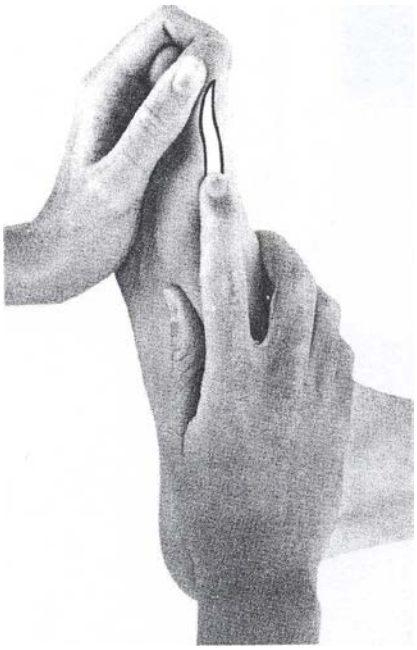
Picture 18 Working up the sacral~coccyx reflex



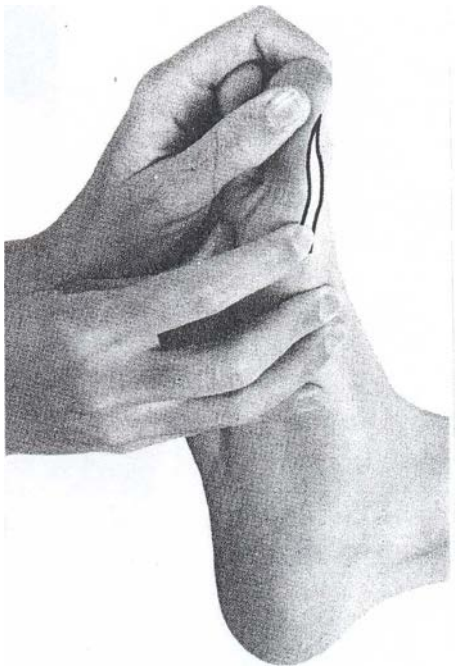
Picture 19 Working up the lumbar reflex



Picture 20 Working up the thoracic reflex



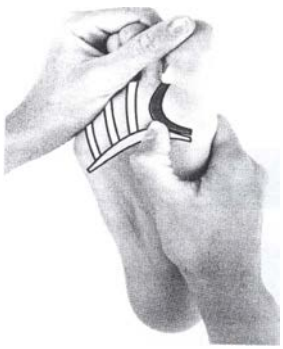
Picture 21 Working up the cervical reflex



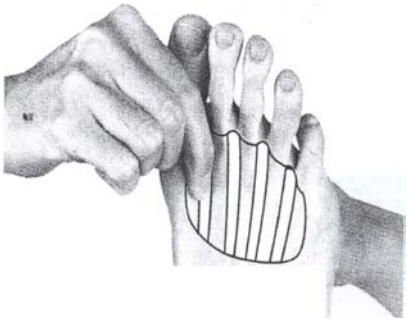
Picture 22 Working across the cervical reflex

Lung reflex

First, work the plantar surface of the foot…use the basic holding position, tilt the foot slightly outwards and gently spread the toes, using the right thumb, apply the basic thumb technique, work up the grooves formed by the bones between each toe, starting with the groove between the great toe and the 2nd toe…separate the great toe and the 2nd toe with the holding hand in order to open the grooves properly, after several passes up this area, proceed with the same technique in the groove between the 2nd and the 3rd toes, then the 3rd and 4th toes, and then the 4th and 5th toes, change hands and with the left thumb, work back in the opposition direction starting with the groove between the 4th and 5th toes…work this same area on the dorsal surface of the foot, this area may be very tender and should be worked very gently at first…working just to the client's discomfort tolerance, start with the right foot using the right hand as the working hand, place the left fist (holding hand) in the metatarsal padding of the foot, then place the thumb of the working hand on the index finger of the holding hand for leverage and work down the dorsum of the foot with the medial corner of the index finger, work in the groove between the great toe and the 2nd toe, making sure the fist is pushing the foot back as this will spread the region while working, line up the 1st knuckle of the fist with the groove you are working, this enables the working finger to line up with that groove, work this area several times and then move to the following grooves repeating this procedure with each groove, change hands and repeat this procedure in the opposite direction (Byers 2001, pp 102-103).



Picture 23 Working the lung reflex

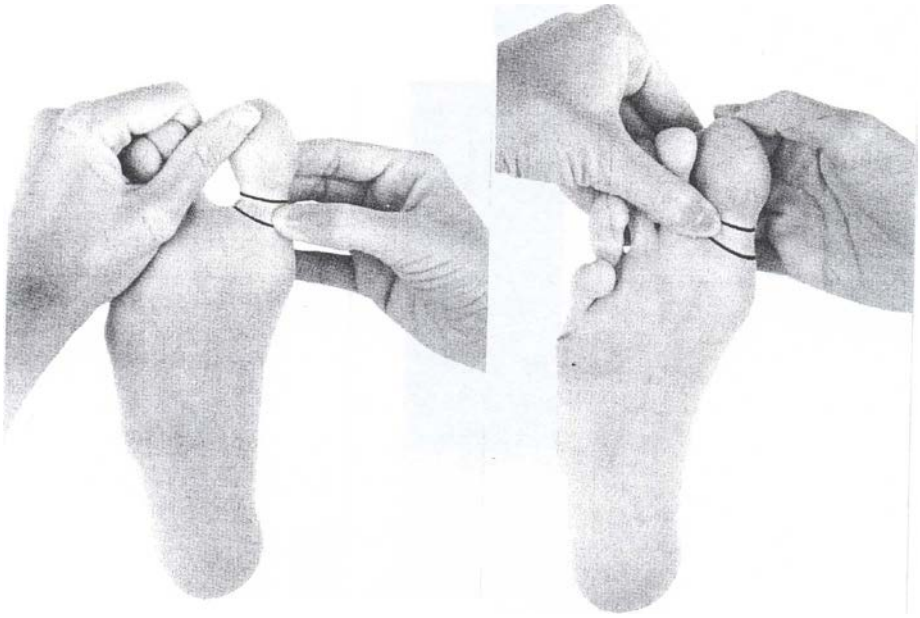


Picture 24 Working the lung/breast reflex (dorsal surface)

Picture 25 The holding hand for working the lung reflex

Thyroid and parathyroid gland reflexes

Since the thyroid gland is located at the base of the neck area, the reflex area will be located at the base of the great toe, to work this area effectively…use the thumb of the holding hand to spread the great toe so that it may be worked on effectively by the thumb of the working hand on those of the holding hand; using the basic thumb technique, make several passes, walking across the base of the great toe from the medial side to the lateral side, change hand and come back in the opposite direction in the same manner; this, of course, is done in order to completely cover the comparatively wide reflex area for the thyroid gland reflex; working several passes in one direction and then changing hands to work in the opposite direction will give you complete coverage of the thyroid reflex area; this will also include the parathyroid gland reflex since they are buried in the thyroid gland (Byers 2001, p 145).

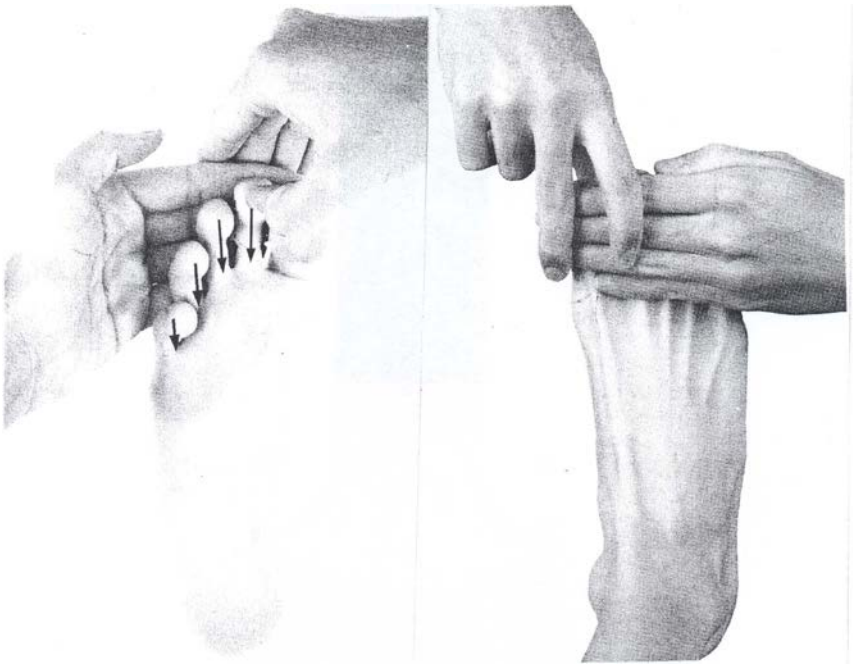


Picture 26 Working the thyroid reflex medial to lateral

Picture 27 Working the thyroid reflex lateral to medial

Sinus reflexes

Starting on the right foot, use the right hand as the working hand and the left as the supporting hand, place the fingers of the supporting hand horizontally across the dorsal surface of the toes, with the index finger level with the tip of the toes, place the fingers of the working hand over the outside of the supporting fingers; the first two fingers of the working hand should be over the first two knuckles of the supporting fingers for leverage, using the basic thumb technique and starting with the great toe, work down the middle and lateral edge of each toe from its tip to its base, the working hand and the holding hand move together as a unit as you move from toe to toe; remember, the first fingers of the working hand should be over the first two knuckles of the supporting fingers…work each toe several times and take about 6 to 10 small bites down the toe, then change hands and repeat this process with the left thumb, starting on the small toe, always work down the middle and then the medial edge of each toe to its base…(Byers 2001, pp 104-105).

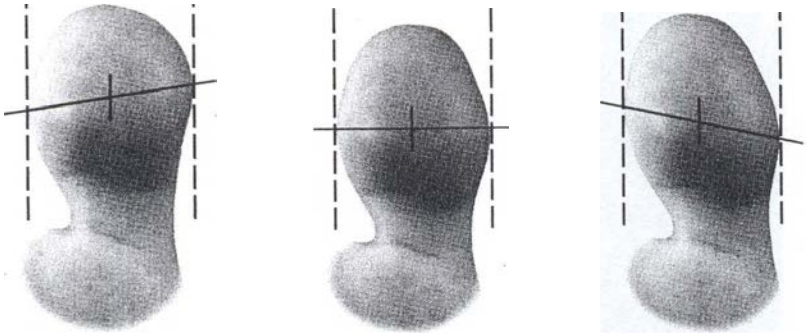


Picture 28 Leverage for working the sinus reflex

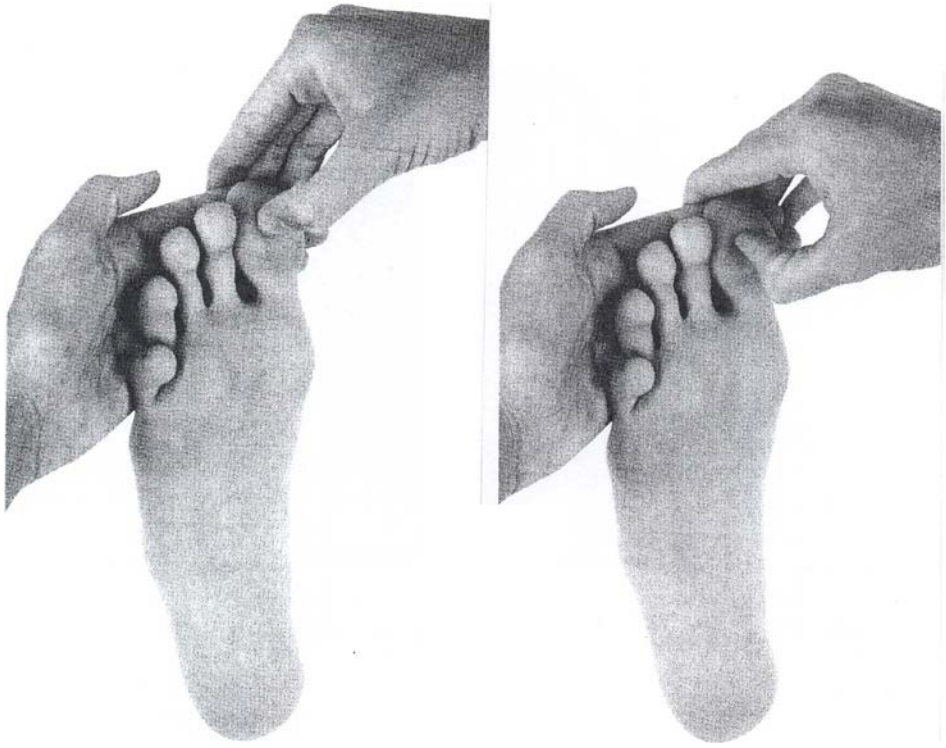
Picture 29 Working the sinus reflex

Pituitary gland reflex

To pinpoint the pituitary reflex…always look for the widest point on both sides of the great toe and then draw an imaginary line from point to point…the pituitary reflex will be found at the midpoint of this hypothetical line…this midpoint should be close to the center of the great toe…when working on the right foot that you use the right hand, and on the left foot you use the left hand; the holding hand will be used to support and protect the great toe, always cover the toes with the fingers of the holding hand, use the fingers of the working hand for leverage; the leverage fingers are always on the outside of the holding hand; this is done to prevent any injury or unnecessary pain to the top of the great toe…always use the medial corner of the thumb of the working hand by utilizing the hook-in, back-up technique…remember the bumblebee who sits down and backs up…making 3 or 4 working contacts with this area…(Byers 2001, p 143).



Picture 30 Locating the pituitary gland reflex



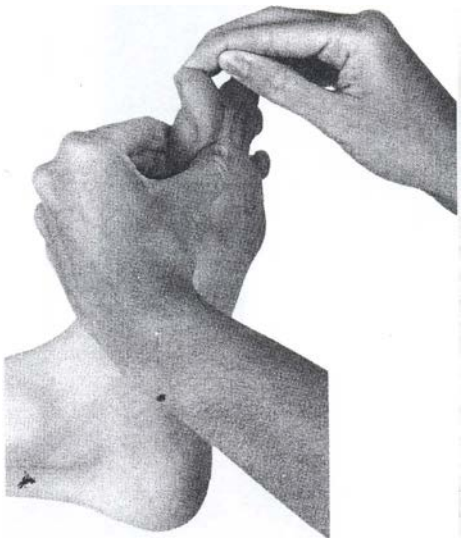
Picture 31 Working the pituitary gland reflex starting position

Picture 32 Working the pituitary gland reflex hook in, back~up technique

Working the brain

Hold the right great toe with the thumb and index finger of the right hand, the 1st joint of the index finger of the left hand will be resting on the tip of the thumb, this stabilizes the index finger which is used to work across the tip of the great toe in a rolling motion with the wrist, start with the lateral edge of the tip of the index finger and rill across the tip of the great toe, pick up the index finger and move to where

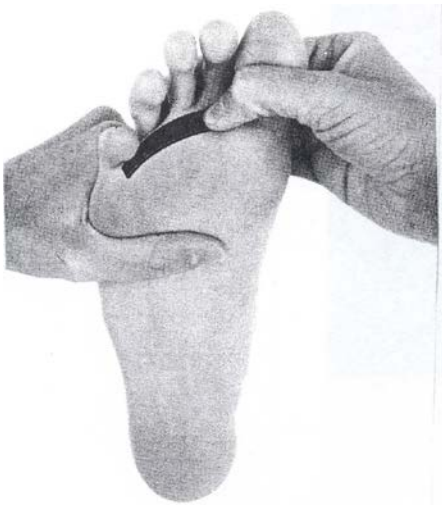
you finished and repeat this process until the entire tip of the great toe is covered, repeat this entire process several times on both feet (Byers 2001, p 50).



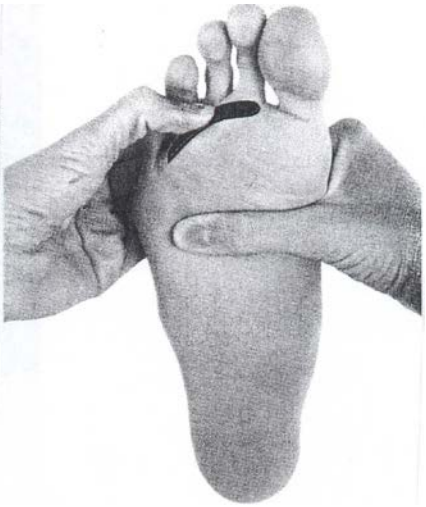
Picture 33 Working the brain reflex

Eye and ear reflex

Start on the right foot with the right hand as the working hand, the fingers of the left hand (holding hand) are placed on the dorsum of the foot opposite the thumb…flat against the metatarsal area along the plantar surface of the foot, place the right thumb of the working hand on the ridge making sure to use the lateral edge of the thumb, the ridge is formed where the base of the small toes meet the metatarsal padding…the thumb will walk from medial to lateral in a forward motion across this ridge starting at the base of the second toe and continuing to the lateral edge of the foot…the walking motion must be one in which the thumb walks all the way across the base of the small toes, is picked up, comes back and starts over…with the pressure of the thumb exerted downward toward the heel…repeat several times, then change hands and walk in the opposite direction several times (Byers 2001, p 92-93).



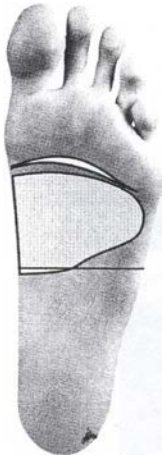
Picture 34 Working the eye and ear reflex medial to lateral



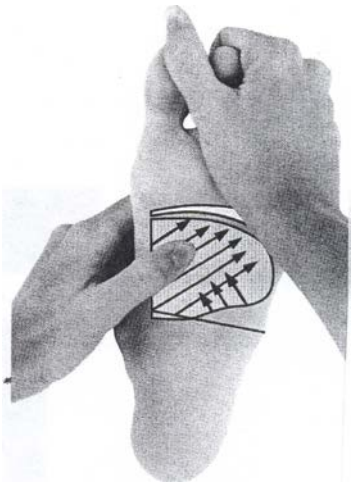
Picture 35 Working the eye and ear reflex lateral to medial

Stomach reflex

The largest part of the stomach reflex is going to be found on the left foot…located below the diaphragm guideline of the foot and above the waistline guideline…start with the left hand on the left foot and work from the waistline guideline in a criss-cross motion up to the diaphragm guideline and cover the entire region, use the basic holding technique, then change hands and cone back in the opposite direction, giving the 'criss-cross' effect (Byers 2001, p 117).



Picture 36 Stomach reflex (left foot)



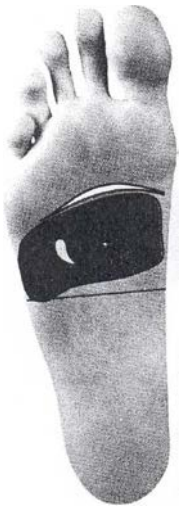
Picture 37 Working the stomach reflex

Liver reflex

The liver reflex is on the right foot…the reflex area covers the space from the waistline guideline to the diaphragm guideline from the medial to the lateral side of the right foot…start with the right hand and work the area towards the diaphragm guideline using the basic holding technique…then come back over the area, change hands, and walk across the area in the opposite direction angling towards the diaphragm guideline (Byers 2001, p 118).

Gallbladder reflex

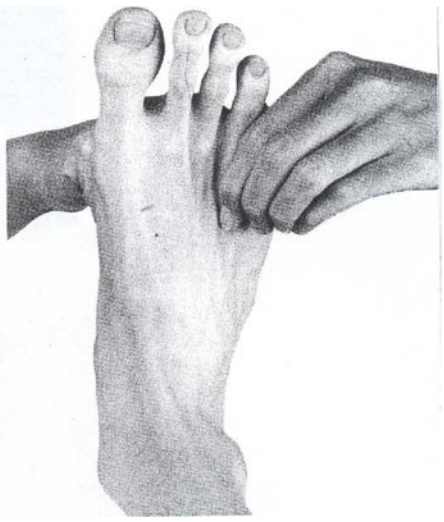
Generally, the gallbladder reflex will be around the 3rd or 4th zone above the waistline guideline approximately a third of the way to the diaphragm guideline; simultaneously, while working the liver reflex you are going to be working the gallbladder reflex, the gallbladder reflex can also be located on the dorsal surface of the foot just opposite the reflex site on the plantar surface (Byers 2001, pp 118-119).



Picture 38 Liver/gallbladder reflex

Picture 39 Liver/gallbladder reflex (dorsal surface)

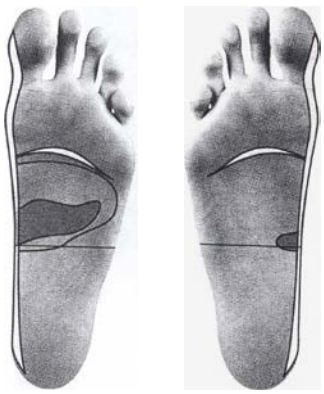
Picture 40 Working the liver reflex



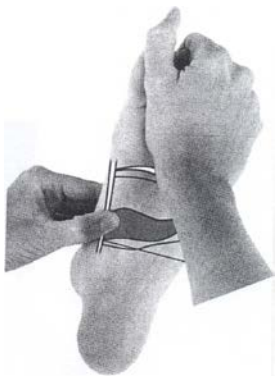
Picture 41 Working the gallbladder reflex (dorsal surface)

Pancreas reflex

The reflex area for the pancreas is found on both feet, but mainly on the left foot and is located slightly above the guideline to the waist to approximately half way to the diaphragm guideline; to work this area, use the basic thumb technique with the left hand, in tiny caterpillar bites, while using the basic holding technique with the right hand; after several slow and complete passes from the medial to the lateral side, change hands and work in the same manner from the other direction; on the right foot the reflex will be slightly below the waistline guideline (Byers 2001, p 119).



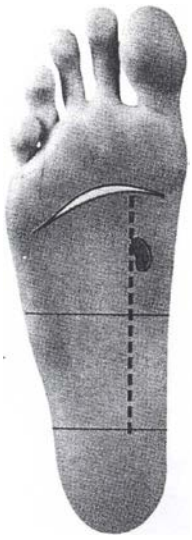
Picture 42 Pancreas reflex left foot and right foot



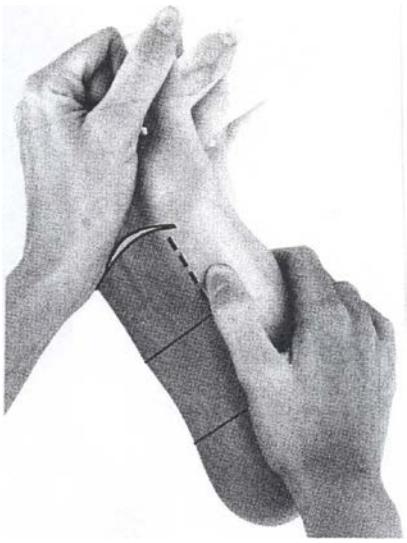
Picture 43 Working the pancreas reflex (left foot)

Adrenal gland reflex

The adrenal gland reflexes are located in the area halfway between the waistline guideline and the diaphragm guideline, on the medial side and next to the protruding tendon; work the adrenal gland reflex by holding the foot with the heel of the holding hand in the metatarsal padding and the thumb on the great toe, which, when pushed back, extends the tendon for a landmark; use the right hand to work on the right foot and the left hand for working on the left foot, using the basic thumb technique, walk slowly from the waistline guideline toward the diaphragm guideline; when approximately halfway up this area, you will find a very sensitive area (adrenal gland reflex) on the medial side of the foot right next to the protruding tendon…you may also use the pivot rotation technique to work this all important reflex…hold the thumb on the exact reflex area and then flex the foot back and forth on the pivot of the thumb; be careful not to exert too much pressure initially, rather work up to the desired pressure (Byers 2001, p 146).



Picture 44 Adrenal gland reflex



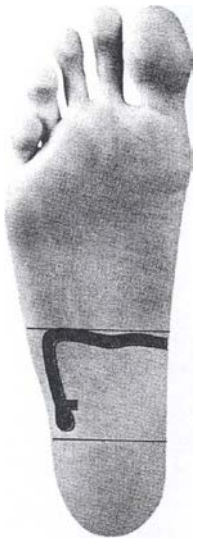
Picture 45 Working the adrenal gland reflex using pivot point technique

Small and large intestine reflexes

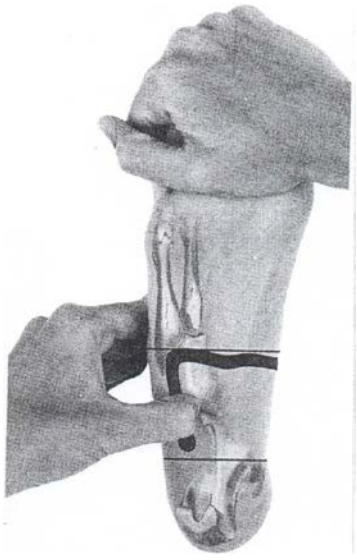
Start on the right foot with the left hand using the basic holding position, working the area from the waistline guideline to the pelvic guideline for both the large and small intestines, work across this area first with the right hand and then the left hand with the basic thumb technique using the criss-cross method (Byers 2001, p 121).

Ileocecal valve reflex

The ileocecal valve reflex is always worked by using the hook-in, back-up technique; this reflex area is found on the plantar surface-lateral side (little toe side) of the right foot, below the waistline guideline. To locate this reflex, use the basic holding technique with the right hand and use the left thumb as the working hand, run the thumb down the lateral edge of the right foot between the waistline guideline and the pelvic guideline into the deepest part of the curve which is about halfway between the two guidelines; once located, place the thumb in a horizontal position, roll it from the edge of the foot straight around into the reflex, make sure the thumb is bent at the first joint and use the wrist to hook-in, back-up; this reflex will be fairly close to the lateral edge of the foot on the plantar surface between the 4th and 5th zones (Byers 2001, p 121).



Picture 46 Ileocecal valve reflex

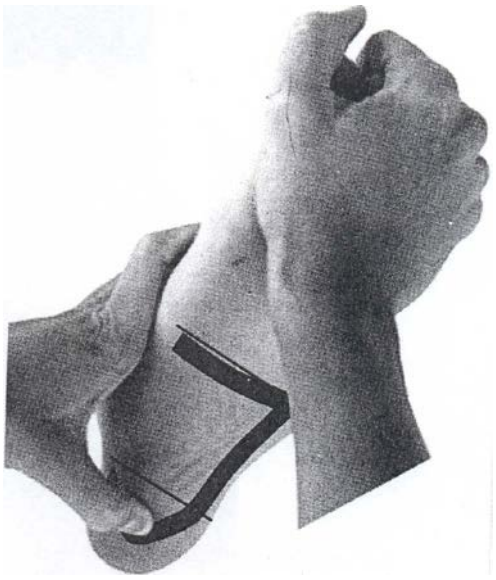


Picture 47 Working the ileocecal valve reflex

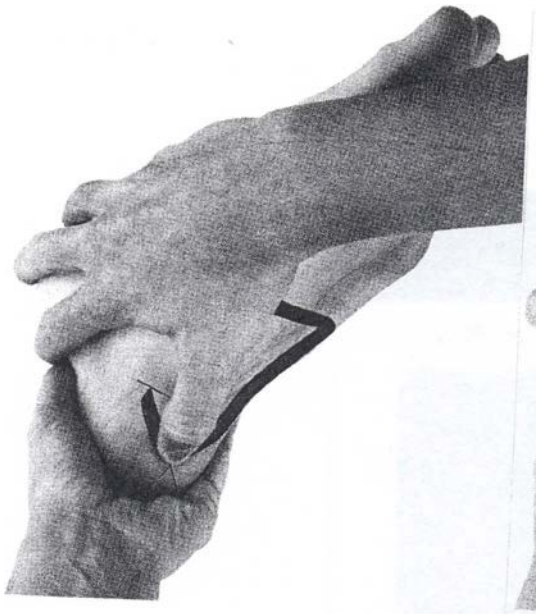
Sigmoid colon reflex

The way to locate the sigmoid flexure, a pin-point reflex, is to begin on the medial side of the left foot where the heel guideline and the spinal reflex intersect…from this point, angle down at approximately 45º to where the 3½ zone line intersects that angle…use the basic holding technique, tip the foot out with the right hand, the left thumb will walk down the 45º angle from the pelvic guideline to where the lines intersect (3½ zone line) and apply the hook-in, back-up technique…after working the whole line downward and using the left thumb for the hook-in, back-up technique, change hands and place the heel of the left foot in the palm of the left hand; tip the foot out in a comfortable position and put the fingers of the working (right) hand around the ankle for leverage, making sure the index finger is placed under the anklebone; this prevents contortion of the thumb joint; starting on the medial point of the pelvic line, walk the thumb down at a 45º angle to this pin-point reflex, stop, hook-in, back-up and then repeat the process several times…(Byers 2001, pp 122-123).

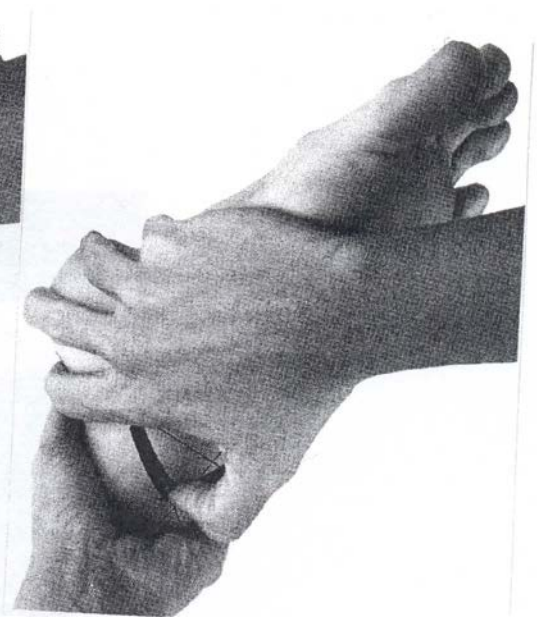
Picture 48 Sigmoid flexure reflex (left foot)



Picture 49 Working the sigmoid flexure with the left hand



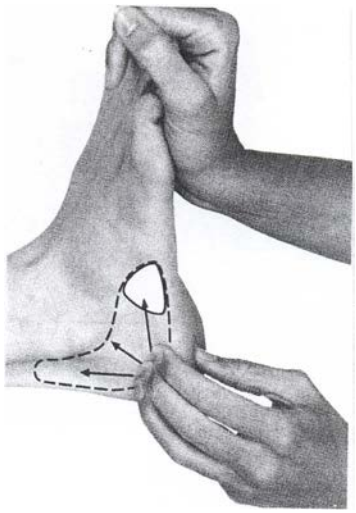
Picture 50 Working the sigmoid flexure with the right hand, starting position



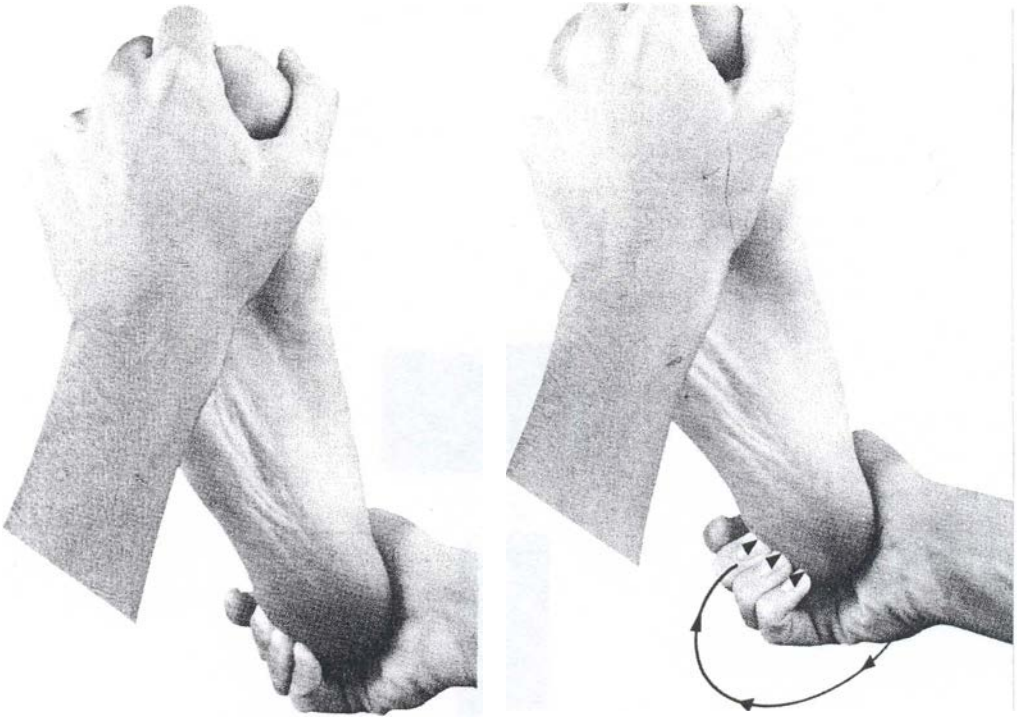
Picture 51 Working the sigmoid flexure, hook-in, back-up technique

Pelvic reflex

Work the pelvic area by keeping the foot back and straight, using the basic holding technique, place the thumb of the working hand on the heel for leverage, using all fingers, work the entire pelvic area in many directions by changing the angle of the wrist (Byers 2001, p 57).



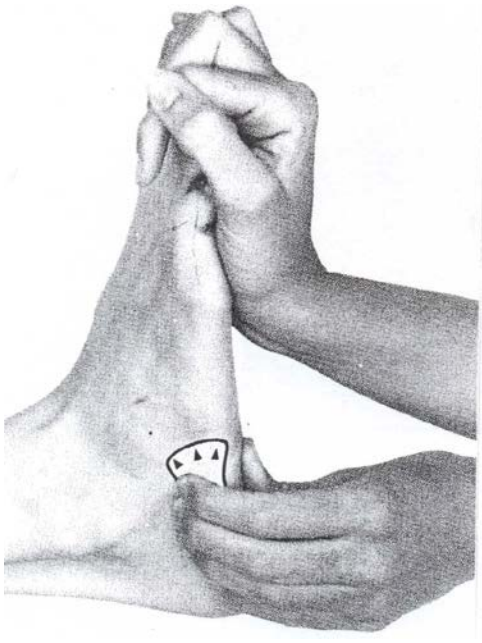
Picture 52 Working the pelvic reflex area

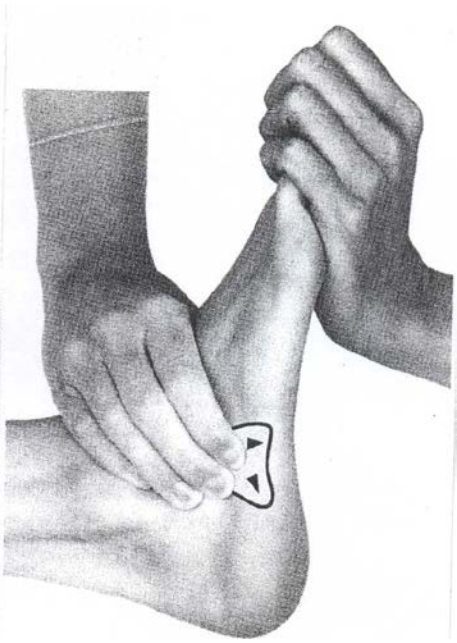


Pictures 53 and 54 Working the pelvic area using the pivot rolling technique

Knee/leg reflex

To work this reflex, the fingers can be used very effectively and thus save the thumb form overuse, use the basic holding technique, place the fingers of the left hand on the lateral edge of the dorsal surface and the thumb on the heel area for leverage, walk the fingers in several directions by changing the angle of the wrist, use the index finger, middle finger or both fingers simultaneously to work this area, also use the alternate hand and come over the top of the foot working toward the lateral edge with the fingers (Byers 2001, p 57).

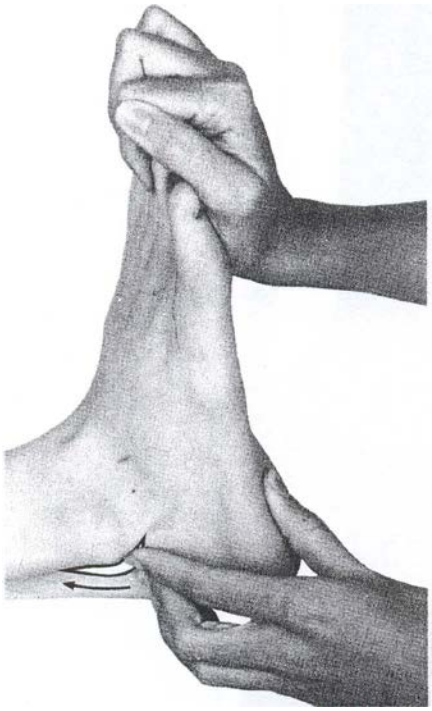




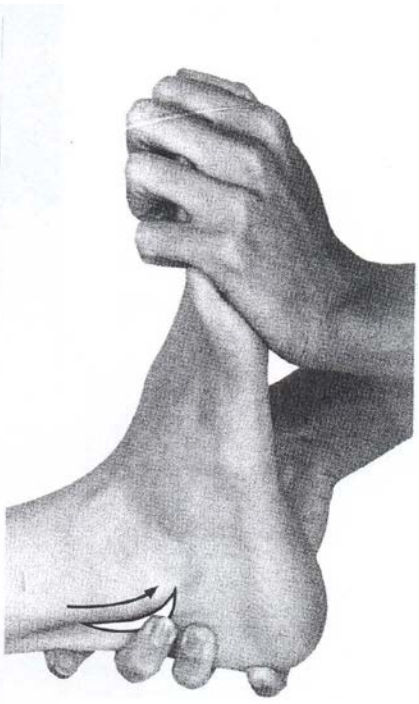
Picture 55 Working the knee reflex **Picture 56 Working down the knee reflex**

Hip/sciatic reflex

Place the heel of the right foot on the 3rd and 4th fingers of the left hand with the index finger resting underneath the lateral side of the anklebone and the thumb on the bottom of the heel for leverage, place the holding hand on the metatarsal padding, keeping the foot back and straight, walk with the index finger in a forward motion angling at an approximately 45º angle into the anklebone, go approximately one quarter to one half inch, stop, lift up, come back and start over, repeat this process several times, change hands, then place the right heel on the palm of the right hand with the 3rd finger resting under the anklebone on the lateral side of the foot, walk it toward you, about one quarter to one half inch, this time the left holding hand will be placed on the metatarsal pad holding the foot back and straight (Byers 2001, p 55).



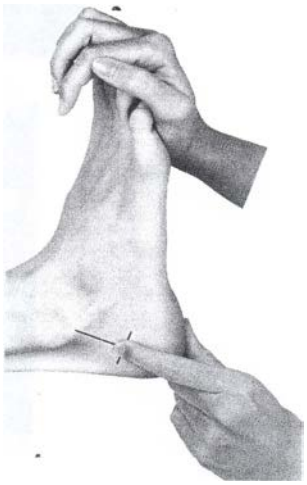
Picture 57 Working up the sciatic reflex



Picture 58 Working down hip sciatic reflex

The ovary and the testicle reflex

The ovary and the testicle reflex is found on the lateral side of the heel (little toe side); find the high spot on the anklebone, square off the back of the heel and draw an imaginary line; divide this line in half; this is where the ovary/testicle reflex is found; it is best to use your left index finger on the right foot, place the finger on this spot where the lines cross and use the slight circular motion, repeat this on the left foot using the right hand…(Byers 2001, p 152).

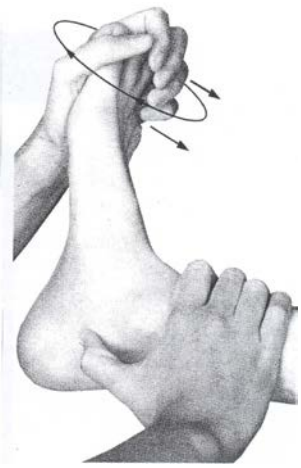


Picture 59 Working the ovaries/testes reflex

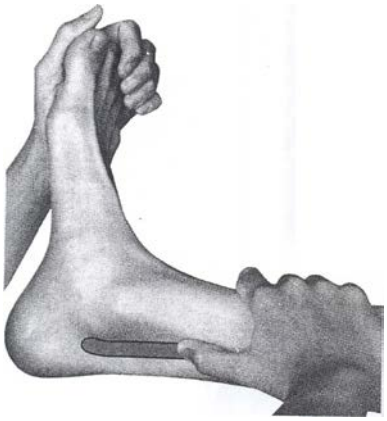
The uterus or prostate reflex

The uterus or prostate reflex is located on the medial side (great toe side) approximately halfway from the high spot on the anklebone to the back corner of the heel at the base of the ridge of the tendon; to work this reflex on the right foot, tip the foot out and support firmly with the holding hand, place the right hand a few inches above the ankle, with the medial edge of the thumb on the inside of the ankle between the bone and the Achilles tendon, walk the thumb down this groove … continue until you reach the high point of the ridge; this is the uterus/prostate reflex; keep the thumb firmly on the reflex while rotating the foot in an outward direction, keep the rotations firm by using the natural spring of the ankle joint; this reflex is worked by the rotation of the foot and not by excessive pressure on the reflex point, repeat several times then repeat on the left foot (Byers 2001, p 152).

Picture 60 Uterus/prostate reflex



Picture 61 Working the uterus/prostate reflex

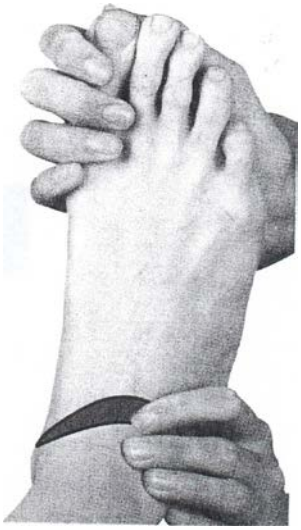


Picture 62 Working the chronic prostate/uterus reflex

Groin reflex

Keeping the foot back, place the thumb on the bottom of the heel for leverage, then place the index finger of the right hand just below the anklebone, then walk it in a forward motion, using 20 to 25 small bites, ending just below the opposite anklebone, repeat this process with the alternate hand, work this region several times in this manner with both hands (Byers 2001, p 82-83).

Picture 63 Working the groin reflex medial to lateral



Picture 64 Working the groin reflex lateral to medial

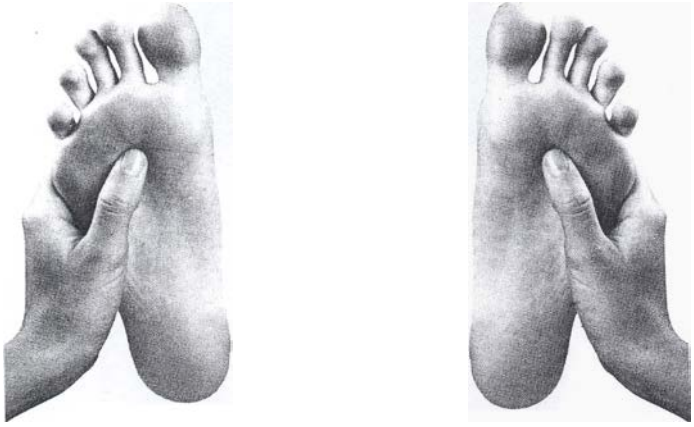
The fallopian tube and the seminal duct reflex

To work this reflex, hold the foot back and straight, work with the index finger of the right hand and walk from the medial side starting just under the anklebone to the lateral side finishing just under the anklebone, take at least 20 to 25 bites, change hands and walk from the lateral side to the medial side of the anklebone…(Byers 2001, p 153).

Picture 65 Working the fallopian tube reflex

Diaphragm-deep breathing

Place the ball of the thumbs in the center of the diaphragm/solar plexus reflex in both feet at the same time, allowing the fingers to comfortably support the dorsum of the foot, ask your client to take a deep breath and maintain it each time you press on this reflex, push in to this reflex as they take a deep breath and maintain the pressure while they hold their breath for a short time, as they slowly exhale, you should slowly let up on the pressure about halfway, do this 4 or 5 times gradually increasing the time you hold the pressure and they hold their breath, always maintain about half the pressure while they slowly exhale…this technique is generally reserved for the end of a session (Byers 2001, p 37).



Picture 66 Diaphragm - deep breathing relaxation technique

Appendix 3 Demographic data questionnaire

Number of questionnaire □□□□

Part I Demographic Data

Name……

Contact number……

1. Gender □ male □ female

2. Age □ 60-74 years (early old age)
□ 75-84 years (middle old age)
□ 85 years and over (late old age)

3. Marital status □ single □ couple
□divorced/separated/widowed

4. Education □ no formal □ primary school
□ secondary school □ university/college

5. Occupation □ worker, officer, government officer (hired by government or private) □ your own business □ retiree
□ no career □ others

6. Financial difficulty? □ no □ yes

7. Do you take any medication? □ no □ yes please list

medication	dose	how often
……..	……	……..
……..	……	……..
……..	……	……..

8. Which of the following medical conditions have you had diagnosed by a doctor?
(please tick ✓ one or more boxes)

□ heart disease □ diabetes
□ stroke □ kidney disease
□ others…….
□ none of the above

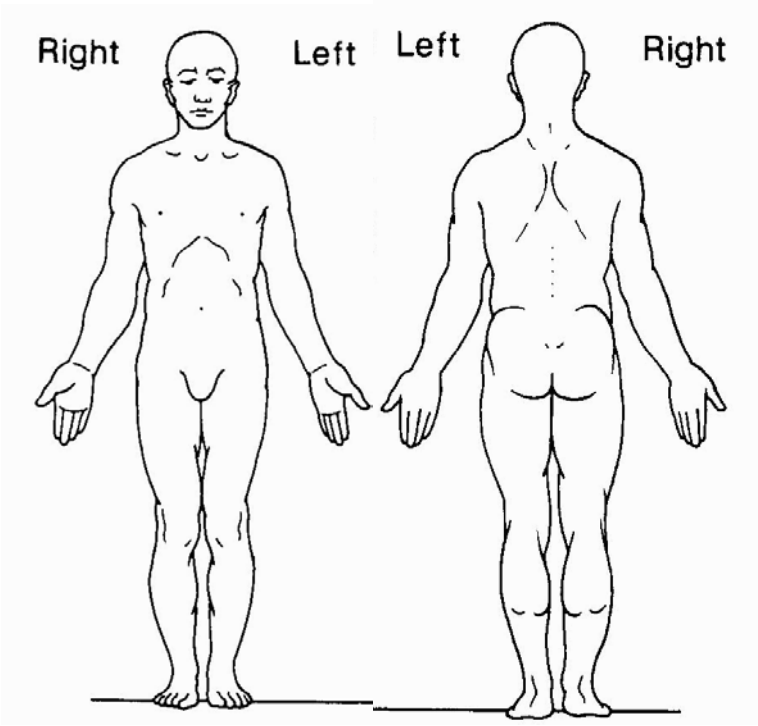
Appendix 4 The Brief Pain Inventory

1. Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain during the *last week*?

☐ yes ☐ no

If you answered yes to this question, please go on to question 2 and finish this questionnaire. If no, you are finished with the questionnaire. Thank you.

2. On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.



3. Please rate your pain by circling the one number that best describes your pain at its *worst* in the last week.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

4. Please rate your pain by circling the one number that best describes your pain at its *least* in the last week.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

5. Please rate your pain by circling the one number that best describes your pain on the *average*.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

6. Please rate your pain by circling the one number that tells how much you have *right now*.

0 1 2 3 4 5 6 7 8 9 10

No pain Pain as bad as you can imagine

7. What kinds of things make your pain feel better (for example, heat, medicine, rest)?

---

8. What kinds of things make your pain worse (for example, walking, standing, lifting)?

---

9. What treatments or medications are you receiving for your pain?

---

10. In the last week, how much relief have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received.

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

No relief Complete relief

11. If you take pain medication, how many hours does it take before the pain returns?

☐ 1. Pain medication doesn't help at all ☐ 2. One hour

☐ 3. Two hours ☐ 4. Three hours

☐ 5. Four hours ☐ 6. Five to twelve hours

☐ 7. More than twelve hours ☐ 8. I do not take pain medication

12. Circle the appropriate answer for each item

I believe my pain is due to:

Yes	No	
☐	☐	1. The effects of treatment (for example, medication, surgery, radiation, prosthetic device).
☐	☐	2. My primary disease (meaning the disease currently being treated and evaluated).
☐	☐	3. A medical condition unrelated to primary disease (for example, arthritis).

13. For each of the following words, check yes or no if that adjective applies to your pain

Aching	☐ Yes	☐ No
Throbbing	☐ Yes	☐ No
Shooting	☐ Yes	☐ No
Heavy	☐ Yes	☐ No
Cramping	☐ Yes	☐ No
Sharp	☐ Yes	☐ No
Tender	☐ Yes	☐ No
Burning	☐ Yes	☐ No
Stabbing/Penetrating	☐ Yes	☐ No
Gnawing/Nagging	☐ Yes	☐ No
Tiring/Exhausting	☐ Yes	☐ No
Numb	☐ Yes	☐ No
Miserable	☐ Yes	☐ No
Unbearable	☐ Yes	☐ No

14. Circle the one number that describes how, during the past week, pain has interfered with your:

A. General activity

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

B. Mood

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

C. Walking ability

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

D. Normal work (includes both work outside the home and housework)

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

E. Relations with other people

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

F. Sleep

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

G. Enjoyment of life

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely interferes

Appendix 5 The Short-Form-36 Health Survey

Your Health and Well-Being

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. *Thank you for completing this survey!*

For each of the following questions, please mark an X in the one box that best describes your answer.

1. In general, would you say your health is: *GH*

Excellent 5	Very good 4.4	Good 3.4	Fair 2	Poor 1
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

2. *Compared to one year ago*, how would you rate your health in general *now*? *This question is not counted in scoring the eight dimensions but is used to estimate change in health from a cross-sectional administration of the SF-36*

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

3. The following items are about activities you might do during a typical day. Does *your health now limit you* in these activities? If so, how much? *PF*

	Yes, limited a lot	Yes, limited a little	No, not limited at all
	▼	▼	▼
a. *Vigorous activities*, such as running, lifting heavy objects, participating in strenuous sports	☐1	☐2	☐3
b. *Moderate activities*, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	☐1	☐2	☐3
c. Lifting or carrying groceries	☐1	☐2	☐3
d. Climbing *several* flights of stairs	☐1	☐2	☐3
	Yes, limited a lot	Yes, limited a little	No, not limited at all
	▼	▼	▼
e. Climbing *one* flight of stairs	☐1	☐2	☐3
f. Bending, kneeling, or stooping	☐1	☐2	☐3

g. Walking *more than a mile*	☐1	☐2	☐3
h. Walking *several blocks*	☐1	☐2	☐3
i. Walking *one block*	☐1	☐2	☐3
j. Bathing or dressing yourself	☐1	☐2	☐3

4. During the *past 4 weeks*, have you had any of the following problems with your work or other regular daily activities *as a result of your physical health*? *RP*

	Yes	No
	▼	▼
a. Cut down on the *amount of time* you spent on work or other activities	☐1	☐2
b. *Accomplished less* than you would like	☐1	☐2
c. Were limited in the *kind* of work or other activities	☐1	☐2
d. Had *difficulty* performing the work or other activities (for example, it took extra effort)	☐1	☐2

5. During the *past 4 weeks*, have you had any of the following problems with your work or other regular activities *as a result of any emotional problems* (such as feeling depressed or anxious)? *RE*

	Yes	No
	▼	▼
a. Cut down on the *amount of time* you spent on work or other activities	☐1	☐2
b. *Accomplished less* than you would like	☐1	☐2
c. Did work or other activities *less carefully than usual*	☐1	☐2

6. During the *past 4 weeks*, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups? *SF*

Not at all	A little bit	Moderately	Quite a bit	Extremely
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

7. How much *bodily* pain have you had during the *past 4 weeks*? *BP*

None	Very mild	Mild	Moderate	Severe	Very severe
▼	▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5	☐6

8. During the *past 4 weeks*, how much did *pain* interfere with your normal work (including both work outside the home and housework)? *BP* If item 7 answer none, item 8 get scored 6; if item 8 answer not at all and item 7 > none them item 8 get scored 5; for the remaining as below

Not at all	A little bit 4	Moderately 3	Quite a bit 2	Extremely 1
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

9. These questions are about how you feel and how things have been with you during the *past 4 weeks*. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the *past 4 weeks*…

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
	▼	▼	▼	▼	▼	▼
a. Did you feel full of pep? *VT*	☐1	☐2	☐3	☐4	☐5	☐6
b. Have you been a very nervous person? *MH*	☐1	☐2	☐3	☐4	☐5	☐6
c. Have you felt so down in the dumps that nothing could cheer you up? *MH*	☐1	☐2	☐3	☐4	☐5	☐6

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
	▼	▼	▼	▼	▼	▼
d. Have you felt calm and peaceful? *MH*	☐1	☐2	☐3	☐4	☐5	☐6
e. Did you have a lot of energy? *VT*	☐1	☐2	☐3	☐4	☐5	☐6
f. Have you felt downhearted and blue? *MH*	☐1	☐2	☐3	☐4	☐5	☐6
g. Did you feel worn out? *VT*	☐1	☐2	☐3	☐4	☐5	☐6
h. Have you been a happy person? *MH*	☐1	☐2	☐3	☐4	☐5	☐6
i. Did you feel tired? *VT*	☐1	☐2	☐3	☐4	☐5	☐6

10. During the *past 4 weeks*, how much of the time has your *physical health or emotional problems* interfered with your social activities (like visiting friends, relatives, etc.)? *SF*

All of the time	Most of the time	Some of the time	A little of the time	None of the time
▼	▼	▼	▼	▼
☐1	☐2	☐3	☐4	☐5

11. How TRUE or FALSE is *each* of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
	▼	▼	▼	▼	▼
a. I seem to get sick a little easier than other people *GH*	☐1	☐2	☐3	☐4	☐5
b. I am as healthy as anybody I know *GH*	☐1	☐2	☐3	☐4	☐5
c. I expect my health to get worse *GH*	☐1	☐2	☐3	☐4	☐5
d. My health is excellent *GH*	☐1	☐2	☐3	☐4	☐5

Thank you for completing these questions!

Appendix 6 Approvals, consent form and information sheets (English and Thai)

Approval from Flinders Clinical Research Ethics Committee (FCREC)

FLINDERS MEDICAL CENTRE
Flinders Clinical Research Ethics Committee
FWA00001785
IRB00001792

Government of South Australia
Southern Adelaide Health Service

Bedford Park 5042
South Australia

Level 2
Room 2A221
Telephone
08 8204 6453
Facsimile
08 8204 4586

20 June 2007

MEMORANDUM

TO: Ms. J. Somchock, School of Nursing & Midwifery

FROM: Ms. C. Hakof, Executive Officer, Flinders Clinical Research Ethics Committee

TOPIC: **Review of Research Application 196/067**

I am pleased to advise you that executive approval has been given to the amended application dated 18 June 2007. This study may now commence.

Approval Status: FINAL

Period of Approval: 19 June 2007 to 19 June 2010

Please note the terms under which ethical approval is granted

1. **If conditional** *('subject to' or 'in principle')* approval is granted, research involving human subjects **may proceed only after written acceptance of the conditions of approval** (including a copy of the modifications) has been received by the Committee.
2. Researchers are required to immediately report to the FCREC anything which might warrant review of ethical approval of the project, including:
   a. Adverse effects of the project on participants, including the total number of participants recruited, and of steps taken to deal with these adverse effects.
   b. Proposed changes in the project.
   c. A change in the base for a decision made by the Committee, e.g. new scientific information that may invalidate the ethical integrity of the project.
   d. Other unforeseen events which might affect continued ethical acceptability of the project.
3. Projects are approved for up to 3 years only and a progress report must be provided annually. Extensions after 3 years will not be granted without a report to the Committee and the provision of an updated submission.
4. Confidentiality of the research participants shall be maintained at all times as required by law.
5. All research participants shall be provided with a Patient Information Sheet and Consent Form, unless otherwise approved by the Committee.
6. The Patient Information Sheet and Consent Form shall be printed on the relevant site letterhead, stating the contact details for the researchers and must also must state that the Executive Officer can be contacted for information concerning policies, rights as a participant, or should the participant wish to make a confidential complaint.
7. A copy of the signed consent form is to be filed in the participant's medical record.
8. A report and a copy of any published material should be forwarded to the Committee at the completion of the project.
9. **For conditional approval or deferred approval, a response must be received within 8 weeks. Failure to do so will result in non-approval of the project**.

f
C. HAKOF

The Flinders Clinical Research Ethics Committee is constituted and operates in accordance with the National Health and Medical Research Council's National Statement on Ethical Conduct in Human Research (March 2007).

Approval from primary health care centre, Lamsompung district

องค์การบริหารส่วนตำบลลำสมพุง
เลขที่รับ ๔๖๖
วันที่ ๒ ก.ค. ๕๐
เวลา

FLINDERS UNIVERSITY
ADELAIDE • AUSTRALIA

Faculty of Health Science
School of Nursing and Midwifery

GPO Box 2100
Adelaide 5001 Australia

Telephone (+61 8) 8201 3409
Fax (+61 8) 8276 1602

10th April 2007

Dear Head of the Lamsompung District

C.C. Head of the primary health care centres

My name is Jeranut Somchock, a PhD candidate of the School of Nursing and Midwifery, Flinders University, Australia. I am also a registered nurse in Thailand, and had worked as a lecturer at Boromarajonani College of Nursing, Phraputtabat, Saraburi from 1992 to 2002. I would like to collect data in the elderly Thai population for my research on 'the effect of foot reflexology on pain reduction in the elderly Thai population'. To do so, I need your permission to allow me to do the research in this population in your district. The research will be undertaken at the primary health care centres in Lamsompung District, and the subjects I need to participate in the study are the elderly persons who get health services from these primary health care centres. The study will be conducted July 2007 to July 2008 approximately.

This research project has been approved by the Flinders Clinical Research Ethics Committee. The administrative officer of this committee can be contacted on (61 8) 8204 4507, fax (61 8) 8204 5834, e-mail carol.hakof@fmc.sa.gov.au.

Any queries you may have concerning this project should be directed to my supervisors, Dr. Lidia Mayner and Professor Paul Arbon at these addresses or by

telephone respectively on 001 618 8201 3377, 001 618 8201 3972, or e-mail: lidia.mayner@flinders.edu.au, paul.arbon@flinders.edu.au

I would be most grateful if you would give me a permission to undertake a research.

Yours sincerely,

Jeranut Somchock

A PhD candidate, School of Nursing and Midwifery

Flinders University, Australia, SA 5042

Ph: (61 8) 431 577 570

E-mail: somc0001@flinders.edu.au

พ.จ.อ.

(วิจิตร ตุลาภิรมย์)

ปลัดองค์การบริหารส่วนตำบล

(นายอรัช สมโชค)

นายกองค์การบริหารส่วนตำบลสำสมุง

(นางสาว เสาวนิตย์)

หัวหน้าสถานีอนามัยสำสมุง

Letter confirming no ethics committee in Lamsompung primary health care

Lamsompung Primary Health Care,

Lamsompung District, Muaklek,

Saraburi,Thailand 18180

2nd July 2007

To whom it may concern,

I approved this research to be carried out at the primary health care centre. We do not have a formal ethics committee in this health centre.

Kind Regards,

Head of Lamsompung Primary Health Care Centre

Consent form (English)

FLINDERS UNIVERSITY
ADELAIDE • AUSTRALIA

FLINDERS MEDICAL CENTRE AND FLINDERS UNIVERSITY

CONSENT TO PARTICIPATION IN RESEARCH

I, ... request and give consent to my
(first or given names) *(last name)*

involvement in the research project *(short title)*: *The effect of foot reflexology on pain reduction in the elderly Thai population*

I acknowledge the nature, purpose and contemplated effects of the research project, especially as far as they affect me, have been fully explained to my satisfaction by .....
(first or given names) *(last name)*

and my consent is given voluntarily.

I acknowledge that the detail(s) of the following has/have been explained to me, including indications of risks; any discomfort involved; anticipation of length of time; and the frequency with which they will be performed:

1. *Interview for pain questionnaire and quality of life questionnaire at the beginning, week 4 and 6 of the treatment session*

Undergo one of the following:

2. *Undergo 50 minutes of foot reflexology twice a week for four weeks for participants in the treatment group*

3. *Receive home visit twice a week for four weeks for talking about pain for participants in the control group with talking about pain*

4. *Receive no intervention for four weeks for participants in the control group with no intervention*

5. *Be offered 50 minutes of foot reflexology twice a week for four weeks for all participants in both control groups*

I have understood and am satisfied with the explanations that I have been given.

I have been provided with a written information sheet.

I understand that my involvement in this research project may not be of any direct benefit to me and that I may withdraw my consent at any stage without affecting my rights or the responsibilities of the researchers in any respect.

I declare that I am over the age of 18 years.

I acknowledge that I have been informed that should I receive an injury as a result of taking part in this study, I may need to start legal action to determine whether I should be paid.

Signature of Research Participant : ..... Date: .....

Signature of Witness: ..... Date: .....

Printed Name of Witness: .....

I, ... have described to ..... the research project and nature and effects of procedure(s) involved. In my opinion he/she understands the explanation and has freely given his/her consent.

Signature: ..... Date: .....

Status in Project: .....

Participant information sheet

Participant Information Sheet

The effect of foot reflexology on pain reduction in the elderly Thai population

I am a PhD student in the School of Nursing and Midwifery at Flinders University in South Australia. My PhD project is 'The effect of foot reflexology on pain reduction in the elderly Thai population'.

You are invited to take part in a study exploring the effect of foot reflexology on reducing pain and improving the quality of life scores in the elderly Thai population. Foot reflexology is a type of massage and one of the non-pharmacological interventions claimed to relieve pain. This study will explore the potential for reflexology to assist in the treatment of pain in the elderly Thai population.

This is a research project, and you do not have to be involved. If you do not wish to participate, your medical care will not be affected in any way.

If you choose to participate, I will ask you to read and sign a consent form to confirm your commitment to being involved in the study. On the first day of the project, you will be asked to answer some general questions about your living circumstances, a pain questionnaire, and a quality of life questionnaire. This will take approximately 20 minutes. Then you will be allocated to one of the three groups which are: (1) the treatment group; as a participant in this group, you will receive fifty minutes of foot reflexology twice a week for four weeks and you will return to the primary health care centre for your treatment. At the end of the treatment session (week 4 and 6), you will be asked again about your pain and quality of life. (2) the control group with talking about pain; you will receive a home visit twice a week for four weeks for talking about pain, and at the end of the treatment session (week 4 and 6), you will be asked again about your pain and quality of life. (3) the control

group with no intervention; you will receive no treatment for four weeks, and at the end of week 4 and 6, you will be asked again about your pain and quality of life. All participants in both control groups will be offerred a fifty minute foot reflexology session twice a week for four weeks at the beginning of week 7.

Should you experience any ill effects you may withdraw from the study. If you decide not to participate in this study or if you withdraw from the study, you may do this freely without prejudice to any treatment at the primary health care centre.

You will not receive any payment for participating in this study. However, we will provide you with transportation if possible or reimbursement of costs to the primary health care centre.

All records containing personal information will remain confidential and no information that could lead to your identification will be released to anyone outside the research team.

Should you require further details about the project, either before, during or after the study, you may leave a message at the primary health care centre or directly contact Ms Jeranut Somchock at this phone number: 08 9801 8265 or this e-mail address: j_somchock@yahoo.com or you can contact Dr. Lidia Mayner or Professor Paul Arbon at these phone number respectively: 001 618 8201 3377, 001 618 8201 3972 or these e-mail addresses: lidia.mayner@flinders.edu.au, paul.arbon@flinders.edu.au

This study has been reviewed by the Flinders Clinical Research Ethics Committee. Should you wish to discuss the project with someone not directly involved, in particular in relation to matters concerning policies, your rights as a participant, or should you wish to make a confidential complaint, you may contact the Administrative Officer – Research, Ms. Carol Hakof, on 001 618 8204 4507.

Appendix 7 Tables related to the Demographic Data

Table 1. Gender and *Pain at its worst*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI3	male	64	4.81	2.315	.289
	female	96	5.50	2.488	.254

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	.971	.326	-1.760	158	.080	-.688	.391	-1.459	.084
	Equal variances not assumed			-1.786	141.652	.076	-.688	.385	-1.449	.074

Table 2. Gender and *Pain at its least*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI4	male	64	2.11	1.534	.192
	female	96	2.36	1.623	.166

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	.644	.423	-.996	158	.321	-.255	.256	-.761	.251
	Equal variances not assumed			-1.007	140.303	.316	-.255	.253	-.756	.246

Table 3. Gender and *Pain on average*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI5	male	64	3.59	1.630	.204
	female	96	4.01	1.714	.175

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	.016	.899	-1.536	158	.127	-.417	.271	-.952	.119
	Equal variances not assumed			-1.552	139.723	.123	-.417	.269	-.948	.114

Table 4. Gender and *Pain right now*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI6	male	64	2.80	1.765	.221
	female	96	3.17	2.218	.226

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	3.402	.067	-1.118	158	.265	-.370	.331	-1.023	.283
	Equal variances not assumed			-1.170	152.997	.244	-.370	.316	-.994	.255

Table 5. Gender and *Percentage of pain relief from medications*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI10	male	64	5.52	2.423	.303
	female	96	6.18	2.384	.243

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI10	Equal variances assumed	.068	.795	-1.708	158	.090	-.661	.387	-1.426	.103
	Equal variances not assumed			-1.702	133.634	.091	-.661	.389	-1.430	.107

Table 6. Gender and *General Activity*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	male	64	3.84	2.033	.254
	female	96	5.14	2.717	.277

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	8.409	.004	-3.244	158	.001	-1.292	.398	-2.078	-.505
	Equal variances not assumed			-3.434	155.828	.001	-1.292	.376	-2.035	-.549

Table 7. Gender and *Mood*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	male	64	2.63	1.750	.219
	female	96	3.82	3.019	.308

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	22.554	.000	-2.867	158	.005	-1.198	.418	-2.023	-.373
	Equal variances not assumed			-3.170	155.380	.002	-1.198	.378	-1.944	-.451

Table 8. Gender and *Walking ability*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	male	64	3.36	2.185	.273
	female	96	4.31	2.878	.294

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	6.733	.010	-2.251	158	.026	-.953	.423	-1.789	-.117
	Equal variances not assumed			-2.377	155.264	.019	-.953	.401	-1.745	-.161

Table 9. Gender and *Normal work*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	male	64	3.39	2.230	.279
	female	96	4.84	2.762	.282

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	6.227	.014	-3.513	158	.001	-1.453	.414	-2.270	-.636
	Equal variances not assumed			-3.666	152.194	.000	-1.453	.396	-2.236	-.670

Table 10. Gender and *Relations with other people*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	male	64	1.47	1.490	.186
	female	96	2.65	2.981	.304

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	24.816	.000	-2.923	158	.004	-1.177	.403	-1.972	-.382
	Equal variances not assumed			-3.300	148.190	.001	-1.177	.357	-1.882	-.472

Table 11. Gender and *Sleep*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	male	64	2.53	2.145	.268
	female	96	3.81	2.982	.304

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	15.330	.000	-2.963	158	.004	-1.281	.432	-2.135	-.427
	Equal variances not assumed			-3.159	157.037	.002	-1.281	.406	-2.082	-.480

Table 12. Gender and *Enjoyment of life*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	male	64	3.14	1.868	.233
	female	96	4.05	2.408	.246

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	4.237	.041	-2.558	158	.011	-.911	.356	-1.615	-.208
	Equal variances not assumed			-2.689	154.318	.008	-.911	.339	-1.581	-.242

Table 13. Gender and *Physical Functioning*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	male	64	65.7813	23.65793	2.95724
	female	96	53.8021	29.75111	3.03646

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	2.621	.107	2.701	158	.008	11.97917	4.43521	3.21923	20.73911
	Equal variances not assumed			2.826	153.051	.005	11.97917	4.23856	3.60554	20.35280

Table 14. Gender and *Role-Physical*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	male	64	39.8438	40.99912	5.12489
	female	96	26.8229	36.31818	3.70671

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	5.042	.026	2.109	158	.036	13.02083	6.17311	.82838	25.21329
	Equal variances not assumed			2.059	123.705	.042	13.02083	6.32489	.50182	25.53985

Table 15. Gender and *Bodily Pain*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	male	64	50.9844	16.23488	2.02936
	female	96	44.2604	19.15051	1.95454

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	.259	.612	2.309	158	.022	6.72396	2.91192	.97265	12.47527
	Equal variances not assumed			2.386	149.042	.018	6.72396	2.81754	1.15648	12.29144

Table 16. Gender and *General Health*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	male	64	47.4531	15.31876	1.91485
	female	96	41.9688	21.59213	2.20374

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	9.455	.002	1.758	158	.081	5.48438	3.12038	-.67865	11.64740
	Equal variances not assumed			1.879	157.350	.062	5.48438	2.91943	-.28196	11.25071

Table 17. Gender and *Vitality*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Vitality	male	64	52.6563	17.97195	2.24649
	female	96	46.9271	19.71334	2.01198

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	1.555	.214	1.865	158	.064	5.72917	3.07226	-.33883	11.79716
	Equal variances not assumed			1.900	143.411	.059	5.72917	3.01576	-.23192	11.69025

Table 18. Gender and *Social Functioning*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	male	64	69.1406	20.76999	2.59625
	female	96	65.7552	25.98360	2.65194

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	5.844	.017	.873	158	.384	3.38542	3.87955	-4.27705	11.04788
	Equal variances not assumed			.912	152.763	.363	3.38542	3.71124	-3.94656	10.71739

Table 19. Gender and *Role-Emotional*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	male	64	50.0000	46.76482	5.84560
	female	96	35.4167	45.57944	4.65193

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	1.479	.226	1.962	158	.051	14.58333	7.43221	-.09598	29.26264
	Equal variances not assumed			1.952	132.754	.053	14.58333	7.47071	-.19370	29.36037

Table 20. Gender and *Mental Health*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	male	64	59.1250	15.04227	1.88028
	female	96	56.9583	18.81316	1.92011

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	2.895	.091	.771	158	.442	2.16667	2.80917	-3.38170	7.71503
	Equal variances not assumed			.806	152.749	.421	2.16667	2.68743	-3.14267	7.47600

Table 21. Gender and *Physical Component Summary (PCS)*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	male	64	41.9107774	7.48612311	.93576539
	female	96	38.0211380	8.30390631	.84751389

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	.145	.704	3.017	158	.003	3.88963946	1.28903708	1.34367255	6.43560638
	Equal variances not assumed			3.081	144.339	.002	3.88963946	1.26251204	1.39423934	6.38503959

Table 22. Gender and *Mental Component Summary (MCS)*

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	male	64	42.8060095	9.04600204	1.13075026
	female	96	41.1046932	10.83968171	1.10632038

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	3.385	.068	1.037	158	.301	1.70131632	1.63996658	-1.53776868	4.94040132
	Equal variances not assumed			1.075	150.119	.284	1.70131632	1.58194214	-1.42443136	4.82706400

Table 23. Age and *Pain at its worst*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI3	60-74 years old	138	80.50
	75-84 years old	19	80.00
	85 years or over	3	83.83
	Total	160	

Test Statistics[a,b]

	BPI3
Chi-Square	.018
df	2
Asymp. Sig.	.991

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 24. Age and *Pain at its least*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI4	60-74 years old	138	77.62
	75-84 years old	19	96.34
	85 years or over	3	112.83
	Total	160	

Test Statistics[a,b]

	BPI4
Chi-Square	4.375
df	2
Asymp. Sig.	.112

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 25. Age and *Pain on average*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI5	60-74 years old	138	79.22
	75-84 years old	19	86.68
	85 years or over	3	100.17
	Total	160	

Test Statistics[a,b]

	BPI5
Chi-Square	1.014
df	2
Asymp. Sig.	.602

a. Kruskal Wallis Test

Test Statistics[a,b]

	BPI5
Chi-Square	1.014
df	2
Asymp. Sig.	.602

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 26. Age and *Pain right now*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI6	60-74 years old	138	77.35
	75-84 years old	19	98.42
	85 years or over	3	111.83
	Total	160	

Test Statistics[a,b]

	BPI6
Chi-Square	5.070
df	2
Asymp. Sig.	.079

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 27. Age and *Percentage of pain relief from medications*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI10	60-74 years old	138	81.96
	75-84 years old	19	75.66
	85 years or over	3	44.00
	Total	160	

Test Statistics[a,b]

	BPI10
Chi-Square	2.246
df	2
Asymp. Sig.	.325

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 28. Age and *General Activity*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI14.1	60-74 years old	138	80.06
	75-84 years old	19	82.53
	85 years or over	3	87.83
	Total	160	

Test Statistics[a,b]

	BPI14.1
Chi-Square	.127
df	2
Asymp. Sig.	.939

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 29. Age and *Mood*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI14.2	60-74 years old	138	78.65
	75-84 years old	19	92.66
	85 years or over	3	88.67
	Total	160	

Test Statistics[a,b]

	BPI14.2
Chi-Square	1.652
df	2
Asymp. Sig.	.438

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 30. Age and *Walking ability*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI14.3	60-74 years old	138	79.46
	75-84 years old	19	85.95
	85 years or over	3	93.67
	Total	160	

Test Statistics[a,b]

	BPI14.3
Chi-Square	.585
df	2
Asymp. Sig.	.747

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 31. Age and *Normal work*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI14.4	60-74 years old	138	80.77
	75-84 years old	19	77.16
	85 years or over	3	89.33
	Total	160	

Test Statistics[a,b]

	BPI14.4
Chi-Square	.216
df	2
Asymp. Sig.	.898

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 32. Age and *Relations with other people*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI14.5	60-74 years old	138	77.88
	75-84 years old	19	94.47
	85 years or over	3	112.50
	Total	160	

Test Statistics[a,b]

	BPI14.5
Chi-Square	3.802
df	2
Asymp. Sig.	.149

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 33. Age and *Sleep*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI14.6	60-74 years old	138	79.08
	75-84 years old	19	88.13
	85 years or over	3	97.67
	Total	160	

Test Statistics[a,b]

	BPI14.6
Chi-Square	1.076
df	2
Asymp. Sig.	.584

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 34. Age and *Enjoyment of life*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
BPI14.7	60-74 years old	138	78.73
	75-84 years old	19	90.97
	85 years or over	3	95.50
	Total	160	

Test Statistics[a,b]

	BPI14.7
Chi-Square	1.518
df	2
Asymp. Sig.	.468

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 35. Age and *Physical Functioning*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Phy Func	60-74 years old	138	83.68
	75-84 years old	19	63.16
	85 years or over	3	43.83
	Total	160	

Test Statistics[a,b]

	Phy Func
Chi-Square	5.339
df	2
Asymp. Sig.	.069

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 36. Age and *Role-Physical*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Role Phy	60-74 years old	138	82.35
	75-84 years old	19	73.45
	85 years or over	3	40.00
	Total	160	

Test Statistics[a,b]

	Role Phy
Chi-Square	3.396
df	2
Asymp. Sig.	.183

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 37. Age and *Bodily Pain*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Body Pain	60-74 years old	138	80.72
	75-84 years old	19	84.24
	85 years or over	3	46.50
	Total	160	

Test Statistics[a,b]

	Body Pain
Chi-Square	1.839
df	2
Asymp. Sig.	.399

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 38. Age and *General Health*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Gen Health	60-74 years old	138	82.73
	75-84 years old	19	72.92
	85 years or over	3	26.00
	Total	160	

Test Statistics[a,b]

	Gen Health
Chi-Square	5.017
df	2
Asymp. Sig.	.081

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 39. Age and *Vitality*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Vitality	60-74 years old	138	82.50
	75-84 years old	19	72.16
	85 years or over	3	41.17
	Total	160	

Test Statistics[a,b]

	Vitality
Chi-Square	3.072
df	2
Asymp. Sig.	.215

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 40. Age and *Social Functioning*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Soc Func	60-74 years old	138	83.12
	75-84 years old	19	69.00
	85 years or over	3	32.67
	Total	160	

Test Statistics[a,b]

	Soc Func
Chi-Square	4.978
df	2
Asymp. Sig.	.083

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 41. Age and *Role-Emotional*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Role-Emo	60-74 years old	138	80.28
	75-84 years old	19	88.13
	85 years or over	3	42.50
	Total	160	

Test Statistics[a,b]

	Role-Emo
Chi-Square	3.124
df	2
Asymp. Sig.	.210

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 42. Age and *Mental Health*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
Ment Health	60-74 years old	138	82.91
	75-84 years old	19	71.00
	85 years or over	3	29.67
	Total	160	

Test Statistics[a,b]

	Ment Health
Chi-Square	4.865
df	2
Asymp. Sig.	.088

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 43. Age and *Physical Component Summary (PCS)*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
PCS baseline	60-74 years old	138	83.92
	75-84 years old	19	62.21
	85 years or over	3	39.00
	Total	160	

Test Statistics[a,b]

	PCS baseline
Chi-Square	6.120
df	2
Asymp. Sig.	.047

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 44. Age and *Mental Component Summary (MCS)*

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
MCS baseline	60-74 years old	138	81.46
	75-84 years old	19	81.63
	85 years or over	3	29.00
	Total	160	

Test Statistics[a,b]

	MCS baseline
Chi-Square	3.778
df	2
Asymp. Sig.	.151

a. Kruskal Wallis Test

b. Grouping Variable: Age

Table 45. Marital status and *Pain at its worst*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI3	Single	9	88.78
	Couple	97	78.51
	Divorced/Separated/Widowed	54	82.69
	Total	160	

Test Statistics[a,b]

	BPI3
Chi-Square	.598
df	2
Asymp. Sig.	.742

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 46. Marital status and *Pain at its least*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI4	Single	9	70.83
	Couple	97	82.38
	Divorced/Separated/Widowed	54	78.74
	Total	160	

Test Statistics[a,b]

	BPI4
Chi-Square	.652
df	2
Asymp. Sig.	.722

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 47. Marital status and *Pain on average*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI5	Single	9	73.28
	Couple	97	78.19
	Divorced/Separated/Widowed	54	85.86
	Total	160	

Test Statistics[a,b]

	BPI5
Chi-Square	1.219
df	2
Asymp. Sig.	.543

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 48. Marital status and *Pain right now*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI6	Single	9	84.83
	Couple	97	79.16
	Divorced/Separated/Widowed	54	82.19
	Total	160	

Test Statistics[a,b]

	BPI6
Chi-Square	.242
df	2
Asymp. Sig.	.886

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 49. Marital status and *Percentage of pain relief from medications*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI10	Single	9	94.50
	Couple	97	78.24
	Divorced/Separated/Widowed	54	82.23
	Total	160	

Test Statistics[a,b]

	BPI10
Chi-Square	1.149
df	2
Asymp. Sig.	.563

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 50. Marital status and *General activity*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI14.1	Single	9	92.22
	Couple	97	74.00
	Divorced/Separated/Widowed	54	90.22
	Total	160	

Test Statistics[a,b]

	BPI14.1
Chi-Square	4.968
df	2
Asymp. Sig.	.083

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 51. Marital status and *Mood*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI14.2	Single	9	77.56
	Couple	97	75.20
	Divorced/Separated/Widowed	54	90.51
	Total	160	

Test Statistics[a,b]

	BPI14.2
Chi-Square	3.896
df	2
Asymp. Sig.	.143

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 52. Marital status and *Walking ability*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI14.3	Single	9	88.28
	Couple	97	77.74
	Divorced/Separated/Widowed	54	84.17
	Total	160	

Test Statistics[a,b]

	BPI14.3
Chi-Square	.954
df	2
Asymp. Sig.	.621

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 53. Marital status and *Normal work*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI14.4	Single	9	83.56
	Couple	97	80.01
	Divorced/Separated/Widowed	54	80.87
	Total	160	

Test Statistics[a,b]

	BPI14.4
Chi-Square	.054
df	2
Asymp. Sig.	.973

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 54. Marital status and *Relations with other people*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI14.5	Single	9	83.28
	Couple	97	73.73
	Divorced/Separated/Widowed	54	92.19
	Total	160	

Test Statistics[a,b]

	BPI14.5
Chi-Square	5.853
df	2
Asymp. Sig.	.054

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 55. Marital status and *Sleep*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI14.6	Single	9	72.89
	Couple	97	77.19
	Divorced/Separated/Widowed	54	87.72
	Total	160	

Test Statistics[a,b]

	BPI14.6
Chi-Square	2.088
df	2
Asymp. Sig.	.352

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 56. Marital status and *Enjoyment of life*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
BPI14.7	Single	9	89.17
	Couple	97	73.57
	Divorced/Separated/Widowed	54	91.50
	Total	160	

Test Statistics[a,b]

	BPI14.7
Chi-Square	5.645
df	2
Asymp. Sig.	.059

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 57. Marital status and *Physical Functioning*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
Phy Func	Single	9	91.00
	Couple	97	83.39
	Divorced/Separated/Widowed	54	73.56
	Total	160	

Test Statistics[a,b]

	Phy Func
Chi-Square	2.111
df	2
Asymp. Sig.	.348

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 58. Marital status and *Role-Physical*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
Role Phy	Single	9	81.06
	Couple	97	77.28
	Divorced/Separated/Widowed	54	86.19
	Total	160	

Test Statistics[a,b]

	Role Phy
Chi-Square	1.479
df	2
Asymp. Sig.	.477

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 59. Marital status and *Bodily Pain*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
Body Pain	Single	9	67.89
	Couple	97	80.54
	Divorced/Separated/Widowed	54	82.53
	Total	160	

Test Statistics[a,b]

	Body Pain
Chi-Square	.813
df	2
Asymp. Sig.	.666

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 60. Marital status and *General Health*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
Gen Health	Single	9	92.50
	Couple	97	80.19
	Divorced/Separated/Widowed	54	79.06
	Total	160	

Test Statistics[a,b]

	Gen Health
Chi-Square	.666
df	2
Asymp. Sig.	.717

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 61. Marital status and *Vitality*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
Vitality	Single	9	89.17
	Couple	97	83.64
	Divorced/Separated/Widowed	54	73.42
	Total	160	

Test Statistics[a,b]

	Vitality
Chi-Square	2.046
df	2
Asymp. Sig.	.360

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 62. Marital status and *Social Functioning*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
Soc Func	Single	9	86.83
	Couple	97	81.33
	Divorced/Separated/Widowed	54	77.95
	Total	160	

Test Statistics[a,b]

	Soc Func
Chi-Square	.375
df	2
Asymp. Sig.	.829

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 63. Marital status and *Role-Emotional*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
Role-Emo	Single	9	102.50
	Couple	97	79.90
	Divorced/Separated/Widowed	54	77.91
	Total	160	

Test Statistics[a,b]

	Role-Emo
Chi-Square	2.727
df	2
Asymp. Sig.	.256

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 64. Marital status and *Mental Health*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
Ment Health	Single	9	111.39
	Couple	97	80.56
	Divorced/Separated/Widowed	54	75.25
	Total	160	

Test Statistics[a,b]

	Ment Health
Chi-Square	4.772
df	2
Asymp. Sig.	.092

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 65. Marital status and *Physical Component Summary (PCS)*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
PCS baseline	Single	9	67.33
	Couple	97	81.39
	Divorced/Separated/Widowed	54	81.09
	Total	160	

Test Statistics[a,b]

	PCS baseline
Chi-Square	.772
df	2
Asymp. Sig.	.680

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 66. Marital status and *Mental Component Summary (MCS)*

Kruskal-Wallis Test

Ranks

	Status	N	Mean Rank
MCS baseline	Single	9	109.22
	Couple	97	82.09
	Divorced/Separated/Widowed	54	72.85
	Total	160	

Test Statistics[a,b]

	MCS baseline
Chi-Square	5.045
df	2
Asymp. Sig.	.080

a. Kruskal Wallis Test

b. Grouping Variable: Status

Table 67. Education and *Pain at its worst*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI3	No education	44	76.41
	Primary school	114	82.21
	High school	2	73.00
	Total	160	

Test Statistics[a,b]

	BPI3
Chi-Square	.560
df	2
Asymp. Sig.	.756

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 68. Education and *Pain at its least*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI4	No education	44	86.66
	Primary school	114	78.17
	High school	2	78.00
	Total	160	

Test Statistics[a,b]

	BPI4
Chi-Square	1.113
df	2
Asymp. Sig.	.573

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 69. Education and *Pain on average*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI5	No education	44	83.15
	Primary school	114	79.61
	High school	2	73.25
	Total	160	

Test Statistics[a,b]

	BPI5
Chi-Square	.242
df	2
Asymp. Sig.	.886

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 70. Education and *Pain right now*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI6	No education	44	83.10
	Primary school	114	79.33
	High school	2	90.00
	Total	160	

Test Statistics[a,b]

	BPI6
Chi-Square	.309
df	2
Asymp. Sig.	.857

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 71. Education and *Percentage of pain relief from medications*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI10	No education	44	70.86
	Primary school	114	83.76
	High school	2	106.50
	Total	160	

Test Statistics[a,b]

	BPI10
Chi-Square	3.154
df	2
Asymp. Sig.	.207

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 72. Education and *General activity*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI14.1	No education	44	75.49
	Primary school	114	83.75
	High school	2	5.50
	Total	160	

Test Statistics[a,b]

	BPI14.1
Chi-Square	6.452
df	2
Asymp. Sig.	.040

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 73. Education and *Mood*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI14.2	No education	44	85.93
	Primary school	114	78.78
	High school	2	59.00
	Total	160	

Test Statistics[a,b]

	BPI14.2
Chi-Square	1.215
df	2
Asymp. Sig.	.545

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 74. Education and *Walking ability*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI14.3	No education	44	83.95
	Primary school	114	79.37
	High school	2	68.75
	Total	160	

Test Statistics[a,b]

	BPI14.3
Chi-Square	.449
df	2
Asymp. Sig.	.799

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 75. Education and *Normal work*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI14.4	No education	44	84.94
	Primary school	114	80.08
	High school	2	6.50
	Total	160	

Test Statistics[a,b]

	BPI14.4
Chi-Square	5.595
df	2
Asymp. Sig.	.061

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 76. Education and *Relations with other people*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI14.5	No education	44	96.73
	Primary school	114	75.15
	High school	2	28.50
	Total	160	

Test Statistics[a,b]

	BPI14.5
Chi-Square	9.966
df	2
Asymp. Sig.	.007

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 77. Education and *Sleep*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI14.6	No education	44	91.70
	Primary school	114	76.42
	High school	2	66.75
	Total	160	

Test Statistics[a,b]

	BPI14.6
Chi-Square	3.699
df	2
Asymp. Sig.	.157

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 78. Education and *Enjoyment of life*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
BPI14.7	No education	44	85.38
	Primary school	114	78.91
	High school	2	64.00
	Total	160	

Test Statistics[a,b]

	BPI14.7
Chi-Square	.894
df	2
Asymp. Sig.	.640

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 79. Education and *Physical Functioning*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
Phy Func	No education	44	61.52
	Primary school	114	87.01
	High school	2	126.75
	Total	160	

Test Statistics[a,b]

	Phy Func
Chi-Square	11.955
df	2
Asymp. Sig.	.003

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 80. Education and *Role-Physical*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
Role Phy	No education	44	63.76
	Primary school	114	85.97
	High school	2	136.75
	Total	160	

Test Statistics[a,b]

	Role Phy
Chi-Square	11.824
df	2
Asymp. Sig.	.003

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 81. Education and *Bodily Pain*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
Body Pain	No education	44	67.18
	Primary school	114	84.92
	High school	2	121.50
	Total	160	

Test Statistics[a,b]

	Body Pain
Chi-Square	6.584
df	2
Asymp. Sig.	.037

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 82. Education and *General Health*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
Gen Health	No education	44	62.94
	Primary school	114	86.16
	High school	2	144.25
	Total	160	

Test Statistics[a,b]

	Gen Health
Chi-Square	11.894
df	2
Asymp. Sig.	.003

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 83. Education and *Vitality*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
Vitality	No education	44	65.73
	Primary school	114	84.97
	High school	2	150.50
	Total	160	

Test Statistics[a,b]

	Vitality
Chi-Square	10.219
df	2
Asymp. Sig.	.006

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 84. Education and *Social Functioning*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
Soc Func	No education	44	64.44
	Primary school	114	85.57
	High school	2	144.50
	Total	160	

Test Statistics[a,b]

	Soc Func
Chi-Square	10.833
df	2
Asymp. Sig.	.004

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 85. Education and *Role-Emotional*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
Role-Emo	No education	44	72.84
	Primary school	114	82.83
	High school	2	116.00
	Total	160	

Test Statistics[a,b]

	Role-Emo
Chi-Square	3.283
df	2
Asymp. Sig.	.194

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 86. Education and *Mental Health*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
Ment Health	No education	44	56.25
	Primary school	114	88.71
	High school	2	145.75
	Total	160	

Test Statistics[a,b]

	Ment Health
Chi-Square	19.932
df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 87. Education and *Physical Component Summary (PCS)*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
PCS baseline	No education	44	59.68
	Primary school	114	87.50
	High school	2	139.50
	Total	160	

Test Statistics[a,b]

	PCS baseline
Chi-Square	14.729
df	2
Asymp. Sig.	.001

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 88. Education and *Mental Component Summary (MCS)*

Kruskal-Wallis Test

Ranks

	Education	N	Mean Rank
MCS baseline	No education	44	66.30
	Primary school	114	84.85
	High school	2	145.00
	Total	160	

Test Statistics[a,b]

	MCS baseline
Chi-Square	9.017
df	2
Asymp. Sig.	.011

a. Kruskal Wallis Test

b. Grouping Variable: Education

Table 89. Occupation and *Pain at its worst*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI3	Hired by government or private	23	88.37
	their own business	84	72.65
	no career	53	89.53
	Total	160	

Test Statistics[a,b]

	BPI3
Chi-Square	5.177
df	2
Asymp. Sig.	.075

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 90. Occupation and *Pain at its least*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI4	Hired by government or private	23	87.50
	their own business	84	71.36
	no career	53	91.94
	Total	160	

Test Statistics[a,b]

	BPI4
Chi-Square	7.288
df	2
Asymp. Sig.	.026

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 91. Occupation and *Pain on average*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI5	Hired by government or private	23	81.46
	their own business	84	72.99
	no career	53	91.98
	Total	160	

Test Statistics[a,b]

	BPI5
Chi-Square	5.634
df	2
Asymp. Sig.	.060

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 92. Occupation and *Pain right now*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI6	Hired by government or private	23	83.09
	their own business	84	70.76
	no career	53	94.81
	Total	160	

Test Statistics[a,b]

	BPI6
Chi-Square	9.236
df	2
Asymp. Sig.	.010

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 93. Occupation and *Percentage of pain relief from medications*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI10	Hired by government or private	23	71.72
	their own business	84	83.35
	no career	53	79.80
	Total	160	

Test Statistics[a,b]

	BPI10
Chi-Square	1.176
df	2
Asymp. Sig.	.555

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 94. Occupation and *General activity*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI14.1	Hired by government or private	23	93.78
	their own business	84	68.24
	no career	53	94.17
	Total	160	

Test Statistics[a,b]

	BPI14.1
Chi-Square	12.654
df	2
Asymp. Sig.	.002

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 95. Occupation and *Mood*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI14.2	Hired by government or private	23	99.52
	their own business	84	69.53
	no career	53	89.63
	Total	160	

Test Statistics[a,b]

	BPI14.2
Chi-Square	10.843
df	2
Asymp. Sig.	.004

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 96. Occupation and *Walking ability*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI14.3	Hired by government or private	23	81.39
	their own business	84	70.43
	no career	53	96.07
	Total	160	

Test Statistics[a,b]

	BPI14.3
Chi-Square	10.140
df	2
Asymp. Sig.	.006

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 97. Occupation and *Normal work*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI14.4	Hired by government or private	23	92.65
	their own business	84	70.26
	no career	53	91.46
	Total	160	

Test Statistics[a,b]

	BPI14.4
Chi-Square	8.779
df	2
Asymp. Sig.	.012

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 98. Occupation and *Relations with other people*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI14.5	Hired by government or private	23	86.02
	their own business	84	68.84
	no career	53	96.58
	Total	160	

Test Statistics[a,b]

	BPI14.5
Chi-Square	12.710
df	2
Asymp. Sig.	.002

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 99. Occupation and *Sleep*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI14.6	Hired by government or private	23	97.43
	their own business	84	67.48
	no career	53	93.78
	Total	160	

Test Statistics[a,b]

	BPI14.6
Chi-Square	14.310
df	2
Asymp. Sig.	.001

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 100. Occupation and *Enjoyment of life*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
BPI14.7	Hired by government or private	23	99.13
	their own business	84	69.87
	no career	53	89.26
	Total	160	

Test Statistics[a,b]

	BPI14.7
Chi-Square	10.252
df	2
Asymp. Sig.	.006

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 101. Occupation and *Physical Functioning*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
Phy Func	Hired by government or private	23	79.98
	their own business	84	91.59
	no career	53	63.15
	Total	160	

Test Statistics[a,b]

	Phy Func
Chi-Square	12.591
df	2
Asymp. Sig.	.002

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 102. Occupation and *Role-Physical*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
Role Phy	Hired by government or private	23	82.93
	their own business	84	84.11
	no career	53	73.73
	Total	160	

Test Statistics[a,b]

	Role Phy
Chi-Square	1.961
df	2
Asymp. Sig.	.375

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 103. Occupation and *Bodily Pain*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
Body Pain	Hired by government or private	23	68.04
	their own business	84	85.93
	no career	53	77.29
	Total	160	

Test Statistics[a,b]

	Body Pain
Chi-Square	3.242
df	2
Asymp. Sig.	.198

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 104. Occupation and *General Health*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
Gen Health	Hired by government or private	23	78.17
	their own business	84	88.67
	no career	53	68.57
	Total	160	

Test Statistics[a,b]

	Gen Health
Chi-Square	6.231
df	2
Asymp. Sig.	.044

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 105. Occupation and *Vitality*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
Vitality	Hired by government or private	23	74.24
	their own business	84	90.86
	no career	53	66.80
	Total	160	

Test Statistics[a,b]

	Vitality
Chi-Square	9.358
df	2
Asymp. Sig.	.009

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 106. Occupation and *Social Functioning*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
Soc Func	Hired by government or private	23	70.70
	their own business	84	88.11
	no career	53	72.70
	Total	160	

Test Statistics[a,b]

	Soc Func
Chi-Square	4.965
df	2
Asymp. Sig.	.084

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 107. Occupation and *Role-Emotional*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
Role-Emo	Hired by government or private	23	78.93
	their own business	84	83.43
	no career	53	76.54
	Total	160	

Test Statistics[a,b]

	Role-Emo
Chi-Square	.923
df	2
Asymp. Sig.	.630

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 108. Occupation and *Mental Health*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
Ment Health	Hired by government or private	23	73.24
	their own business	84	89.16
	no career	53	69.92
	Total	160	

Test Statistics[a,b]

	Ment Health
Chi-Square	6.366
df	2
Asymp. Sig.	.041

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 109. Occupation and *Physical Component Summary (PCS)*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
PCS baseline	Hired by government or private	23	79.22
	their own business	84	90.61
	no career	53	65.04
	Total	160	

Test Statistics[a,b]

	PCS baseline
Chi-Square	9.918
df	2
Asymp. Sig.	.007

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 110. Occupation and *Mental Component Summary (MCS)*

Kruskal-Wallis Test

Ranks

	Occupation	N	Mean Rank
MCS baseline	Hired by government or private	23	72.00
	their own business	84	88.08
	no career	53	72.17
	Total	160	

Test Statistics[a,b]

	MCS baseline
Chi-Square	4.738
df	2
Asymp. Sig.	.094

a. Kruskal Wallis Test

b. Grouping Variable: Occupation

Table 111. Financial difficulty and *Pain at its worst*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI3	No	70	4.59	2.157	.258
	Yes	90	5.72	2.535	.267

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	4.682	.032	-3.000	158	.003	-1.137	.379	-1.885	-.388
	Equal variances not assumed			-3.061	156.693	.003	-1.137	.371	-1.870	-.403

Table 112. Financial difficulty and *Pain at its least*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI4	No	70	2.26	1.639	.196
	Yes	90	2.27	1.556	.164

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	.032	.859	-.038	158	.970	-.010	.254	-.511	.492
	Equal variances not assumed			-.037	144.586	.970	-.010	.256	-.515	.496

Table 113. Financial difficulty and *Pain on average*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI5	No	70	3.63	1.626	.194
	Yes	90	4.01	1.726	.182

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	.673	.413	-1.427	158	.156	-.383	.268	-.912	.147
	Equal variances not assumed			-1.437	152.265	.153	-.383	.266	-.908	.143

Table 114. Financial difficulty and *Pain right now*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI6	No	70	2.84	1.862	.223
	Yes	90	3.16	2.187	.231

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	1.484	.225	-.956	158	.340	-.313	.327	-.958	.333
	Equal variances not assumed			-.976	156.673	.331	-.313	.320	-.946	.320

Table 115. Financial difficulty and *Percentage of pain relief from medications*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI10	No	70	5.74	2.448	.293
	Yes	90	6.04	2.393	.252

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI10	Equal variances assumed	.213	.645	-.783	158	.435	-.302	.385	-1.062	.459
	Equal variances not assumed			-.781	146.832	.436	-.302	.386	-1.065	.462

Table 116. Financial difficulty and *General activity*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	No	70	4.44	2.591	.310
	Yes	90	4.76	2.505	.264

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	.122	.728	-.772	158	.442	-.313	.405	-1.113	.488
	Equal variances not assumed			-.768	145.984	.444	-.313	.407	-1.117	.492

Table 117. Financial difficulty and *Mood*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	No	70	3.10	2.439	.291
	Yes	90	3.53	2.797	.295

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	2.348	.127	-1.027	158	.306	-.433	.422	-1.266	.400
	Equal variances not assumed			-1.045	155.905	.298	-.433	.415	-1.252	.386

Table 118. Financial difficulty and *Walking ability*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	No	70	3.70	2.361	.282
	Yes	90	4.11	2.866	.302

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	3.779	.054	-.971	158	.333	-.411	.423	-1.247	.425
	Equal variances not assumed			-.994	157.448	.322	-.411	.413	-1.228	.405

Table 119. Financial difficulty and *Normal work*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	No	70	3.93	2.645	.316
	Yes	90	4.52	2.645	.279

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	.400	.528	-1.409	158	.161	-.594	.421	-1.426	.239
	Equal variances not assumed			-1.409	148.446	.161	-.594	.421	-1.427	.239

Table 120. Financial difficulty and *Relations with other people*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	No	70	2.29	2.444	.292
	Yes	90	2.09	2.646	.279

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	.498	.482	.482	158	.630	.197	.408	-.609	1.003
	Equal variances not assumed			.487	153.345	.627	.197	.404	-.601	.995

Table 121. Financial difficulty and *Sleep*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	No	70	3.16	2.320	.277
	Yes	90	3.41	3.042	.321

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	7.262	.008	-.579	158	.563	-.254	.438	-1.120	.612
	Equal variances not assumed			-.599	157.948	.550	-.254	.424	-1.091	.583

Table 122. Financial difficulty and *Enjoyment of life*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	No	70	3.61	2.073	.248
	Yes	90	3.74	2.382	.251

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	3.163	.077	-.363	158	.717	-.130	.359	-.839	.579
	Equal variances not assumed			-.369	155.966	.713	-.130	.353	-.827	.567

Table 123. Financial difficulty and *Physical Functioning*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	No	70	58.8571	30.43372	3.63753
	Yes	90	58.3889	26.16744	2.75829

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	2.254	.135	.105	158	.917	.46825	4.47977	-8.37970	9.31621
	Equal variances not assumed			.103	136.241	.918	.46825	4.56506	-8.55928	9.49579

Table 124. Financial difficulty and *Role-Physical*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	No	70	37.1429	42.29444	5.05515
	Yes	90	28.0556	35.32111	3.72317

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	8.256	.005	1.480	158	.141	9.08730	6.13901	-3.03782	21.21242
	Equal variances not assumed			1.447	133.668	.150	9.08730	6.27826	-3.33029	21.50489

Table 125. Financial difficulty and *Bodily Pain*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	No	70	47.1286	18.48848	2.20980
	Yes	90	46.8111	18.23436	1.92207

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	.161	.688	.109	158	.914	.31746	2.92365	-5.45702	6.09194
	Equal variances not assumed			.108	147.461	.914	.31746	2.92875	-5.47027	6.10520

Table 126. Financial difficulty and *General Health*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	No	70	44.7857	17.12350	2.04665
	Yes	90	43.6778	21.18661	2.23327

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	6.885	.010	.356	158	.722	1.10794	3.11023	-5.03505	7.25093
	Equal variances not assumed			.366	157.749	.715	1.10794	3.02923	-4.87515	7.09102

Table 127. Financial difficulty and *Vitality*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
Vitality	No	70	48.5000	17.01129	2.03324
	Yes	90	49.7778	20.79746	2.19224

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	4.590	.034	-.417	158	.677	-1.27778	3.06550	-7.33243	4.77688
	Equal variances not assumed			-.427	157.576	.670	-1.27778	2.98998	-7.18339	4.62784

Table 128. Financial difficulty and *Social Functioning*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	No	70	63.2143	23.87749	2.85391
	Yes	90	70.1389	23.82745	2.51163

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	1.302	.256	-1.822	158	.070	-6.92460	3.80072	-14.43137	.58216
	Equal variances not assumed			-1.821	148.303	.071	-6.92460	3.80172	-14.43714	.58794

Table 129. Financial difficulty and *Role-Emotional*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	No	70	49.5238	48.06827	5.74526
	Yes	90	34.8148	44.38823	4.67893

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	6.845	.010	2.005	158	.047	14.70899	7.33576	.22019	29.19780
	Equal variances not assumed			1.985	142.338	.049	14.70899	7.40948	.06215	29.35584

Table 130. Financial difficulty and *Mental Health*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	No	70	57.3714	16.79041	2.00684
	Yes	90	58.1778	17.92028	1.88896

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	.974	.325	-.290	158	.772	-.80635	2.77865	-6.29443	4.68173
	Equal variances not assumed			-.293	152.575	.770	-.80635	2.75601	-6.25121	4.63852

Table 131. Financial difficulty and *Physical Component Summary (PCS)*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	No	70	39.7863674	8.28841731	.99065535
	Yes	90	39.4141476	8.15352502	.85945700

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	.075	.785	.284	158	.776	.37221985	1.30880819	-2.21279682	2.95723653
	Equal variances not assumed			.284	147.274	.777	.37221985	1.31151224	-2.21959430	2.96403401

Table 132. Financial difficulty and *Mental Component Summary (MCS)*

Group Statistics

	Finance	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	No	70	42.0447132	9.57654737	1.14461634
	Yes	90	41.5833915	10.64885731	1.12248812

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	1.607	.207	.284	158	.777	.46132174	1.62462685	-2.74746587	3.67010934
	Equal variances not assumed			.288	154.645	.774	.46132174	1.60316130	-2.70559962	3.62824309

Table 133. Medication use and *Pain at its worst*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI3	No	44	4.14	2.086	.315
	Yes	116	5.64	2.440	.227

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	4.652	.033	-3.610	158	.000	-1.502	.416	-2.323	-.680
	Equal variances not assumed			-3.874	90.127	.000	-1.502	.388	-2.272	-.731

Table 134. Medication use and *Pain at its least*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI4	No	44	2.11	1.715	.259
	Yes	116	2.32	1.541	.143

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	.326	.569	-.729	158	.467	-.205	.282	-.761	.351
	Equal variances not assumed			-.695	70.905	.489	-.205	.295	-.794	.384

Table 135. Medication use and *Pain on average*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI5	No	44	3.32	1.653	.249
	Yes	116	4.04	1.665	.155

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	.205	.652	-2.464	158	.015	-.725	.294	-1.306	-.144
	Equal variances not assumed			-2.472	78.119	.016	-.725	.293	-1.309	-.141

Table 136. Medication use and *Pain right now*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI6	No	44	2.70	1.720	.259
	Yes	116	3.14	2.158	.200

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	1.609	.207	-1.195	158	.234	-.433	.363	-1.150	.283
	Equal variances not assumed			-1.323	96.822	.189	-.433	.328	-1.084	.217

Table 137. Medication use and *Percentage of pain relief from medications*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI10	No	44	4.59	2.160	.326
	Yes	116	6.41	2.322	.216

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI10	Equal variances assumed	1.494	.223	-4.517	158	.000	-1.823	.404	-2.620	-1.026
	Equal variances not assumed			-4.667	82.999	.000	-1.823	.391	-2.600	-1.046

Table 138. Medication use and *General activity*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	No	44	3.91	2.208	.333
	Yes	116	4.89	2.614	.243

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	5.224	.024	-2.203	158	.029	-.979	.444	-1.856	-.101
	Equal variances not assumed			-2.376	91.217	.020	-.979	.412	-1.797	-.161

Table 139. Medication use and *Mood*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	No	44	2.77	2.271	.342
	Yes	116	3.56	2.755	.256

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	3.786	.053	-1.690	158	.093	-.788	.466	-1.708	.133
	Equal variances not assumed			-1.843	93.505	.068	-.788	.427	-1.636	.061

Table 140. Medication use and *Walking ability*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	No	44	3.09	1.998	.301
	Yes	116	4.25	2.810	.261

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	8.039	.005	-2.505	158	.013	-1.159	.463	-2.073	-.245
	Equal variances not assumed			-2.909	108.811	.004	-1.159	.398	-1.949	-.369

Table 141. Medication use and *Normal work*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	No	44	3.64	2.273	.343
	Yes	116	4.50	2.755	.256

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	6.902	.009	-1.853	158	.066	-.864	.466	-1.784	.057
	Equal variances not assumed			-2.020	93.430	.046	-.864	.428	-1.713	-.014

Table 142. Medication use and *Relations with other people*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	No	44	1.80	1.424	.215
	Yes	116	2.32	2.861	.266

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	14.474	.000	-1.159	158	.248	-.524	.452	-1.416	.369
	Equal variances not assumed			-1.533	146.812	.127	-.524	.341	-1.198	.151

Table 143. Medication use and *Sleep*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	No	44	2.98	2.063	.311
	Yes	116	3.42	2.961	.275

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	9.564	.002	-.916	158	.361	-.445	.486	-1.405	.515
	Equal variances not assumed			-1.072	111.104	.286	-.445	.415	-1.268	.377

Table 144. Medication use and *Enjoyment of life*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	No	44	3.43	1.873	.282
	Yes	116	3.78	2.373	.220

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	4.282	.040	-.886	158	.377	-.353	.398	-1.139	.433
	Equal variances not assumed			-.985	97.773	.327	-.353	.358	-1.063	.358

Table 145. Medication use and *Physical Functioning*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	No	44	62.2727	26.37949	3.97686
	Yes	116	57.1983	28.60745	2.65614

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	.242	.623	1.023	158	.308	5.07445	4.96080	-4.72359	14.87250
	Equal variances not assumed			1.061	83.693	.292	5.07445	4.78231	-4.43620	14.58510

Table 146. Medication use and *Role-Physical*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	No	44	35.2273	43.90734	6.61928
	Yes	116	30.8190	36.61755	3.39985

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	6.735	.010	.643	158	.521	4.40831	6.85863	-9.13811	17.95473
	Equal variances not assumed			.592	66.939	.556	4.40831	7.44136	-10.44496	19.26158

Table 147. Medication use and *Bodily Pain*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	No	44	49.5000	17.15253	2.58584
	Yes	116	45.9828	18.68177	1.73456

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	.032	.859	1.087	158	.279	3.51724	3.23623	-2.87461	9.90909
	Equal variances not assumed			1.130	84.040	.262	3.51724	3.11372	-2.67469	9.70918

Table 148. Medication use and *General Health*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	No	44	45.2273	17.78929	2.68184
	Yes	116	43.7586	20.11991	1.86809

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	3.887	.050	.425	158	.671	1.46865	3.45488	-5.35506	8.29237
	Equal variances not assumed			.449	87.177	.654	1.46865	3.26833	-5.02733	7.96463

Table 149. Medication use and *Vitality*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
Vitality	No	44	48.6364	15.56545	2.34658
	Yes	116	49.4397	20.44900	1.89864

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	5.512	.020	-.236	158	.814	-.80329	3.40705	-7.53254	5.92596
	Equal variances not assumed			-.266	101.469	.791	-.80329	3.01849	-6.79083	5.18424

Table 150. Medication use and *Social Functioning*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	No	44	67.6136	18.34706	2.76592
	Yes	116	66.9181	25.92078	2.40668

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	8.370	.004	.163	158	.871	.69553	4.26637	-7.73095	9.12201
	Equal variances not assumed			.190	109.327	.850	.69553	3.66640	-6.57090	7.96197

Table 151. Medication use and *Role-Emotional*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	No	44	48.4848	48.46723	7.30671
	Yes	116	38.5057	45.59927	4.23379

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	2.944	.088	1.215	158	.226	9.97910	8.21482	-6.24592	26.20412
	Equal variances not assumed			1.182	73.619	.241	9.97910	8.44470	-6.84878	26.80698

Table 152. Medication use and *Mental Health*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	No	44	55.1818	14.37257	2.16675
	Yes	116	58.8276	18.35698	1.70440

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	4.785	.030	-1.186	158	.237	-3.64577	3.07425	-9.71770	2.42617
	Equal variances not assumed			-1.322	98.567	.189	-3.64577	2.75677	-9.11610	1.82456

Table 153. Medication use and *Physical Component Summary (PCS)*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	No	44	40.9026288	8.05709021	1.21465205
	Yes	116	39.0741667	8.21676783	.76290774

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	.002	.961	1.263	158	.208	1.82846212	1.44716854	-1.02982899	4.68675324
	Equal variances not assumed			1.275	79.020	.206	1.82846212	1.43436670	-1.02656205	4.68348630

Table 154. Medication use and *Mental Component Summary (MCS)*

Group Statistics

	Medication	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	No	44	41.4618895	8.71934596	1.31449086
	Yes	116	41.9078623	10.69470354	.99297830

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	2.789	.097	-.247	158	.805	-.44597281	1.80507594	-4.01116399	3.11921837
	Equal variances not assumed			-.271	94.564	.787	-.44597281	1.64738949	-3.71664913	2.82470350

Table 155. Heart and *Pain at its worst*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI3	Yes	8	7.25	1.488	.526
	No	152	5.12	2.433	.197

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	2.411	.122	2.449	158	.015	2.132	.870	.413	3.850
	Equal variances not assumed			3.794	9.100	.004	2.132	.562	.863	3.401

Table 156. Heart and Pain at its least

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI4	Yes	8	2.88	1.458	.515
	No	152	2.23	1.592	.129

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	1.219	.271	1.120	158	.264	.645	.576	-.492	1.782
	Equal variances not assumed			1.213	7.906	.260	.645	.531	-.583	1.873

Table 157. Heart and *Pain on average*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI5	Yes	8	5.38	.916	.324
	No	152	3.76	1.683	.136

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	4.270	.040	2.683	158	.008	1.612	.601	.425	2.798
	Equal variances not assumed			4.586	9.692	.001	1.612	.351	.825	2.398

Table 158. Heart and *Pain right now*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI6	Yes	8	2.88	1.959	.693
	No	152	3.03	2.062	.167

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	.006	.938	-.203	158	.840	-.151	.746	-1.625	1.323
	Equal variances not assumed			-.212	7.838	.837	-.151	.713	-1.801	1.498

Table 159. Heart and *General activity*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	Yes	8	6.25	2.550	.901
	No	152	4.53	2.519	.204

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	.001	.969	1.878	158	.062	1.717	.914	-.088	3.523
	Equal variances not assumed			1.858	7.737	.102	1.717	.924	-.427	3.861

Table 160. Heart and *Mood*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	Yes	8	7.50	1.195	.423
	No	152	3.13	2.520	.204

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	3.071	.082	4.871	158	.000	4.375	.898	2.601	6.149
	Equal variances not assumed			9.320	10.630	.000	4.375	.469	3.337	5.413

Table 161. Heart and *Walking ability*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	Yes	8	5.63	3.378	1.194
	No	152	3.84	2.597	.211

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	2.146	.145	1.864	158	.064	1.783	.956	-.106	3.672
	Equal variances not assumed			1.470	7.442	.182	1.783	1.213	-1.051	4.616

Table 162. Heart and *Normal work*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	Yes	8	6.25	2.550	.901
	No	152	4.16	2.625	.213

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	.040	.841	2.200	158	.029	2.092	.951	.214	3.970
	Equal variances not assumed			2.259	7.802	.055	2.092	.926	-.053	4.237

Table 163. Heart and *Relations with other people*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	Yes	8	6.00	2.928	1.035
	No	152	1.97	2.378	.193

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	.739	.391	4.615	158	.000	4.026	.872	2.303	5.749
	Equal variances not assumed			3.824	7.494	.006	4.026	1.053	1.569	6.483

Table 164. Heart and *Sleep*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	Yes	8	4.63	3.378	1.194
	No	152	3.23	2.703	.219

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	1.055	.306	1.405	158	.162	1.395	.992	-.566	3.355
	Equal variances not assumed			1.149	7.479	.286	1.395	1.214	-1.440	4.229

Table 165. Heart and *Enjoyment of life*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	Yes	8	4.75	2.915	1.031
	No	152	3.63	2.204	.179

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	1.332	.250	1.376	158	.171	1.118	.813	-.486	2.723
	Equal variances not assumed			1.069	7.427	.319	1.118	1.046	-1.327	3.564

Table 166. Heart and *Physical Functioning*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	Yes	8	38.7500	26.42374	9.34220
	No	152	59.6382	27.79479	2.25446

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	.272	.603	-2.076	158	.039	-20.88816	10.06072	-40.75900	-1.01732
	Equal variances not assumed			-2.174	7.838	.062	-20.88816	9.61038	-43.12981	1.35350

Table 167. Heart and *Role-Physical*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	Yes	8	18.7500	34.71825	12.27476
	No	152	32.7303	38.84013	3.15035

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	2.582	.110	-.997	158	.320	-13.98026	14.02593	-41.68277	13.72224
	Equal variances not assumed			-1.103	7.951	.302	-13.98026	12.67258	-43.23469	15.27417

Table 168. Heart and *Bodily Pain*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	Yes	8	36.3750	12.82784	4.53533
	No	152	47.5066	18.39378	1.49193

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	.614	.435	-1.688	158	.093	-11.13158	6.59577	-24.15884	1.89568
	Equal variances not assumed			-2.332	8.592	.046	-11.13158	4.77442	-22.01069	-.25247

Table 169. Heart and *General Health*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	Yes	8	40.0000	25.91194	9.16125
	No	152	44.3816	19.15152	1.55339

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	1.434	.233	-.619	158	.537	-4.38158	7.07365	-18.35269	9.58953
	Equal variances not assumed			-.472	7.408	.651	-4.38158	9.29202	-26.11075	17.34759

Table 170. Heart and *Vitality*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
Vitality	Yes	8	36.2500	24.16461	8.54348
	No	152	49.9013	18.73897	1.51993

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	1.101	.296	-1.979	158	.049	-13.65132	6.89643	-27.27241	-.03022
	Equal variances not assumed			-1.573	7.450	.157	-13.65132	8.67763	-33.92217	6.61954

Table 171. Heart and *Social Functioning*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	Yes	8	53.1250	17.35913	6.13738
	No	152	67.8454	24.14095	1.95809

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	2.175	.142	-1.699	158	.091	-14.72039	8.66266	-31.82994	2.38915
	Equal variances not assumed			-2.285	8.493	.050	-14.72039	6.44217	-29.42715	-.01364

Table 172. Heart and *Role-Emotional*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	Yes	8	25.0000	46.29100	16.36634
	No	152	42.1053	46.47023	3.76923

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	1.849	.176	-1.015	158	.312	-17.10526	16.85365	-50.39277	16.18225
	Equal variances not assumed			-1.018	7.761	.339	-17.10526	16.79477	-56.04244	21.83191

Table 173. Heart and *Mental Health*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	Yes	8	48.0000	22.32231	7.89213
	No	152	58.3421	17.02320	1.38076

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	.810	.370	-1.649	158	.101	-10.34211	6.27261	-22.73108	2.04687
	Equal variances not assumed			-1.291	7.435	.235	-10.34211	8.01200	-29.06520	8.38099

Table 174. Heart and *Physical Component Summary (PCS)*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	Yes	8	34.8905075	5.26070726	1.85994089
	No	152	39.8236509	8.25249188	.66936548

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	3.397	.067	-1.670	158	.097	-4.93314339	2.95386639	-10.76730148	.90101470
	Equal variances not assumed			-2.496	8.924	.034	-4.93314339	1.97672210	-9.41063224	-.45565455

Table 175. Heart and *Mental Component Summary (MCS)*

Group Statistics

	Heart	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	Yes	8	36.6173176	12.70036072	4.49025559
	No	152	42.0572146	9.99166111	.81043073

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	.591	.443	-1.481	158	.141	-5.43989704	3.67345498	-12.69530884	1.81551476
	Equal variances not assumed			-1.192	7.463	.270	-5.43989704	4.56280542	-16.09496559	5.21517151

Table 176. Diabetes and *Pain at its worst*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI3	Yes	14	6.64	2.341	.626
	No	146	5.09	2.410	.199

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	.187	.666	2.310	158	.022	1.554	.673	.225	2.882
	Equal variances not assumed			2.367	15.762	.031	1.554	.657	.160	2.947

Table 177. Diabetes and *Pain at its least*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI4	Yes	14	2.43	1.651	.441
	No	146	2.25	1.587	.131

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	.029	.864	.409	158	.683	.182	.445	-.698	1.062
	Equal variances not assumed			.395	15.395	.698	.182	.460	-.797	1.161

Table 178. Diabetes and *Pain on average*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI5	Yes	14	4.71	1.139	.304
	No	146	3.76	1.711	.142

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	5.038	.026	2.040	158	.043	.954	.468	.030	1.878
	Equal variances not assumed			2.842	19.159	.010	.954	.336	.252	1.656

Table 179. Diabetes and *Pain right now*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI6	Yes	14	2.64	2.061	.551
	No	146	3.05	2.054	.170

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	.183	.669	-.717	158	.475	-.412	.575	-1.547	.723
	Equal variances not assumed			-.715	15.581	.485	-.412	.576	-1.637	.813

Table 180. Diabetes and *General activity*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	Yes	14	5.43	2.901	.775
	No	146	4.54	2.500	.207

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	1.722	.191	1.251	158	.213	.887	.709	-.514	2.289
	Equal variances not assumed			1.106	14.910	.286	.887	.803	-.824	2.599

Table 181. Diabetes and *Mood*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	Yes	14	3.64	3.201	.856
	No	146	3.32	2.599	.215

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	1.341	.249	.441	158	.659	.328	.742	-1.139	1.794
	Equal variances not assumed			.372	14.690	.716	.328	.882	-1.556	2.212

Table 182. Diabetes and *Walking ability*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	Yes	14	4.29	2.813	.752
	No	146	3.90	2.649	.219

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	.020	.888	.521	158	.603	.388	.745	-1.083	1.860
	Equal variances not assumed			.496	15.295	.627	.388	.783	-1.278	2.055

Table 183. Diabetes and *Normal work*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	Yes	14	4.57	3.546	.948
	No	146	4.23	2.565	.212

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	5.734	.018	.455	158	.650	.339	.744	-1.131	1.808
	Equal variances not assumed			.349	14.334	.732	.339	.971	-1.740	2.417

Table 184. Diabetes and *Relations with other people*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	Yes	14	1.36	2.307	.617
	No	146	2.25	2.570	.213

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	.444	.506	-1.257	158	.211	-.896	.713	-2.305	.512
	Equal variances not assumed			-1.374	16.256	.188	-.896	.652	-2.277	.485

Table 185. Diabetes and *Sleep*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	Yes	14	4.50	3.611	.965
	No	146	3.18	2.634	.218

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	5.531	.020	1.723	158	.087	1.315	.763	-.192	2.822
	Equal variances not assumed			1.329	14.357	.205	1.315	.989	-.802	3.432

Table 186. Diabetes and *Enjoyment of life*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	Yes	14	3.93	2.200	.588
	No	146	3.66	2.257	.187

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	.124	.726	.419	158	.676	.264	.630	-.980	1.509
	Equal variances not assumed			.428	15.741	.674	.264	.617	-1.045	1.574

Table 187. Diabetes and *Physical Functioning*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	Yes	14	59.2857	26.95132	7.20304
	No	146	58.5274	28.21205	2.33485

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	.292	.590	.096	158	.923	.75832	7.86480	-14.77538	16.29201
	Equal variances not assumed			.100	15.860	.921	.75832	7.57201	-15.30518	16.82181

Table 188. Diabetes and *Role-Physical*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	Yes	14	10.7143	16.15515	4.31765
	No	146	34.0753	39.59712	3.27708

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	20.169	.000	-2.185	158	.030	-23.36106	10.69191	-44.47856	-2.24355
	Equal variances not assumed			-4.310	31.359	.000	-23.36106	5.42046	-34.41102	-12.31110

Table 189. Diabetes and *Bodily Pain*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	Yes	14	48.7143	16.75355	4.47757
	No	146	46.7808	18.47365	1.52889

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	.105	.746	.377	158	.707	1.93346	5.13070	-8.20014	12.06707
	Equal variances not assumed			.409	16.188	.688	1.93346	4.73140	-8.08718	11.95411

Table 190. Diabetes and *General Health*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	Yes	14	39.0714	18.84538	5.03664
	No	146	44.6507	19.51395	1.61499

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	.204	.652	-1.025	158	.307	-5.57926	5.44450	-16.33265	5.17414
	Equal variances not assumed			-1.055	15.796	.307	-5.57926	5.28923	-16.80372	5.64521

Table 191. Diabetes and *Vitality*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
Vitality	Yes	14	49.6429	20.42475	5.45874
	No	146	49.1781	19.13678	1.58377

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	.010	.922	.086	158	.931	.46477	5.38468	-10.17047	11.10002
	Equal variances not assumed			.082	15.271	.936	.46477	5.68386	-11.63137	12.56092

Table 192. Diabetes and *Social Functioning*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	Yes	14	69.6429	33.51029	8.95600
	No	146	66.8664	23.05318	1.90790

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	1.992	.160	.412	158	.681	2.77642	6.73871	-10.53316	16.08600
	Equal variances not assumed			.303	14.204	.766	2.77642	9.15697	-16.83688	22.38972

Table 193. Diabetes and *Role-Emotional*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	Yes	14	21.4286	36.06059	9.63760
	No	146	43.1507	47.00498	3.89016

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	23.152	.000	-1.680	158	.095	-21.72211	12.92661	-47.25337	3.80914
	Equal variances not assumed			-2.090	17.539	.051	-21.72211	10.39311	-43.59838	.15416

Table 194. Diabetes and *Mental Health*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	Yes	14	60.2857	18.26063	4.88036
	No	146	57.5890	17.34664	1.43562

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	.103	.749	.553	158	.581	2.69667	4.87482	-6.93155	12.32489
	Equal variances not assumed			.530	15.337	.604	2.69667	5.08713	-8.12558	13.51893

Table 195. Diabetes and *Physical Component Summary (PCS)*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	Yes	14	38.1195254	5.67780964	1.51745845
	No	146	39.7167510	8.39155842	.69449032

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	6.255	.013	-.696	158	.487	-1.59722555	2.29483893	-6.12974373	2.93529263
	Equal variances not assumed			-.957	18.942	.351	-1.59722555	1.66883102	-5.09085587	1.89640477

Table 196. Diabetes and *Mental Component Summary (MCS)*

Group Statistics

	Diabetes	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	Yes	14	40.7285977	10.96374295	2.93018356
	No	146	41.8865397	10.11964541	.83750781

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	.063	.802	-.406	158	.685	-1.15794196	2.85146286	-6.78984366	4.47395973
	Equal variances not assumed			-.380	15.202	.709	-1.15794196	3.04752277	-7.64608457	5.33020065

Table 197. Hypertension and *Pain at its worst*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI3	Yes	39	5.56	2.303	.369
	No	121	5.12	2.477	.225

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	.310	.579	.999	158	.319	.448	.449	-.438	1.335
	Equal variances not assumed			1.038	68.598	.303	.448	.432	-.414	1.311

Table 198. Hypertension and *Pain at its least*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI4	Yes	39	2.31	1.472	.236
	No	121	2.25	1.629	.148

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	.176	.675	.204	158	.839	.060	.293	-.520	.639
	Equal variances not assumed			.215	70.470	.831	.060	.278	-.495	.615

Table 199. Hypertension and *Pain on average*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI5	Yes	39	4.08	1.326	.212
	No	121	3.77	1.788	.163

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	6.614	.011	.992	158	.323	.308	.311	-.306	.922
	Equal variances not assumed			1.153	86.232	.252	.308	.267	-.223	.840

Table 200. Hypertension and *Pain right now*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI6	Yes	39	2.67	1.611	.258
	No	121	3.13	2.168	.197

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	2.316	.130	-1.235	158	.219	-.466	.377	-1.210	.279
	Equal variances not assumed			-1.434	85.996	.155	-.466	.325	-1.111	.180

Table 201. Hypertension and *General activity*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	Yes	39	5.03	2.433	.390
	No	121	4.49	2.569	.234

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	.061	.804	1.152	158	.251	.538	.467	-.385	1.461
	Equal variances not assumed			1.184	67.465	.240	.538	.454	-.369	1.445

Table 202. Hypertension and *Mood*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	Yes	39	3.31	2.726	.436
	No	121	3.36	2.633	.239

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	.121	.728	-.098	158	.922	-.048	.489	-1.013	.918
	Equal variances not assumed			-.096	62.500	.924	-.048	.498	-1.043	.947

Table 203. Hypertension and *Walking ability*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	Yes	39	4.41	2.603	.417
	No	121	3.78	2.666	.242

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	.036	.850	1.298	158	.196	.633	.488	-.331	1.598
	Equal variances not assumed			1.314	65.669	.194	.633	.482	-.329	1.596

Table 204. Hypertension and *Normal work*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	Yes	39	4.56	2.945	.472
	No	121	4.17	2.557	.232

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	2.666	.105	.816	158	.416	.399	.489	-.567	1.365
	Equal variances not assumed			.759	57.634	.451	.399	.526	-.654	1.451

Table 205. Hypertension and *Relations with other people*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	Yes	39	2.05	2.819	.451
	No	121	2.21	2.474	.225

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	.336	.563	-.347	158	.729	-.164	.472	-1.095	.768
	Equal variances not assumed			-.324	58.079	.747	-.164	.504	-1.173	.846

Table 206. Hypertension and *Sleep*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	Yes	39	3.95	3.077	.493
	No	121	3.09	2.608	.237

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	2.083	.151	1.708	158	.090	.858	.502	-.134	1.850
	Equal variances not assumed			1.569	56.662	.122	.858	.547	-.237	1.953

Table 207. Hypertension and *Enjoyment of life*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	Yes	39	3.44	2.326	.372
	No	121	3.77	2.224	.202

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	.273	.602	-.803	158	.423	-.333	.414	-1.151	.485
	Equal variances not assumed			-.785	61.989	.435	-.333	.424	-1.180	.514

Table 208. Hypertension and *Physical Functioning*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	Yes	39	57.6923	27.52621	4.40772
	No	121	58.8843	28.28786	2.57162

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	.025	.874	-.230	158	.818	-1.19199	5.17539	-11.41385	9.02987
	Equal variances not assumed			-.234	65.857	.816	-1.19199	5.10306	-11.38100	8.99702

Table 209. Hypertension and *Role-Physical*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	Yes	39	25.0000	34.88704	5.58640
	No	121	34.2975	39.67737	3.60703

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	6.283	.013	-1.309	158	.193	-9.29752	7.10384	-23.32826	4.73321
	Equal variances not assumed			-1.398	72.310	.166	-9.29752	6.64970	-22.55249	3.95745

Table 210. Hypertension and *Bodily Pain*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	Yes	39	47.0769	14.90211	2.38625
	No	121	46.9091	19.30932	1.75539

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	2.306	.131	.050	158	.960	.16783	3.37819	-6.50440	6.84006
	Equal variances not assumed			.057	82.596	.955	.16783	2.96236	-5.72461	6.06027

Table 211. Hypertension and *General Health*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	Yes	39	40.4615	17.79835	2.85002
	No	121	45.3554	19.89257	1.80842

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	.064	.801	-1.369	158	.173	-4.89383	3.57397	-11.95274	2.16508
	Equal variances not assumed			-1.450	71.109	.151	-4.89383	3.37535	-11.62390	1.83624

Table 212. Hypertension and *Vitality*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
Vitality	Yes	39	48.4615	19.74022	3.16096
	No	121	49.4628	19.08099	1.73464

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	.014	.905	-.283	158	.778	-1.00127	3.54304	-7.99910	5.99656
	Equal variances not assumed			-.278	62.537	.782	-1.00127	3.60564	-8.20762	6.20507

Table 213. Hypertension and *Social Functioning*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	Yes	39	69.2308	24.30720	3.89227
	No	121	66.4256	23.99181	2.18107

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	.000	.986	.633	158	.528	2.80515	4.43176	-5.94797	11.55827
	Equal variances not assumed			.629	63.625	.532	2.80515	4.46171	-6.10915	11.71945

Table 214. Hypertension and *Role-Emotional*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	Yes	39	35.0427	45.85045	7.34195
	No	121	43.2507	46.67552	4.24323

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	1.479	.226	-.959	158	.339	-8.20795	8.55828	-25.11134	8.69543
	Equal variances not assumed			-.968	65.317	.337	-8.20795	8.47993	-25.14198	8.72608

Table 215. Hypertension and *Mental Health*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	Yes	39	57.0256	19.19908	3.07431
	No	121	58.0826	16.83725	1.53066

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	1.404	.238	-.329	158	.742	-1.05700	3.21030	-7.39764	5.28363
	Equal variances not assumed			-.308	58.045	.759	-1.05700	3.43429	-7.93136	5.81735

Table 216. Hypertension and *Physical Component Summary (PCS)*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	Yes	39	38.7626802	6.66096243	1.06660762
	No	121	39.8394585	8.63236572	.78476052

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	4.908	.028	-.713	158	.477	-1.07677824	1.51020136	-4.05956498	1.90600850
	Equal variances not assumed			-.813	82.611	.418	-1.07677824	1.32419820	-3.71073867	1.55718218

Table 217. Hypertension and *Mental Component Summary (MCS)*

Group Statistics

	Hypertension	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	Yes	39	41.2305111	10.99917282	1.76127724
	No	121	41.9640102	9.92288906	.90208082

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	.589	.444	-.391	158	.696	-.73349911	1.87672163	-4.44019712	2.97319890
	Equal variances not assumed			-.371	59.260	.712	-.73349911	1.97885000	-4.69280524	3.22580702

Table 218. Allergy and Pain at its worst

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI3	Yes	3	6.33	.577	.333
	No	157	5.20	2.454	.196

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	4.295	.040	.794	158	.428	1.130	1.422	-1.679	3.938
	Equal variances not assumed			2.922	3.614	.049	1.130	.387	.009	2.250

Table 219. Allergy and *Pain at its least*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI4	Yes	3	2.00	.000	.000
	No	157	2.27	1.603	.128

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	6.690	.011	-.288	158	.774	-.268	.928	-2.101	1.566
	Equal variances not assumed			-2.091	156.000	.038	-.268	.128	-.520	-.015

Table 220. Allergy and *Pain on average*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI5	Yes	3	4.33	.577	.333
	No	157	3.83	1.702	.136

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	3.336	.070	.506	158	.614	.499	.986	-1.449	2.447
	Equal variances not assumed			1.386	2.718	.268	.499	.360	-.717	1.715

Table 221. Allergy and *Pain right now*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI6	Yes	3	1.00	.000	.000
	No	157	3.06	2.051	.164

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	4.578	.034	-1.732	158	.085	-2.057	1.188	-4.404	.289
	Equal variances not assumed			-12.566	156.000	.000	-2.057	.164	-2.381	-1.734

Table 222. Allergy and *General activity*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	Yes	3	5.00	4.000	2.309
	No	157	4.61	2.523	.201

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	.552	.459	.262	158	.794	.389	1.485	-2.544	3.321
	Equal variances not assumed			.168	2.031	.882	.389	2.318	-9.443	10.220

Table 223. Allergy and *Mood*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	Yes	3	4.00	4.583	2.646
	No	157	3.33	2.620	.209

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	1.830	.178	.432	158	.666	.669	1.547	-2.386	3.724
	Equal variances not assumed			.252	2.025	.824	.669	2.654	-10.616	11.954

Table 224. Allergy and *Walking ability*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	Yes	3	3.33	2.082	1.202
	No	157	3.94	2.670	.213

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	.268	.605	-.392	158	.695	-.609	1.553	-3.676	2.457
	Equal variances not assumed			-.499	2.128	.664	-.609	1.221	-5.570	4.352

Table 225. Allergy and *Normal work*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	Yes	3	5.33	3.512	2.028
	No	157	4.24	2.644	.211

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	.103	.748	.705	158	.482	1.091	1.549	-1.967	4.150
	Equal variances not assumed			.535	2.044	.645	1.091	2.039	-7.503	9.686

Table 226. Allergy and *Relations with other people*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	Yes	3	4.67	4.619	2.667
	No	157	2.13	2.501	.200

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	3.094	.080	1.716	158	.088	2.539	1.480	-.383	5.461
	Equal variances not assumed			.950	2.022	.442	2.539	2.674	-8.845	13.923

Table 227. Allergy and *Sleep*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	Yes	3	5.67	3.215	1.856
	No	157	3.25	2.727	.218

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	.066	.797	1.514	158	.132	2.412	1.593	-.735	5.558
	Equal variances not assumed			1.291	2.055	.323	2.412	1.869	-5.424	10.248

Table 228. Allergy and *Enjoyment of life*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	Yes	3	4.00	.000	.000
	No	157	3.68	2.267	.181

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	5.447	.021	.243	158	.809	.318	1.313	-2.275	2.912
	Equal variances not assumed			1.760	156.000	.080	.318	.181	-.039	.676

Table 229. Allergy and *Physical Functioning*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	Yes	3	85.0000	15.00000	8.66025
	No	157	58.0892	27.99688	2.23439

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	1.868	.174	1.657	158	.100	26.91083	16.24391	-5.17239	58.99405
	Equal variances not assumed			3.009	2.275	.081	26.91083	8.94385	-7.44015	61.26181

Table 230. Allergy and *Role-Physical*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	Yes	3	66.6667	38.18813	22.04793
	No	157	31.3694	38.49164	3.07197

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	.277	.600	1.574	158	.118	35.29724	22.43225	-9.00851	79.60299
	Equal variances not assumed			1.586	2.078	.249	35.29724	22.26091	-57.10353	127.69801

Table 231. Allergy and *Bodily Pain*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	Yes	3	64.6667	34.07834	19.67514
	No	157	46.6115	17.88483	1.42737

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	2.142	.145	1.704	158	.090	18.05520	10.59614	-2.87315	38.98355
	Equal variances not assumed			.915	2.021	.456	18.05520	19.72685	-65.97878	102.08918

Table 232. Allergy and *General Health*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	Yes	3	46.6667	15.27525	8.81917
	No	157	44.1146	19.56972	1.56183

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	.286	.594	.224	158	.823	2.55202	11.37778	-19.92014	25.02418
	Equal variances not assumed			.285	2.127	.801	2.55202	8.95640	-33.85522	38.95925

Table 233. Allergy and *Vitality*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
Vitality	Yes	3	60.0000	.00000	.00000
	No	157	49.0127	19.31055	1.54115

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	4.836	.029	.982	158	.327	10.98726	11.18350	-11.10119	33.07571
	Equal variances not assumed			7.129	156.000	.000	10.98726	1.54115	7.94305	14.03147

Table 234. Allergy and *Social Functioning*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	Yes	3	95.8333	7.21688	4.16667
	No	157	66.5605	23.90287	1.90766

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	3.547	.062	2.113	158	.036	29.27282	13.85119	1.91545	56.63019
	Equal variances not assumed			6.388	2.925	.008	29.27282	4.58260	14.47417	44.07148

Table 235. Allergy and *Role-Emotional*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	Yes	3	55.5556	50.91751	29.39724
	No	157	40.9766	46.51266	3.71211

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	.805	.371	.537	158	.592	14.57891	27.14347	-39.03193	68.18975
	Equal variances not assumed			.492	2.064	.670	14.57891	29.63068	-109.18167	138.33949

Table 236. Allergy and *Mental Health*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	Yes	3	78.6667	19.73153	11.39200
	No	157	57.4268	17.16295	1.36975

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	.063	.801	2.119	158	.036	21.23992	10.02360	1.44238	41.03745
	Equal variances not assumed			1.851	2.058	.202	21.23992	11.47406	-26.81413	69.29396

Table 237. Allergy and *Physical Component Summary (PCS)*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	Yes	3	46.9888497	5.36092400	3.09513091
	No	157	39.4353659	8.17943407	.65278991

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	.910	.342	1.590	158	.114	7.55348375	4.75006073	-1.82832354	16.93529103
	Equal variances not assumed			2.388	2.182	.129	7.55348375	3.16322146	-5.02555246	20.13251996

Table 238. Allergy and *Mental Component Summary (MCS)*

Group Statistics

	Allergy	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	Yes	3	49.5393586	12.41850770	7.16982876
	No	157	41.6370515	10.10729573	.80665002

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	.043	.837	1.337	158	.183	7.90230710	5.90990930	-3.77030790	19.57492211
	Equal variances not assumed			1.095	2.051	.385	7.90230710	7.21506263	-22.41419998	38.21881419

Table 239. Dyslipidaemia and *Pain at its worst*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI3	Yes	2	8.00	1.414	1.000
	No	158	5.19	2.429	.193

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	1.155	.284	1.629	158	.105	2.810	1.725	-.596	6.217
	Equal variances not assumed			2.759	1.076	.207	2.810	1.018	-8.157	13.778

Table 240. Dyslipidaemia and *Pain at its least*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI4	Yes	2	3.00	1.414	1.000
	No	158	2.25	1.592	.127

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	.239	.626	.660	158	.510	.747	1.132	-1.489	2.983
	Equal variances not assumed			.741	1.032	.591	.747	1.008	-11.151	12.644

Table 241. Dyslipidaemia and *Pain on average*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI5	Yes	2	5.50	.707	.500
	No	158	3.82	1.687	.134

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	1.877	.173	1.401	158	.163	1.677	1.198	-.688	4.043
	Equal variances not assumed			3.240	1.149	.164	1.677	.518	-3.188	6.543

Table 242. Dyslipidaemia and *Pain right now*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI6	Yes	2	4.00	4.243	3.000
	No	158	3.01	2.033	.162

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	2.453	.119	.680	158	.498	.994	1.462	-1.894	3.881
	Equal variances not assumed			.331	1.006	.796	.994	3.004	-36.662	38.649

Table 243. Dyslipidaemia and *General activity*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	Yes	2	4.50	3.536	2.500
	No	158	4.62	2.540	.202

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	.201	.654	-.066	158	.947	-.120	1.813	-3.701	3.461
	Equal variances not assumed			-.048	1.013	.969	-.120	2.508	-31.031	30.790

Table 244. Dyslipidaemia and *Mood*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	Yes	2	1.50	2.121	1.500
	No	158	3.37	2.650	.211

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	.339	.561	-.991	158	.323	-1.867	1.884	-5.587	1.853
	Equal variances not assumed			-1.233	1.040	.428	-1.867	1.515	-19.453	15.719

Table 245. Dyslipidaemia and *Walking ability*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	Yes	2	8.50	.707	.500
	No	158	3.87	2.622	.209

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	1.676	.197	2.487	158	.014	4.627	1.860	.952	8.301
	Equal variances not assumed			8.540	1.378	.037	4.627	.542	.931	8.322

Table 246. Dyslipidaemia and *Normal work*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	Yes	2	5.00	7.071	5.000
	No	158	4.25	2.608	.207

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	7.353	.007	.395	158	.694	.747	1.893	-2.991	4.485
	Equal variances not assumed			.149	1.003	.906	.747	5.004	-62.325	63.819

Table 247. Dyslipidaemia and *Relations with other people*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	Yes	2	.00	.000	.000
	No	158	2.20	2.558	.204

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	2.782	.097	-1.214	158	.227	-2.203	1.815	-5.787	1.381
	Equal variances not assumed			-10.822	157.000	.000	-2.203	.204	-2.605	-1.801

Table 248. Dyslipidaemia and *Sleep*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	Yes	2	5.00	7.071	5.000
	No	158	3.28	2.697	.215

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	6.468	.012	.881	158	.380	1.722	1.954	-2.138	5.581
	Equal variances not assumed			.344	1.004	.789	1.722	5.005	-61.319	64.762

Table 249. Dyslipidaemia and *Enjoyment of life*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	Yes	2	4.50	3.536	2.500
	No	158	3.68	2.241	.178

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	.561	.455	.514	158	.608	.823	1.602	-2.342	3.987
	Equal variances not assumed			.328	1.010	.798	.823	2.506	-30.274	31.919

Table 250. Dyslipidaemia and *Physical Functioning*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	Yes	2	65.0000	14.14214	10.00000
	No	158	58.5127	28.16868	2.24098

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	1.326	.251	.324	158	.746	6.48734	19.99643	-33.00745	45.98214
	Equal variances not assumed			.633	1.103	.633	6.48734	10.24802	-98.24260	111.21728

Table 251. Dyslipidaemia and *Role-Physical*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	Yes	2	.0000	.00000	.00000
	No	158	32.4367	38.74109	3.08208

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	6.753	.010	-1.180	158	.240	-32.43671	27.47954	-86.71134	21.83792
	Equal variances not assumed			-10.524	157.000	.000	-32.43671	3.08208	-38.52439	-26.34903

Table 252. Dyslipidaemia and *Bodily Pain*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	Yes	2	51.5000	14.84924	10.50000
	No	158	46.8924	18.35932	1.46059

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	.190	.664	.353	158	.724	4.60759	13.04960	-21.16657	30.38176
	Equal variances not assumed			.435	1.039	.737	4.60759	10.60110	-118.69320	127.90839

Table 253. Dyslipidaemia and *General Health*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	Yes	2	42.5000	24.74874	17.50000
	No	158	44.1835	19.48569	1.55020

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	.086	.770	-.121	158	.904	-1.68354	13.89227	-29.12206	25.75498
	Equal variances not assumed			-.096	1.016	.939	-1.68354	17.56853	-216.89473	213.52764

Table 254. Dyslipidaemia and *Vitality*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
Vitality	Yes	2	52.5000	17.67767	12.50000
	No	158	49.1772	19.25244	1.53164

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	.095	.759	.243	158	.809	3.32278	13.69261	-23.72139	30.36696
	Equal variances not assumed			.264	1.030	.835	3.32278	12.59349	-146.00543	152.65100

Table 255. Dyslipidaemia and *Social Functioning*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	Yes	2	87.5000	17.67767	12.50000
	No	158	66.8513	24.02258	1.91113

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	.666	.416	1.210	158	.228	20.64873	17.06888	-13.06388	54.36135
	Equal variances not assumed			1.633	1.047	.342	20.64873	12.64525	-123.85303	165.15050

Table 256. Dyslipidaemia and *Role-Emotional*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	Yes	2	16.6667	23.57023	16.66667
	No	158	41.5612	46.64038	3.71051

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	8.954	.003	-.752	158	.453	-24.89451	33.10951	-90.28884	40.49982
	Equal variances not assumed			-1.458	1.102	.366	-24.89451	17.07471	-199.84558	150.05655

Table 257. Dyslipidaemia and *Mental Health*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	Yes	2	74.0000	19.79899	14.00000
	No	158	57.6203	17.32735	1.37849

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	.001	.974	1.327	158	.186	16.37975	12.34151	-7.99587	40.75536
	Equal variances not assumed			1.164	1.019	.449	16.37975	14.06770	-154.49351	187.25301

Table 258. Dyslipidaemia and *Physical Component Summary (PCS)*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	Yes	2	37.4014161	2.51126378	1.77573165
	No	158	39.6045327	8.23478429	.65512426

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	2.209	.139	-.377	158	.707	-2.20311661	5.84276676	-13.74311892	9.33688570
	Equal variances not assumed			-1.164	1.291	.416	-2.20311661	1.89272573	-16.57554683	12.16931362

Table 259. Dyslipidaemia and *Mental Component Summary (MCS)*

Group Statistics

	Dyslipidaemia	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	Yes	2	45.9428715	8.06301659	5.70141371
	No	158	41.7325912	10.19828949	.81133235

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	.486	.487	.581	158	.562	4.21028027	7.24816234	-10.10550771	18.52606824
	Equal variances not assumed			.731	1.041	.594	4.21028027	5.75885218	-62.50511333	70.92567387

Table 260. Musculoskeletal joint and *Pain at its worst*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI3	Yes	15	6.33	1.676	.433
	No	145	5.11	2.478	.206

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	3.524	.062	1.865	158	.064	1.223	.656	-.072	2.518
	Equal variances not assumed			2.552	20.942	.019	1.223	.479	.226	2.220

Table 261. Musculoskeletal joint and *Pain at its least*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI4	Yes	15	2.73	1.624	.419
	No	145	2.21	1.582	.131

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	.004	.949	1.208	158	.229	.520	.430	-.330	1.369
	Equal variances not assumed			1.182	16.867	.254	.520	.439	-.408	1.447

Table 262. Musculoskeletal joint and *Pain on average*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI5	Yes	15	4.60	1.121	.289
	No	145	3.77	1.720	.143

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	4.995	.027	1.836	158	.068	.834	.454	-.063	1.732
	Equal variances not assumed			2.585	21.522	.017	.834	.323	.164	1.505

Table 263. Musculoskeletal joint and *Pain right now*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI6	Yes	15	3.07	1.870	.483
	No	145	3.01	2.075	.172

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	.271	.603	.095	158	.925	.053	.558	-1.049	1.155
	Equal variances not assumed			.103	17.767	.919	.053	.513	-1.025	1.131

Table 264. Musculoskeletal joint and *General activity*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	Yes	15	5.53	2.200	.568
	No	145	4.52	2.561	.213

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	.175	.676	1.470	158	.143	1.009	.686	-.346	2.365
	Equal variances not assumed			1.664	18.166	.113	1.009	.606	-.264	2.282

Table 265. Musculoskeletal joint and *Mood*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	Yes	15	3.00	2.507	.647
	No	145	3.38	2.667	.221

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	.483	.488	-.527	158	.599	-.379	.720	-1.801	1.042
	Equal variances not assumed			-.554	17.446	.586	-.379	.684	-1.820	1.061

Table 266. Musculoskeletal joint and *Walking ability*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	Yes	15	3.93	2.282	.589
	No	145	3.93	2.699	.224

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	1.439	.232	.003	158	.997	.002	.723	-1.425	1.430
	Equal variances not assumed			.004	18.307	.997	.002	.631	-1.321	1.325

Table 267. Musculoskeletal joint and *Normal work*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	Yes	15	5.20	2.704	.698
	No	145	4.17	2.638	.219

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	.001	.976	1.443	158	.151	1.034	.717	-.382	2.451
	Equal variances not assumed			1.414	16.875	.176	1.034	.732	-.510	2.579

Table 268. Musculoskeletal joint and *Relations with other people*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	Yes	15	1.93	2.282	.589
	No	145	2.20	2.586	.215

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	1.735	.190	-.384	158	.702	-.267	.695	-1.638	1.105
	Equal variances not assumed			-.425	17.935	.676	-.267	.627	-1.585	1.051

Table 269. Musculoskeletal joint and *Sleep*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	Yes	15	3.80	2.651	.685
	No	145	3.25	2.758	.229

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	.037	.847	.740	158	.460	.552	.745	-.921	2.024
	Equal variances not assumed			.764	17.288	.455	.552	.722	-.969	2.073

Table 270. Musculoskeletal joint and *Enjoyment of life*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	Yes	15	3.73	1.792	.463
	No	145	3.68	2.293	.190

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	2.642	.106	.083	158	.934	.051	.611	-1.157	1.258
	Equal variances not assumed			.101	19.096	.921	.051	.500	-.996	1.097

Table 271. Musculoskeletal joint and *Physical Functioning*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	Yes	15	58.0000	29.20372	7.54037
	No	145	58.6552	28.00208	2.32545

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	.004	.947	-.086	158	.932	-.65517	7.62432	-15.71390	14.40355
	Equal variances not assumed			-.083	16.775	.935	-.65517	7.89081	-17.32035	16.01000

Table 272. Musculoskeletal joint and *Role-Physical*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	Yes	15	21.6667	31.14865	8.04255
	No	145	33.1034	39.29531	3.26330

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	5.539	.020	-1.091	158	.277	-11.43678	10.48093	-32.13757	9.26401
	Equal variances not assumed			-1.318	18.939	.203	-11.43678	8.67938	-29.60687	6.73331

Table 273. Musculoskeletal joint and *Bodily Pain*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	Yes	15	41.4667	14.16669	3.65782
	No	145	47.5172	18.61044	1.54551

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	2.134	.146	-1.222	158	.224	-6.05057	4.95269	-15.83259	3.73144
	Equal variances not assumed			-1.524	19.385	.144	-6.05057	3.97093	-14.35068	2.24953

Table 274. Musculoskeletal joint and *General Health*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	Yes	15	40.1333	12.82780	3.31212
	No	145	44.5793	20.00995	1.66174

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	2.259	.135	-.841	158	.401	-4.44598	5.28368	-14.88173	5.98978
	Equal variances not assumed			-1.200	21.801	.243	-4.44598	3.70561	-12.13501	3.24306

Table 275. Musculoskeletal joint and *Vitality*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
Vitality	Yes	15	44.6667	19.22300	4.96336
	No	145	49.6897	19.18677	1.59337

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	.000	.983	-.965	158	.336	-5.02299	5.20481	-15.30297	5.25699
	Equal variances not assumed			-.964	17.017	.349	-5.02299	5.21285	-16.02031	5.97433

Table 276. Musculoskeletal joint and *Social Functioning*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	Yes	15	62.5000	27.14051	7.00765
	No	145	67.5862	23.73065	1.97072

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	.245	.621	-.780	158	.437	-5.08621	6.52360	-17.97091	7.79850
	Equal variances not assumed			-.699	16.292	.495	-5.08621	7.27948	-20.49557	10.32315

Table 277. Musculoskeletal joint and *Role-Emotional*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	Yes	15	31.1111	40.75998	10.52418
	No	145	42.2989	47.01838	3.90466

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	10.793	.001	-.887	158	.376	-11.18774	12.61140	-36.09642	13.72094
	Equal variances not assumed			-.997	18.086	.332	-11.18774	11.22518	-34.76292	12.38744

Table 278. Musculoskeletal joint and *Mental Health*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	Yes	15	57.0667	16.10442	4.15814
	No	145	57.9034	17.56311	1.45854

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	.166	.685	-.177	158	.860	-.83678	4.72984	-10.17865	8.50509
	Equal variances not assumed			-.190	17.631	.852	-.83678	4.40653	-10.10846	8.43490

Table 279. Musculoskeletal joint and *Physical Component Summary (PCS)*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	Yes	15	37.8888877	7.62744365	1.96939748
	No	145	39.7516254	8.24985988	.68511357

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	.958	.329	-.838	158	.403	-1.86273774	2.22313093	-6.25362601	2.52815054
	Equal variances not assumed			-.893	17.569	.384	-1.86273774	2.08516355	-6.25122721	2.52575174

Table 280. Musculoskeletal joint and *Mental Component Summary (MCS)*

Group Statistics

	Total MJ	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	Yes	15	39.8169482	10.00249071	2.58263200
	No	145	41.9888341	10.19395369	.84656178

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	.000	.992	-.787	158	.433	-2.17188588	2.76029727	-7.62372714	3.27995538
	Equal variances not assumed			-.799	17.151	.435	-2.17188588	2.71784011	-7.90218707	3.55841531

Table 281. Peptic ulcer and *Pain at its worst*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI3	Yes	4	5.00	.816	.408
	No	156	5.23	2.465	.197

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	5.660	.019	-.186	158	.852	-.231	1.238	-2.675	2.213
	Equal variances not assumed			-.509	4.561	.634	-.231	.453	-1.431	.969

Table 282. Peptic ulcer and *Pain at its least*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI4	Yes	4	1.50	.577	.289
	No	156	2.28	1.602	.128

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	3.431	.066	-.972	158	.332	-.782	.804	-2.371	.806
	Equal variances not assumed			-2.476	4.297	.064	-.782	.316	-1.636	.072

Table 283. Peptic ulcer and *Pain on average*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI5	Yes	4	3.25	.500	.250
	No	156	3.86	1.706	.137

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	5.004	.027	-.711	158	.478	-.609	.856	-2.300	1.082
	Equal variances not assumed			-2.138	5.049	.085	-.609	.285	-1.339	.121

Table 284. Peptic ulcer and *Pain right now*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI6	Yes	4	3.00	1.414	.707
	No	156	3.02	2.068	.166

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	.849	.358	-.018	158	.985	-.019	1.042	-2.077	2.039
	Equal variances not assumed			-.026	3.338	.980	-.019	.726	-2.204	2.165

Table 285. Peptic ulcer and *General activity*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	Yes	4	4.00	3.367	1.683
	No	156	4.63	2.527	.202

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	.408	.524	-.492	158	.623	-.635	1.289	-3.181	1.912
	Equal variances not assumed			-.374	3.087	.732	-.635	1.695	-5.945	4.675

Table 286. Peptic ulcer and *Mood*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	Yes	4	2.00	1.826	.913
	No	156	3.38	2.660	.213

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	.695	.406	-1.028	158	.305	-1.378	1.340	-4.025	1.269
	Equal variances not assumed			-1.470	3.335	.229	-1.378	.937	-4.199	1.442

Table 287. Peptic ulcer and *Walking ability*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	Yes	4	4.25	2.754	1.377
	No	156	3.92	2.663	.213

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	.057	.812	.242	158	.809	.327	1.349	-2.338	2.992
	Equal variances not assumed			.235	3.146	.829	.327	1.393	-3.993	4.647

Table 288. Peptic ulcer and *Normal work*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	Yes	4	4.25	3.862	1.931
	No	156	4.26	2.633	.211

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	2.096	.150	-.010	158	.992	-.013	1.348	-2.674	2.649
	Equal variances not assumed			-.007	3.072	.995	-.013	1.943	-6.114	6.088

Table 289. Peptic ulcer and *Relations with other people*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	Yes	4	.50	1.000	.500
	No	156	2.22	2.569	.206

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	2.157	.144	-1.332	158	.185	-1.718	1.290	-4.266	.830
	Equal variances not assumed			-3.178	4.099	.032	-1.718	.541	-3.205	-.231

Table 290. Peptic ulcer and *Sleep*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	Yes	4	1.50	2.380	1.190
	No	156	3.35	2.744	.220

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	.376	.541	-1.332	158	.185	-1.846	1.386	-4.584	.892
	Equal variances not assumed			-1.525	3.208	.219	-1.846	1.210	-5.561	1.868

Table 291. Peptic ulcer and *Enjoyment of life*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	Yes	4	3.50	1.291	.645
	No	156	3.69	2.268	.182

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	1.412	.237	-.169	158	.866	-.192	1.141	-2.446	2.061
	Equal variances not assumed			-.287	3.493	.790	-.192	.671	-2.166	1.781

Table 292. Peptic ulcer and *Physical Functioning*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	Yes	4	65.0000	21.21320	10.60660
	No	156	58.4295	28.20892	2.25852

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	.469	.494	.462	158	.645	6.57051	14.22510	-21.52537	34.66640
	Equal variances not assumed			.606	3.278	.584	6.57051	10.84440	-26.34263	39.48365

Table 293. Peptic ulcer and *Role-Physical*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	Yes	4	25.0000	50.00000	25.00000
	No	156	32.2115	38.52205	3.08423

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	.163	.687	-.367	158	.714	-7.21154	19.63279	-45.98810	31.56502
	Equal variances not assumed			-.286	3.092	.793	-7.21154	25.18953	-86.04323	71.62015

Table 294. Peptic ulcer and *Bodily Pain*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	Yes	4	33.2500	25.43456	12.71728
	No	156	47.3013	18.04490	1.44475

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	.425	.516	-1.524	158	.130	-14.05128	9.22259	-32.26674	4.16418
	Equal variances not assumed			-1.098	3.078	.351	-14.05128	12.79908	-54.20643	26.10387

Table 295. Peptic ulcer and *General Health*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	Yes	4	58.7500	17.50000	8.75000
	No	156	43.7885	19.41699	1.55460

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	.036	.851	1.524	158	.129	14.96154	9.81464	-4.42327	34.34635
	Equal variances not assumed			1.684	3.192	.185	14.96154	8.88703	-12.38103	42.30411

Table 296. Peptic ulcer and *Vitality*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
Vitality	Yes	4	51.2500	23.93568	11.96784
	No	156	49.1667	19.14152	1.53255

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	.095	.759	.214	158	.831	2.08333	9.74441	-17.16278	21.32945
	Equal variances not assumed			.173	3.099	.874	2.08333	12.06557	-35.62879	39.79546

Table 297. Peptic ulcer and *Social Functioning*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	Yes	4	62.5000	25.00000	12.50000
	No	156	67.2276	24.06908	1.92707

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	.039	.843	-.388	158	.699	-4.72756	12.19697	-28.81770	19.36258
	Equal variances not assumed			-.374	3.144	.732	-4.72756	12.64767	-43.95326	34.49813

Table 298. Peptic ulcer and *Role-Emotional*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	Yes	4	16.6667	33.33333	16.66667
	No	156	41.8803	46.66233	3.73598

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	8.383	.004	-1.072	158	.285	-25.21368	23.51828	-71.66445	21.23710
	Equal variances not assumed			-1.476	3.309	.228	-25.21368	17.08026	-76.80977	26.38242

Table 299. Peptic ulcer and *Mental Health*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	Yes	4	73.0000	20.49390	10.24695
	No	156	57.4359	17.19984	1.37709

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	.033	.857	1.780	158	.077	15.56410	8.74411	-1.70633	32.83453
	Equal variances not assumed			1.505	3.109	.226	15.56410	10.33907	-16.69454	47.82275

Table 300. Peptic ulcer and *Physical Component Summary*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	Yes	4	39.4922388	7.88896021	3.94448011
	No	156	39.5791670	8.22097575	.65820483

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	.190	.664	-.021	158	.983	-.08692815	4.15972397	-8.30276600	8.12890969
	Equal variances not assumed			-.022	3.169	.984	-.08692815	3.99901950	-12.43740803	12.26355172

Table 301. Peptic ulcer and *Mental Component Summary (MCS)*

Group Statistics

	PU	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	Yes	4	42.3788841	10.33375302	5.16687651
	No	156	41.7699976	10.19393203	.81616776

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	.275	.601	.118	158	.906	.60888652	5.16325150	-9.58901059	10.80678363
	Equal variances not assumed			.116	3.152	.914	.60888652	5.23094090	-15.59449199	16.81226502

Table 302. Sciatica and *Pain at its worst*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI3	Yes	4	6.00	2.828	1.414
	No	156	5.21	2.433	.195

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI3	Equal variances assumed	.001	.972	.643	158	.521	.795	1.236	-1.646	3.236
	Equal variances not assumed			.557	3.115	.615	.795	1.428	-3.655	5.245

Table 303. Sciatica and *Pain at its least*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI4	Yes	4	2.00	2.160	1.080
	No	156	2.27	1.579	.126

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI4	Equal variances assumed	.190	.664	-.334	158	.739	-.269	.806	-1.862	1.323
	Equal variances not assumed			-.248	3.083	.820	-.269	1.088	-3.678	3.140

Table 304. Sciatica and *Pain on average*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI5	Yes	4	4.50	1.732	.866
	No	156	3.83	1.689	.135

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI5	Equal variances assumed	.103	.749	.786	158	.433	.673	.856	-1.017	2.363
	Equal variances not assumed			.768	3.148	.496	.673	.877	-2.044	3.390

Table 305. Sciatica and *Pain right now*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI6	Yes	4	4.75	3.775	1.887
	No	156	2.97	1.990	.159

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI6	Equal variances assumed	7.372	.007	1.720	158	.087	1.776	1.032	-.263	3.815
	Equal variances not assumed			.937	3.043	.417	1.776	1.894	-4.205	7.756

Table 306. Sciatica and *General activity*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI14.1	Yes	4	9.00	1.155	.577
	No	156	4.51	2.467	.197

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.1	Equal variances assumed	1.511	.221	3.625	158	.000	4.494	1.240	2.045	6.942
	Equal variances not assumed			7.364	3.742	.002	4.494	.610	2.752	6.235

Table 307. Sciatica and *Mood*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI14.2	Yes	4	7.75	.957	.479
	No	156	3.23	2.580	.207

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.2	Equal variances assumed	2.768	.098	3.488	158	.001	4.519	1.296	1.960	7.078
	Equal variances not assumed			8.668	4.218	.001	4.519	.521	3.101	5.938

Table 308. Sciatica and *Walking ability*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI14.3	Yes	4	8.00	1.633	.816
	No	156	3.83	2.598	.208

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.3	Equal variances assumed	1.480	.226	3.190	158	.002	4.173	1.308	1.590	6.757
	Equal variances not assumed			4.953	3.402	.012	4.173	.843	1.662	6.684

Table 309. Sciatica and *Normal work*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI14.4	Yes	4	8.00	1.633	.816
	No	156	4.17	2.607	.209

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.4	Equal variances assumed	2.099	.149	2.920	158	.004	3.833	1.313	1.241	6.426
	Equal variances not assumed			4.549	3.405	.015	3.833	.843	1.323	6.344

Table 310. Sciatica and *Relations with other people*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI14.5	Yes	4	7.00	1.414	.707
	No	156	2.05	2.457	.197

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.5	Equal variances assumed	1.008	.317	4.003	158	.000	4.949	1.236	2.507	7.390
	Equal variances not assumed			6.743	3.482	.004	4.949	.734	2.786	7.112

Table 311. Sciatica and *Sleep*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI14.6	Yes	4	4.25	2.630	1.315
	No	156	3.28	2.751	.220

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.6	Equal variances assumed	.001	.981	.700	158	.485	.974	1.392	-1.775	3.724
	Equal variances not assumed			.731	3.171	.515	.974	1.333	-3.142	5.091

Table 312. Sciatica and *Enjoyment of life*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
BPI14.7	Yes	4	8.00	.816	.408
	No	156	3.58	2.161	.173

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BPI14.7	Equal variances assumed	3.595	.060	4.075	158	.000	4.423	1.086	2.279	6.567
	Equal variances not assumed			9.975	4.172	.000	4.423	.443	3.212	5.634

Table 313. Sciatica and *Physical Functioning*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
Phy Func	Yes	4	23.7500	18.87459	9.43729
	No	156	59.4872	27.68591	2.21665

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Phy Func	Equal variances assumed	1.462	.228	-2.562	158	.011	-35.73718	13.94789	-63.28554	-8.18882
	Equal variances not assumed			-3.686	3.340	.029	-35.73718	9.69412	-64.88566	-6.58870

Table 314. Sciatica and *Role-Physical*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
Role Phy	Yes	4	18.7500	37.50000	18.75000
	No	156	32.3718	38.75252	3.10268

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role Phy	Equal variances assumed	.378	.540	-.695	158	.488	-13.62179	19.61125	-52.35582	25.11223
	Equal variances not assumed			-.717	3.166	.523	-13.62179	19.00498	-72.34419	45.10060

Table 315. Sciatica and *Bodily Pain*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
Body Pain	Yes	4	38.7500	41.08021	20.54010
	No	156	47.1603	17.56885	1.40663

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Body Pain	Equal variances assumed	8.789	.004	-.908	158	.365	-8.41026	9.26596	-26.71139	9.89087
	Equal variances not assumed			-.408	3.028	.710	-8.41026	20.58821	-73.58726	56.76675

Table 316. Sciatica and *General Health*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
Gen Health	Yes	4	38.0000	8.90693	4.45346
	No	156	44.3205	19.64786	1.57309

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gen Health	Equal variances assumed	1.897	.170	-.640	158	.523	-6.32051	9.87375	-25.82209	13.18106
	Equal variances not assumed			-1.338	3.794	.255	-6.32051	4.72313	-19.71939	7.07836

Table 317. Sciatica and *Vitality*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
Vitality	Yes	4	28.7500	6.29153	3.14576
	No	156	49.7436	19.12434	1.53117

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitality	Equal variances assumed	3.020	.084	-2.186	158	.030	-20.99359	9.60165	-39.95773	-2.02945
	Equal variances not assumed			-6.001	4.585	.002	-20.99359	3.49862	-30.23758	-11.74960

Table 318. Sciatica and *Social Functioning*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
Soc Func	Yes	4	34.3750	31.25000	15.62500
	No	156	67.9487	23.33917	1.86863

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Soc Func	Equal variances assumed	.118	.732	-2.820	158	.005	-33.57372	11.90686	-57.09087	-10.05657
	Equal variances not assumed			-2.134	3.086	.120	-33.57372	15.73634	-82.86981	15.72237

Table 319. Sciatica and *Role-Emotional*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
Role-Emo	Yes	4	.0000	.00000	.00000
	No	156	42.3077	46.58151	3.72951

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Role-Emo	Equal variances assumed	45.606	.000	-1.811	158	.072	-42.30769	23.36246	-88.45070	3.83532
	Equal variances not assumed			-11.344	155.000	.000	-42.30769	3.72951	-49.67491	-34.94047

Table 320. Sciatica and *Mental Health*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
Ment Health	Yes	4	39.0000	17.39732	8.69866
	No	156	58.3077	17.17035	1.37473

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ment Health	Equal variances assumed	.025	.875	-2.220	158	.028	-19.30769	8.69674	-36.48455	-2.13083
	Equal variances not assumed			-2.192	3.152	.112	-19.30769	8.80662	-46.58641	7.97103

Table 321. Sciatica and *Physical Component Summary (PCS)*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
PCS baseline	Yes	4	34.9163707	11.91677238	5.95838619
	No	156	39.6964969	8.09108759	.64780546

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PCS baseline	Equal variances assumed	.699	.404	-1.154	158	.250	-4.78012619	4.14231018	-12.96157018	3.40131781
	Equal variances not assumed			-.798	3.071	.482	-4.78012619	5.99349797	-23.60592838	14.04567601

Table 322. Sciatica and *Mental Component Summary (MCS)*

Group Statistics

	Sciatica	N	Mean	Std. Deviation	Std. Error Mean
MCS baseline	Yes	4	29.0435966	3.72974255	1.86487128
	No	156	42.1119280	10.07105212	.80632949

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MCS baseline	Equal variances assumed	3.497	.063	-2.584	158	.011	-13.06833145	5.05772857	-23.05781106	-3.07885184
	Equal variances not assumed			-6.432	4.224	.002	-13.06833145	2.03172639	-18.59341335	-7.54324955

Table 323. Other co-morbidities of the three study groups

Medical Conditions	Intervention group (n = 80) %	Alternative intervention group (n = 40) %	Group with no intervention (n = 40) %
Peptic ulcer	3.8	2.5	0
Allergy	3.8	0	0
Dyslipidaemia	2.5	0	0
Hemiplegia	1.3	0	0
Emphysema	1.3	0	0
Parkinson	1.3	0	0
Thyroid disease	1.3	0	0
Hypotension	1.3	0	0
Anemia	1.3	0	0
Hepatitis	1.3	0	0

Table 324. Other medical treatments of the three study groups

Medical Treatments	Intervention group (n = 80) %	Alternative intervention group (n = 40) %	Group with no intervention (n = 40) %
Anti-Anginal drugs	3.75	0	0
Antihyperlipidaemia Agents	3.75	0	0
Antianemics	3.75	0	0
Gout preparations	2.5	0	0
Vitamin B	2.5	10	0
Cardiac drugs	2.5	0	0
Antiemetics & Antivertigo Drugs	2.5	0	0
Antiparkinsonian Drugs	2.5	0	0
Angiotensin II Antagonists	1.25	0	0
Cough & Cold Remedies	1.25	2.5	0
Calcium	1.25	0	0
Aminoglycosides	1.25	0	0
Muscle Relaxants	1.25	0	0
Antihistamines & Antiallergics	1.25	0	0

Appendix 8 Tables related to the Brief Pain Inventory

Table 1. Multiple Comparisons between groups: pain on average at the end of week 4

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	-.688	.321	.099	-1.46	.09
		The group with no intervention	-.438	.309	.405	-1.19	.31
	The alternative intervention group	The intervention group	.688	.321	.099	-.09	1.46
		The group with no intervention	.250	.229	.625	-.31	.81
	The group with no intervention	The intervention group	.438	.309	.405	-.31	1.19
		The alternative intervention group	-.250	.229	.625	-.81	.31
Dunnett T3	The intervention group	The alternative intervention group	-.688	.321	.099	-1.46	.09
		The group with no intervention	-.438	.309	.403	-1.18	.31
	The alternative intervention group	The intervention group	.688	.321	.099	-.09	1.46
		The group with no intervention	.250	.229	.622	-.31	.81
	The group with no intervention	The intervention group	.438	.309	.403	-.31	1.18
		The alternative intervention group	-.250	.229	.622	-.81	.31

Table 2. Multiple Comparisons between groups: pain right now at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	-1.475(*)	.321	*.000*	-2.25	-.70
	The group with no intervention	-.625	.354	.222	-1.48	.23
The alternative intervention group	The intervention group	1.475(*)	.321	*.000*	.70	2.25
	The group with no intervention	.850(*)	.305	*.020*	.10	1.60
The group with no intervention	The intervention group	.625	.354	.222	-.23	1.48
	The alternative intervention group	-.850(*)	.305	*.020*	-1.60	-.10

* The mean difference is significant at the .05 level.

Table 3. Multiple Comparisons between groups: pain at its worst at the end of week 6

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	.988(*)	.395	*.041*	.03	1.95
		The group with no intervention	1.363(*)	.383	*.002*	.43	2.29
	The alternative intervention group	The intervention group	-.988(*)	.395	*.041*	-1.95	-.03
		The group with no intervention	.375	.211	.220	-.14	.89
	The group with no intervention	The intervention group	-1.363(*)	.383	*.002*	-2.29	-.43
		The alternative intervention group	-.375	.211	.220	-.89	.14
Dunnett T3	The intervention group	The alternative intervention group	.988(*)	.395	*.041*	.03	1.95
		The group with no intervention	1.363(*)	.383	*.002*	.43	2.29
	The alternative intervention group	The intervention group	-.988(*)	.395	*.041*	-1.95	-.03
		The group with no intervention	.375	.211	.218	-.14	.89
	The group with no intervention	The intervention group	-1.363(*)	.383	*.002*	-2.29	-.43
		The alternative intervention group	-.375	.211	.218	-.89	.14

* The mean difference is significant at the .05 level.

Table 4. Multiple Comparisons between groups: pain interference with general activity at the end of week 6

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	2.775(*)	.446	*.000*	1.69	3.86
		The group with no intervention	3.050(*)	.460	*.000*	1.93	4.17
	The alternative intervention group	The intervention group	-2.775(*)	.446	*.000*	-3.86	-1.69
		The group with no intervention	.275	.194	.411	-.20	.75
	The group with no intervention	The intervention group	-3.050(*)	.460	*.000*	-4.17	-1.93
		The alternative intervention group	-.275	.194	.411	-.75	.20
Dunnett T3	The intervention group	The alternative intervention group	2.775(*)	.446	*.000*	1.69	3.86
		The group with no intervention	3.050(*)	.460	*.000*	1.93	4.17
	The alternative intervention group	The intervention group	-2.775(*)	.446	*.000*	-3.86	-1.69
		The group with no intervention	.275	.194	.408	-.20	.75
	The group with no intervention	The intervention group	-3.050(*)	.460	*.000*	-4.17	-1.93
		The alternative intervention group	-.275	.194	.408	-.75	.20

* The mean difference is significant at the .05 level.

Table 5. Multiple Comparisons between groups: pain interference with mood at the end of week 6

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	4.113(*)	.481	*.000*	2.94	5.28
		The group with no intervention	4.213(*)	.482	*.000*	3.04	5.39
	The alternative intervention group	The intervention group	-4.113(*)	.481	*.000*	-5.28	-2.94
		The group with no intervention	.100	.156	.891	-.28	.48
	The group with no intervention	The intervention group	-4.213(*)	.482	*.000*	-5.39	-3.04
		The alternative intervention group	-.100	.156	.891	-.48	.28
Dunnett T3	The intervention group	The alternative intervention group	4.113(*)	.481	*.000*	2.94	5.28
		The group with no intervention	4.213(*)	.482	*.000*	3.04	5.38
	The alternative intervention group	The intervention group	-4.113(*)	.481	*.000*	-5.28	-2.94
		The group with no intervention	.100	.156	.889	-.28	.48
	The group with no intervention	The intervention group	-4.213(*)	.482	*.000*	-5.38	-3.04
		The alternative intervention group	-.100	.156	.889	-.48	.28

* The mean difference is significant at the .05 level.

Table 6. Multiple Comparisons between groups: pain interference with walking ability at the end of week 6

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	2.763(*)	.470	.000	1.62	3.90
		The group with no intervention	3.038(*)	.477	.000	1.88	4.20
	The alternative intervention group	The intervention group	-2.763(*)	.470	.000	-3.90	-1.62
		The group with no intervention	.275	.193	.406	-.20	.75
	The group with no intervention	The intervention group	-3.038(*)	.477	.000	-4.20	-1.88
		The alternative intervention group	-.275	.193	.406	-.75	.20
Dunnett T3	The intervention group	The alternative intervention group	2.763(*)	.470	.000	1.62	3.90
		The group with no intervention	3.038(*)	.477	.000	1.88	4.20
	The alternative intervention group	The intervention group	-2.763(*)	.470	.000	-3.90	-1.62
		The group with no intervention	.275	.193	.403	-.20	.75
	The group with no intervention	The intervention group	-3.038(*)	.477	.000	-4.20	-1.88
		The alternative intervention group	-.275	.193	.403	-.75	.20

* The mean difference is significant at the .05 level.

Table 7. Multiple Comparisons between groups: pain interference with normal work at the end of week 6

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	2.325(*)	.508	*.000*	1.09	3.56
		The group with no intervention	2.475(*)	.510	*.000*	1.23	3.72
	The alternative intervention group	The intervention group	-2.325(*)	.508	*.000*	-3.56	-1.09
		The group with no intervention	.150	.212	.861	-.37	.67
	The group with no intervention	The intervention group	-2.475(*)	.510	*.000*	-3.72	-1.23
		The alternative intervention group	-.150	.212	.861	-.67	.37
Dunnett T3	The intervention group	The alternative intervention group	2.325(*)	.508	*.000*	1.09	3.56
		The group with no intervention	2.475(*)	.510	*.000*	1.24	3.71
	The alternative intervention group	The intervention group	-2.325(*)	.508	*.000*	-3.56	-1.09
		The group with no intervention	.150	.212	.859	-.37	.67
	The group with no intervention	The intervention group	-2.475(*)	.510	*.000*	-3.71	-1.24
		The alternative intervention group	-.150	.212	.859	-.67	.37

* The mean difference is significant at the .05 level.

Table 8. Multiple Comparisons between groups: pain interference with social relations at the end of week 6

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	2.400(*)	.567	*.000*	1.02	3.78
		The group with no intervention	2.400(*)	.566	*.000*	1.02	3.78
	The alternative intervention group	The intervention group	-2.400(*)	.567	*.000*	-3.78	-1.02
		The group with no intervention	.000	.182	1.000	-.44	.44
	The group with no intervention	The intervention group	-2.400(*)	.566	*.000*	-3.78	-1.02
		The alternative intervention group	.000	.182	1.000	-.44	.44
Dunnett T3	The intervention group	The alternative intervention group	2.400(*)	.567	*.000*	1.02	3.78
		The group with no intervention	2.400(*)	.566	*.000*	1.02	3.78
	The alternative intervention group	The intervention group	-2.400(*)	.567	*.000*	-3.78	-1.02
		The group with no intervention	.000	.182	1.000	-.44	.44
	The group with no intervention	The intervention group	-2.400(*)	.566	*.000*	-3.78	-1.02
		The alternative intervention group	.000	.182	1.000	-.44	.44

* The mean difference is significant at the .05 level.

Table 9. Multiple Comparisons between groups: pain interference with sleep at the end of week 6

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	3.650(*)	.531	*.000*	2.36	4.94
		The group with no intervention	3.925(*)	.526	*.000*	2.64	5.21
	The alternative intervention group	The intervention group	-3.650(*)	.531	*.000*	-4.94	-2.36
		The group with no intervention	.275	.188	.383	-.18	.73
	The group with no intervention	The intervention group	-3.925(*)	.526	*.000*	-5.21	-2.64
		The alternative intervention group	-.275	.188	.383	-.73	.18
Dunnett T3	The intervention group	The alternative intervention group	3.650(*)	.531	*.000*	2.36	4.94
		The group with no intervention	3.925(*)	.526	*.000*	2.65	5.20
	The alternative intervention group	The intervention group	-3.650(*)	.531	*.000*	-4.94	-2.36
		The group with no intervention	.275	.188	.380	-.18	.73
	The group with no intervention	The intervention group	-3.925(*)	.526	*.000*	-5.20	-2.65
		The alternative intervention group	-.275	.188	.380	-.73	.18

* The mean difference is significant at the .05 level.

Table 10. Multiple Comparisons between groups: pain interference with enjoyment of life at the end of week 6

	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Upper Bound	Lower Bound
Tamhane	The intervention group	The alternative intervention group	2.125(*)	.482	*.000*	.95	3.30
		The group with no intervention	2.425(*)	.470	*.000*	1.28	3.57
	The alternative intervention group	The intervention group	-2.125(*)	.482	*.000*	-3.30	-.95
		The group with no intervention	.300	.178	.262	-.14	.74
	The group with no intervention	The intervention group	-2.425(*)	.470	*.000*	-3.57	-1.28
		The alternative intervention group	-.300	.178	.262	-.74	.14
Dunnett T3	The intervention group	The alternative intervention group	2.125(*)	.482	*.000*	.95	3.30
		The group with no intervention	2.425(*)	.470	*.000*	1.28	3.57
	The alternative intervention group	The intervention group	-2.125(*)	.482	*.000*	-3.30	-.95
		The group with no intervention	.300	.178	.260	-.14	.74
	The group with no intervention	The intervention group	-2.425(*)	.470	*.000*	-3.57	-1.28
		The alternative intervention group	-.300	.178	.260	-.74	.14

* The mean difference is significant at the .05 level.

Table 11. Pairwise Comparisons between groups: pain on average at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	-1.047(*)	.348	*.003*	-1.734	-.360
	The group with no intervention	-.856(*)	.351	*.016*	-1.549	-.163
The alternative intervention group	The intervention group	1.047(*)	.348	*.003*	.360	1.734
	The group with no intervention	.191	.391	.626	-.582	.964
The group with no intervention	The intervention group	.856(*)	.351	*.016*	.163	1.549
	The alternative intervention group	-.191	.391	.626	-.964	.582

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 12. Pairwise Comparisons between groups: pain right now at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	-1.549(*)	.350	*.000*	-2.241	-.857
	The group with no intervention	-.730(*)	.351	*.039*	-1.423	-.038
The alternative intervention group	The intervention group	1.549(*)	.350	*.000*	.857	2.241
	The group with no intervention	.819(*)	.404	*.044*	.021	1.617
The group with no intervention	The intervention group	.730(*)	.351	*.039*	.038	1.423
	The alternative intervention group	-.819(*)	.404	*.044*	-1.617	-.021

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 13. Pairwise Comparisons between groups: pain interference with general activity at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	2.983(*)	.603	*.000*	1.793	4.174
	The group with no intervention	2.863(*)	.596	*.000*	1.685	4.041
The alternative intervention group	The intervention group	-2.983(*)	.603	*.000*	-4.174	-1.793
	The group with no intervention	-.121	.678	.859	-1.460	1.219
The group with no intervention	The intervention group	-2.863(*)	.596	*.000*	-4.041	-1.685
	The alternative intervention group	.121	.678	.859	-1.219	1.460

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 14. Pairwise Comparisons between groups: pain interference with mood at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	3.612(*)	.671	*.000*	2.287	4.937
	The group with no intervention	3.975(*)	.646	*.000*	2.699	5.250
The alternative intervention group	The intervention group	-3.612(*)	.671	*.000*	-4.937	-2.287
	The group with no intervention	.362	.728	.619	-1.077	1.801
The group with no intervention	The intervention group	-3.975(*)	.646	*.000*	-5.250	-2.699
	The alternative intervention group	-.362	.728	.619	-1.801	1.077

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 15. Pairwise Comparisons between groups: pain interference with walking ability at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	2.382(*)	.642	*.000*	1.114	3.650
	The group with no intervention	2.296(*)	.633	*.000*	1.046	3.546
The alternative intervention group	The intervention group	-2.382(*)	.642	*.000*	-3.650	-1.114
	The group with no intervention	-.086	.732	.907	-1.532	1.361
The group with no intervention	The intervention group	-2.296(*)	.633	*.000*	-3.546	-1.046
	The alternative intervention group	.086	.732	.907	-1.361	1.532

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 16. Pairwise Comparisons between groups: pain interference with normal work at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	2.874(*)	.655	*.000*	1.579	4.168
	The group with no intervention	2.706(*)	.629	*.000*	1.463	3.948
The alternative intervention group	The intervention group	-2.874(*)	.655	*.000*	-4.168	-1.579
	The group with no intervention	-.168	.724	.817	-1.597	1.261
The group with no intervention	The intervention group	-2.706(*)	.629	*.000*	-3.948	-1.463
	The alternative intervention group	.168	.724	.817	-1.261	1.597

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 17. Pairwise Comparisons between groups: pain interference with social relations at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	2.400(*)	.731	*.001*	.956	3.844
	The group with no intervention	2.731(*)	.727	*.000*	1.296	4.167
The alternative intervention group	The intervention group	-2.400(*)	.731	*.001*	-3.844	-.956
	The group with no intervention	.331	.847	.696	-1.342	2.004
The group with no intervention	The intervention group	-2.731(*)	.727	*.000*	-4.167	-1.296
	The alternative intervention group	-.331	.847	.696	-2.004	1.342

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 18. Pairwise Comparisons between groups: pain interference with sleep at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	3.001(*)	.707	*.000*	1.604	4.398
	The group with no intervention	3.128(*)	.684	*.000*	1.777	4.479
The alternative intervention group	The intervention group	-3.001(*)	.707	*.000*	-4.398	-1.604
	The group with no intervention	.127	.775	.870	-1.405	1.659
The group with no intervention	The intervention group	-3.128(*)	.684	*.000*	-4.479	-1.777
	The alternative intervention group	-.127	.775	.870	-1.659	1.405

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 19. Pairwise Comparisons between groups: pain interference with enjoyment of life at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	2.649(*)	.664	*.000*	1.336	3.961
	The group with no intervention	2.078(*)	.630	*.001*	.833	3.322
The alternative intervention group	The intervention group	-2.649(*)	.664	*.000*	-3.961	-1.336
	The group with no intervention	-.571	.751	.448	-2.054	.912
The group with no intervention	The intervention group	-2.078(*)	.630	*.001*	-3.322	-.833
	The alternative intervention group	.571	.751	.448	-.912	2.054

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 20. Pairwise Comparisons between groups: pain interference with general activity at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	2.594(*)	.557	*.000*	1.247	3.941
	The group with no intervention	2.910(*)	.550	*.000*	1.578	4.242
The alternative intervention group	The intervention group	-2.594(*)	.557	*.000*	-3.941	-1.247
	The group with no intervention	.316	.626	1.000	-1.198	1.831
The group with no intervention	The intervention group	-2.910(*)	.550	*.000*	-4.242	-1.578
	The alternative intervention group	-.316	.626	1.000	-1.831	1.198

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 21. Pairwise Comparisons between groups: pain interference with mood at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	3.693(*)	.619	*.000*	2.195	5.192
	The group with no intervention	3.940(*)	.596	*.000*	2.497	5.382
The alternative intervention group	The intervention group	-3.693(*)	.619	*.000*	-5.192	-2.195
	The group with no intervention	.247	.672	1.000	-1.381	1.874
The group with no intervention	The intervention group	-3.940(*)	.596	*.000*	-5.382	-2.497
	The alternative intervention group	-.247	.672	1.000	-1.874	1.381

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 22. Pairwise Comparisons between groups: pain interference with walking ability at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	2.708(*)	.580	*.000*	1.303	4.112
	The group with no intervention	3.016(*)	.572	*.000*	1.632	4.400
The alternative intervention group	The intervention group	-2.708(*)	.580	*.000*	-4.112	-1.303
	The group with no intervention	.308	.662	1.000	-1.293	1.909
The group with no intervention	The intervention group	-3.016(*)	.572	*.000*	-4.400	-1.632
	The alternative intervention group	-.308	.662	1.000	-1.909	1.293

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 23. Pairwise Comparisons between groups: pain interference with normal work at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	1.858(*)	.638	*.012*	.313	3.402
	The group with no intervention	2.241(*)	.612	*.001*	.759	3.724
The alternative intervention group	The intervention group	-1.858(*)	.638	*.012*	-3.402	-.313
	The group with no intervention	.384	.705	1.000	-1.322	2.089
The group with no intervention	The intervention group	-2.241(*)	.612	*.001*	-3.724	-.759
	The alternative intervention group	-.384	.705	1.000	-2.089	1.322

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 24. Pairwise Comparisons between groups: pain interference with social relations at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	2.292(*)	.691	*.003*	.621	3.964
	The group with no intervention	2.442(*)	.686	*.001*	.781	4.103
The alternative intervention group	The intervention group	-2.292(*)	.691	*.003*	-3.964	-.621
	The group with no intervention	.149	.800	1.000	-1.786	2.085
The group with no intervention	The intervention group	-2.442(*)	.686	*.001*	-4.103	-.781
	The alternative intervention group	-.149	.800	1.000	-2.085	1.786

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 25. Pairwise Comparisons between groups: pain interference with sleep at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	3.100(*)	.666	*.000*	1.488	4.711
	The group with no intervention	3.575(*)	.644	*.000*	2.017	5.133
The alternative intervention group	The intervention group	-3.100(*)	.666	*.000*	-4.711	-1.488
	The group with no intervention	.475	.730	1.000	-1.292	2.242
The group with no intervention	The intervention group	-3.575(*)	.644	*.000*	-5.133	-2.017
	The alternative intervention group	-.475	.730	1.000	-2.242	1.292

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 26. Pairwise Comparisons between groups: pain interference with enjoyment of life at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	1.946(*)	.607	*.005*	.477	3.414
	The group with no intervention	2.404(*)	.575	*.000*	1.012	3.797
The alternative intervention group	The intervention group	-1.946(*)	.607	*.005*	-3.414	-.477
	The group with no intervention	.459	.686	1.000	-1.201	2.119
The group with no intervention	The intervention group	-2.404(*)	.575	*.000*	-3.797	-1.012
	The alternative intervention group	-.459	.686	1.000	-2.119	1.201

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Appendix 9 Tables related to the Short-Form 36

Table 1. Multiple Comparisons between groups: physical function at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	33.31250(*)	4.23372	*.000*	23.0673	43.5577
	The group with no intervention	21.31250(*)	4.23372	*.000*	11.0673	31.5577
The alternative intervention group	The intervention group	-33.31250(*)	4.23372	*.000*	-43.5577	-23.0673
	The group with no intervention	-12.00000(*)	4.88868	*.046*	-23.8301	-.1699
The group with no intervention	The intervention group	-21.31250(*)	4.23372	*.000*	-31.5577	-11.0673
	The alternative intervention group	12.00000(*)	4.88868	*.046*	.1699	23.8301

* The mean difference is significant at the .05 level.

Table 2. Multiple Comparisons between groups: social functioning at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	9.37500(*)	3.51043	*.026*	.8724	17.8776
	The group with no intervention	.93750	3.54557	.991	-7.6502	9.5252
The alternative intervention group	The intervention group	-9.37500(*)	3.51043	*.026*	-17.8776	-.8724
	The group with no intervention	-8.43750(*)	2.87066	*.013*	-15.4423	-1.4327
The group with no intervention	The intervention group	-.93750	3.54557	.991	-9.5252	7.6502
	The alternative intervention group	8.43750(*)	2.87066	*.013*	1.4327	15.4423

* The mean difference is significant at the .05 level.

Table 3. Multiple Comparisons between groups: mental health at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	18.10000(*)	2.73860	*.000*	11.4634	24.7366
	The group with no intervention	17.70000(*)	2.47208	*.000*	11.7117	23.6883
The alternative intervention group	The intervention group	-18.10000(*)	2.73860	*.000*	-24.7366	-11.4634
	The group with no intervention	-.40000	2.21730	.997	-5.8199	5.0199
The group with no intervention	The intervention group	-17.70000(*)	2.47208	*.000*	-23.6883	-11.7117
	The alternative intervention group	.40000	2.21730	.997	-5.0199	5.8199

* The mean difference is significant at the .05 level.

Table 4. Multiple Comparisons between groups: role-emotional at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	-14.16667	9.07156	.324	-36.2752	7.9418
	The group with no intervention	-22.50000(*)	7.85098	*.015*	-41.5591	-3.4409
The alternative intervention group	The intervention group	14.16667	9.07156	.324	-7.9418	36.2752
	The group with no intervention	-8.33333	9.18898	.747	-30.7847	14.1180
The group with no intervention	The intervention group	22.50000(*)	7.85098	*.015*	3.4409	41.5591
	The alternative intervention group	8.33333	9.18898	.747	-14.1180	30.7847

* The mean difference is significant at the .05 level.

Table 5. Multiple Comparisons between groups: vitality at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	19.43750(*)	2.80718	*.000*	12.6368	26.2382
	The group with no intervention	19.06250(*)	2.71998	*.000*	12.4743	25.6507
The alternative intervention group	The intervention group	-19.43750(*)	2.80718	*.000*	-26.2382	-12.6368
	The group with no intervention	-.37500	2.36790	.998	-6.1538	5.4038
The group with no intervention	The intervention group	-19.06250(*)	2.71998	*.000*	-25.6507	-12.4743
	The alternative intervention group	.37500	2.36790	.998	-5.4038	6.1538

* The mean difference is significant at the .05 level.

Table 6. Multiple Comparisons between groups: general health at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	19.20000(*)	2.67390	*.000*	12.7195	25.6805
	The group with no intervention	20.20000(*)	2.77161	*.000*	13.4786	26.9214
The alternative intervention group	The intervention group	-19.20000(*)	2.67390	*.000*	-25.6805	-12.7195
	The group with no intervention	1.00000	2.58183	.973	-5.3008	7.3008
The group with no intervention	The intervention group	-20.20000(*)	2.77161	*.000*	-26.9214	-13.4786
	The alternative intervention group	-1.00000	2.58183	.973	-7.3008	5.3008

* The mean difference is significant at the .05 level.

Table 7. Multiple Comparisons between groups: physical function at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	22.50000(*)	3.90117	*.000*	13.0595	31.9405
	The group with no intervention	38.50000(*)	3.90117	*.000*	29.0595	47.9405
The alternative intervention group	The intervention group	-22.50000(*)	3.90117	*.000*	-31.9405	-13.0595
	The group with no intervention	16.00000(*)	4.50469	*.002*	5.0991	26.9009
The group with no intervention	The intervention group	-38.50000(*)	3.90117	*.000*	-47.9405	-29.0595
	The alternative intervention group	-16.00000(*)	4.50469	*.002*	-26.9009	-5.0991

* The mean difference is significant at the .05 level.

Table 8. Multiple Comparisons between groups: role-physical at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	6.87500	6.56869	.653	-9.0447	22.7947
	The group with no intervention	16.87500(*)	5.77685	*.013*	2.8783	30.8717
The alternative intervention group	The intervention group	-6.87500	6.56869	.653	-22.7947	9.0447
	The group with no intervention	10.00000	5.20416	.166	-2.7350	22.7350
The group with no intervention	The intervention group	-16.87500(*)	5.77685	*.013*	-30.8717	-2.8783
	The alternative intervention group	-10.00000	5.20416	.166	-22.7350	2.7350

* The mean difference is significant at the .05 level.

Table 9. Multiple Comparisons between groups: bodily pain at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	10.85000(*)	3.26164	*.004*	2.9422	18.7578
	The group with no intervention	7.62500	3.47409	.088	-.7901	16.0401
The alternative intervention group	The intervention group	-10.85000(*)	3.26164	*.004*	-18.7578	-2.9422
	The group with no intervention	-3.22500	2.41857	.462	-9.1343	2.6843
The group with no intervention	The intervention group	-7.62500	3.47409	.088	-16.0401	.7901
	The alternative intervention group	3.22500	2.41857	.462	-2.6843	9.1343

* The mean difference is significant at the .05 level.

Table 10. Multiple Comparisons between groups: social functioning at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	10.78125(*)	3.43424	*.007*	2.4545	19.1080
	The group with no intervention	4.84375	3.32496	.381	-3.2139	12.9014
The alternative intervention group	The intervention group	-10.78125(*)	3.43424	*.007*	-19.1080	-2.4545
	The group with no intervention	-5.93750	3.16758	.182	-13.6676	1.7926
The group with no intervention	The intervention group	-4.84375	3.32496	.381	-12.9014	3.2139
	The alternative intervention group	5.93750	3.16758	.182	-1.7926	13.6676

* The mean difference is significant at the .05 level.

Table 11. Multiple Comparisons between groups: mental health at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	17.20000(*)	2.46552	*.000*	11.2276	23.1724
	The group with no intervention	14.80000(*)	2.35488	*.000*	9.0961	20.5039
The alternative intervention group	The intervention group	-17.20000(*)	2.46552	*.000*	-23.1724	-11.2276
	The group with no intervention	-2.40000	1.99371	.548	-7.2667	2.4667
The group with no intervention	The intervention group	-14.80000(*)	2.35488	*.000*	-20.5039	-9.0961
	The alternative intervention group	2.40000	1.99371	.548	-2.4667	7.2667

* The mean difference is significant at the .05 level.

Table 12. Multiple Comparisons between groups: role-emotional at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	-22.50000(*)	7.79942	*.014*	-41.4383	-3.5617
	The group with no intervention	-15.83333	7.23076	.089	-33.3630	1.6964
The alternative intervention group	The intervention group	22.50000(*)	7.79942	*.014*	3.5617	41.4383
	The group with no intervention	6.66667	7.45117	.754	-11.5243	24.8576
The group with no intervention	The intervention group	15.83333	7.23076	.089	-1.6964	33.3630
	The alternative intervention group	-6.66667	7.45117	.754	-24.8576	11.5243

* The mean difference is significant at the .05 level.

Table 13. Multiple Comparisons between groups: vitality at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	19.81250(*)	2.74829	*.000*	13.1533	26.4717
	The group with no intervention	19.06250(*)	2.59997	*.000*	12.7651	25.3599
The alternative intervention group	The intervention group	-19.81250(*)	2.74829	*.000*	-26.4717	-13.1533
	The group with no intervention	-.75000	2.31460	.984	-6.4005	4.9005
The group with no intervention	The intervention group	-19.06250(*)	2.59997	*.000*	-25.3599	-12.7651
	The alternative intervention group	.75000	2.31460	.984	-4.9005	6.4005

* The mean difference is significant at the .05 level.

Table 14. Multiple Comparisons between groups: general health at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	16.35000(*)	2.84026	*.000*	9.4695	23.2305
	The group with no intervention	16.50000(*)	2.93381	*.000*	9.3903	23.6097
The alternative intervention group	The intervention group	-16.35000(*)	2.84026	*.000*	-23.2305	-9.4695
	The group with no intervention	.15000	2.58639	1.000	-6.1619	6.4619
The group with no intervention	The intervention group	-16.50000(*)	2.93381	*.000*	-23.6097	-9.3903
	The alternative intervention group	-.15000	2.58639	1.000	-6.4619	6.1619

* The mean difference is significant at the .05 level.

Table 15. Pairwise Comparisons between groups: physical function at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	27.241(*)	3.755	*.000*	18.155	36.328
	The group with no intervention	15.648(*)	3.743	*.000*	6.590	24.706
The alternative intervention group	The intervention group	-27.241(*)	3.755	*.000*	-36.328	-18.155
	The group with no intervention	-11.594(*)	4.229	*.021*	-21.829	-1.358
The group with no intervention	The intervention group	-15.648(*)	3.743	*.000*	-24.706	-6.590
	The alternative intervention group	11.594(*)	4.229	*.021*	1.358	21.829

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 16. Pairwise Comparisons between groups: mental health at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	6.880(*)	2.585	*.026*	.624	13.135
	The group with no intervention	5.861	2.615	.079	-.466	12.189
The alternative intervention group	The intervention group	-6.880(*)	2.585	*.026*	-13.135	-.624
	The group with no intervention	-1.018	2.662	1.000	-7.461	5.425
The group with no intervention	The intervention group	-5.861	2.615	.079	-12.189	.466
	The alternative intervention group	1.018	2.662	1.000	-5.425	7.461

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 17. Pairwise Comparisons between groups: role-emotional at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	-14.963	8.599	.251	-35.774	5.848
	The group with no intervention	-22.022(*)	8.596	*.034*	-42.824	-1.220
The alternative intervention group	The intervention group	14.963	8.599	.251	-5.848	35.774
	The group with no intervention	-7.059	9.936	1.000	-31.105	16.986
The group with no intervention	The intervention group	22.022(*)	8.596	*.034*	1.220	42.824
	The alternative intervention group	7.059	9.936	1.000	-16.986	31.105

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 18. Pairwise Comparisons between groups: vitality at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	12.917(*)	2.662	*.000*	6.474	19.359
	The group with no intervention	11.113(*)	2.716	*.000*	4.540	17.687
The alternative intervention group	The intervention group	-12.917(*)	2.662	*.000*	-19.359	-6.474
	The group with no intervention	-1.803	2.946	1.000	-8.934	5.327
The group with no intervention	The intervention group	-11.113(*)	2.716	*.000*	-17.687	-4.540
	The alternative intervention group	1.803	2.946	1.000	-5.327	8.934

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 19. Pairwise Comparisons between groups: general health at the end of week 4

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	13.930(*)	2.581	*.000*	7.684	20.176
	The group with no intervention	14.963(*)	2.580	*.000*	8.719	21.206
The alternative intervention group	The intervention group	-13.930(*)	2.581	*.000*	-20.176	-7.684
	The group with no intervention	1.033	2.879	1.000	-5.934	8.000
The group with no intervention	The intervention group	-14.963(*)	2.580	*.000*	-21.206	-8.719
	The alternative intervention group	-1.033	2.879	1.000	-8.000	5.934

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 20. Pairwise Comparisons between groups: physical function at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	17.772(*)	3.626	*.000*	8.996	26.547
	The group with no intervention	34.088(*)	3.615	*.000*	25.340	42.836
The alternative intervention group	The intervention group	-17.772(*)	3.626	*.000*	-26.547	-8.996
	The group with no intervention	16.317(*)	4.085	*.000*	6.432	26.201
The group with no intervention	The intervention group	-34.088(*)	3.615	*.000*	-42.836	-25.340
	The alternative intervention group	-16.317(*)	4.085	*.000*	-26.201	-6.432

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 21. Pairwise Comparisons between groups: role-physical at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	6.404	6.642	1.000	-9.671	22.479
	The group with no intervention	17.503(*)	6.643	*.028*	1.426	33.581
The alternative intervention group	The intervention group	-6.404	6.642	1.000	-22.479	9.671
	The group with no intervention	11.100	7.675	.450	-7.473	29.673
The group with no intervention	The intervention group	-17.503(*)	6.643	*.028*	-33.581	-1.426
	The alternative intervention group	-11.100	7.675	.450	-29.673	7.473

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 22. Pairwise Comparisons between groups: bodily pain at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	10.912(*)	3.709	*.011*	1.937	19.888
	The group with no intervention	7.812	3.709	.110	-1.163	16.788
The alternative intervention group	The intervention group	-10.912(*)	3.709	*.011*	-19.888	-1.937
	The group with no intervention	-3.100	4.282	1.000	-13.464	7.264
The group with no intervention	The intervention group	-7.812	3.709	.110	-16.788	1.163
	The alternative intervention group	3.100	4.282	1.000	-7.264	13.464

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 23. Pairwise Comparisons between groups: mental health at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	7.013(*)	2.435	*.014*	1.119	12.907
	The group with no intervention	4.052	2.463	.306	-1.910	10.013
The alternative intervention group	The intervention group	-7.013(*)	2.435	*.014*	-12.907	-1.119
	The group with no intervention	-2.961	2.509	.719	-9.032	3.110
The group with no intervention	The intervention group	-4.052	2.463	.306	-10.013	1.910
	The alternative intervention group	2.961	2.509	.719	-3.110	9.032

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 24. Pairwise Comparisons between groups: role-emotional at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	-22.805(*)	8.013	*.015*	-42.198	-3.412
	The group with no intervention	-15.650	8.010	.158	-35.035	3.734
The alternative intervention group	The intervention group	22.805(*)	8.013	*.015*	3.412	42.198
	The group with no intervention	7.155	9.259	1.000	-15.253	29.562
The group with no intervention	The intervention group	15.650	8.010	.158	-3.734	35.035
	The alternative intervention group	-7.155	9.259	1.000	-29.562	15.253

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 25. Pairwise Comparisons between groups: vitality at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	13.635(*)	2.593	*.000*	7.360	19.910
	The group with no intervention	11.532(*)	2.645	*.000*	5.130	17.934
The alternative intervention group	The intervention group	-13.635(*)	2.593	*.000*	-19.910	-7.360
	The group with no intervention	-2.103	2.870	1.000	-9.048	4.842
The group with no intervention	The intervention group	-11.532(*)	2.645	*.000*	-17.934	-5.130
	The alternative intervention group	2.103	2.870	1.000	-4.842	9.048

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

Table 26. Pairwise Comparisons between groups: general health at the end of week 6

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.(a)	95% Confidence Interval for Difference(a)	
					Upper Bound	Lower Bound
The intervention group	The alternative intervention group	12.270(*)	3.036	*.000*	4.922	19.618
	The group with no intervention	12.445(*)	3.035	*.000*	5.101	19.790
The alternative intervention group	The intervention group	-12.270(*)	3.036	*.000*	-19.618	-4.922
	The group with no intervention	.175	3.387	1.000	-8.021	8.372
The group with no intervention	The reflexology group	-12.445(*)	3.035	*.000*	-19.790	-5.101
	The alternative intervention group	-.175	3.387	1.000	-8.372	8.021

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a Adjustment for multiple comparisons: Bonferroni.

8. References

Adulpokathorn, E 2000, 'Effects of preferred music on postoperative pain in patients with abdominal surgery', Masters thesis, Khon Kaen University.

Ahmad, M & Goucke, CR 2002, 'Management strategies for the treatment of neuropathic pain in the elderly', *Drugs Aging*, vol. 19, no. 12, pp. 929-945.

Ahmedzai, S 1995, 'Recent clinical trials of pain control: impact on quality of life', *European Journal of Cancer*, vol. 31A, Suppl. 6, pp. S2-S7.

Allison, PJ, Locker, D, Wood-Dauphinee, S, Black, M & Feine, JS 1998, 'Correlates of health-related quality of life in upper aerodigestive tract cancer patients', *Quality of Life Research*, vol. 7, no. 8, pp. 713-722.

American Geriatrics Society Panel 2002, 'The management of persistent pain in older persons', *The American Geriatrics Society*, vol. 50, no. 6s, pp.s205-s224.

Andersson, HI, Ejlertsson, G, Leden, I & Scherstén, B 1999, 'Impact of chronic pain on health care seeking, self care, and medication: results from a population-based Swedish study', *Journal of Epidemiology and Community Health*, vol. 53, pp. 503-509.

Aparasu, R, McCoy, RA, Weber, C, Mair, D & Parasuraman, TV 1999, 'Opioid-induced emesis among hospitalized nonsurgical patients: effect on pain and

quality of life', *Journal of Pain and Symptom Management,* vol. 18, no. 4, pp. 280-288.

Aree-ue, S 1997, 'Stress, coping, and quality of life in elderly women with osteoarthritis of the knee', Masters thesis, Mahidol University.

Arriaga, F, Lara, E, Matos-Pires, A, Cavaglia, F & Bastos, L 1995, 'Diagnostic relevance of sleep complaints in anxiety and mood disorders', *European Psychiatry,* vol. 10, pp. 386-390.

Asghari, A, Ghaderi, N & Ashory, A 2006, 'The prevalence of pain among residents of nursing homes and the impact of pain on their mood and quality of life', *Archives of Iranian Medicine,* vol. 9, no. 4, pp. 368-373.

Astin, JA 1998, 'Why patients use alternative medicine: results of a national study', *The Journal of the American Medical Association,* vol. 279, no. 19, pp. 1548-1553.

Astin, JA, Pelletier, KR, Marie, A & Haskell, WL 2000, 'Complementary and alternative medicine use among elderly persons: one-year analysis of a blue shield medicare supplement', *The Journals of Gerontology,* vol. 55A, No. 1, pp. M4-M9.

Auabandit, N, Aunkeaw, M, Kum-au, M, Thayida, M & Audthon, Y 2001, *A community survey of musculoskeletal pain and management in Namphong*

district, Khon Kaen province, Health Systems Research Institute and Alliances, Nonthaburi, Thailand, viewed 08 March 2010, <http://library.hsri.or.th/abs/res/hs0809t.doc>.

Australian Bureau of Statistics 2006, *Australian social trends 2006,* Australian Bureau of Statistics, viewed 14 January 2010, <http://wwwabs.gov.au/ausstats/ABS@.nsf/0/7ADBFF9AAFA8F0E5CA2571B00019BE37?opendocument#>.

Barnes, P, Powell-Griner, E, McFann, K & Nahin, R 2004, 'Complementary and alternative medicine use among adults: United States 2002', *Advanced Data,* vol. 343, pp.1-20.

Bdesha, AS, Bunce, CJ, Snell, ME & Witherow, RO 1994, ' A sham controlled trial of transurethral microwave therapy with subsequent treatment of the control group', *Journal of Urology,* vol. 152, no. 2 Pt 1, pp. 453-458.

Bender, T, Nagy, G, Barna, I, Tefner, I, Kádas, E & Géher, P 2007, 'The effect of physical therapy on beta-endorphin levels', *European Journal of Applied Physiology,* vol. 100, pp. 371-382.

Bennett, DS & Carr, DB 2002, 'Opiophobia as a barrier to the treatment of pain', *Journal of Pain & Palliative Care Pharmacotherapy,* vol. 16, no. 1, pp. 105-109.

Bishop, E, McKinnon, E, Weir, E & Brown, DW 2003, 'Reflexology in the management of encopresis and chronic constipation', *Paediatric Nursing,* vol. 15, no. 3, pp. 20-21.

Blomqvist, K & Edberg, AK 2002, 'Living with persistent pain: experiences of older people receiving home care', *Journal of Advanced Nursing,* vol. 40, no. 3, pp. 297-306.

Booddee, N 2002, 'Effects of massage on pain in unilateral total knee arthroplasty patients', Masters thesis, Mahidol University.

Borglin, G, Jakobsson, U, Edberg, AK & Hallberg, IR 2006, 'Older people in Sweden with various degrees of present quality of life: their health, social support, everyday activities and sense of coherence', *Health and Social Care in the Community,* vol. 14, no. 2, pp. 136-146.

Bostrom, B, Sandh, M, Lundberg, D & Fridlund, B 2003, 'A comparison of pain and health-related quality of life between two groups of cancer patients with differing average levels of pain', *Journal of Clinical Nursing,* vol. 12, pp. 726-735.

Bowling, A 2005, *Measuring health: a review of quality of life measurement scales,* 3rd edn, Open University Press, Berkshire, England.

Bowling, A, Seetai, S, Morris, R & Ebrahim, S 2007, 'Quality of life among older people with poor functioning: the influence of perceived control over life', *Age and ageing*, vol. 36, pp. 310-315.

Brattberg, G, Parker, MG & Thorslund, M 1996, 'The prevalence of pain among the oldest old in Sweden', *Pain*, vol. 67, pp. 29-34.

Bruckenthal, P, Reid, C & Reisner, L 2009, 'Special issues in the management of chronic pain in older adults', *Pain Medicine*, vol. 10, no. S2, pp. S67-S78.

Brygge, T, Heinig, JH, Collins, P, Ronborg, S, Gehrchen, PM, Hilden, J, Heegaard, S & Poulsen, LK 2001, 'Reflexology and bronchial asthma', *Respiratory Medicine*, vol. 95, no. 3, pp. 173-179.

Bunnag, C, Leurmarnkul, W, Jareoncharsri, P, Tunsuriyawong, P, Assanasen, P & Pawankar, R 2005, 'Quality of life assessment in Thai patients with allergic rhinoconjunctivitis using the SF-36 questionnaire (Thai version)', *Rhinology*, vol. 43, pp. 99-103.

Bushnell, MC & Apkarian, AV 2006, 'Representation of pain in the brain', in *Wall and Melzack's Textbook of Pain*, eds S McMahon & M Koltzenburg, Elsevier Churchill Livingstone, Philadelphia, USA.

Byers, DC 2001, *Better Health with Foot Reflexology*, revised edn, Ingham publishing INC, Florida.

Cahana, A 2007, 'The placebo effect and the theory of the mind', *Pain Practice,* vol. 7, no. 1, pp. 1-3.

Cano, A, Leong, L, Heller, JB & Lutz, JR 2009, 'Perceived entitlement to pain-related support and pain catastrophizing: associations with perceived and observed support', *Pain,* vol. 147, pp. 249-254.

Carr, AJ, Gibson, B & Robinson, PG 2001, 'Measuring quality of life: is quality of life determined by expectations or experience?', *British Medical Journal,* vol. 322, pp. 1240-1243.

Casten, RJ, Parmelee, PA, Kleban, MH, Lawton, MP & Katz, IR 1995, 'The relationships among anxiety, depression, and pain in a geriatric institutionalized sample', *Pain,* vol. 61, pp. 271-276.

Celentano, DD, Linet, MS & Stewart, WF 1990, 'Gender differences in the experience of headache', *Social Science & Medicine,* vol. 30, no. 12, pp. 1289-1295.

Chaisangmongkol, S 1992, 'User behaviour of pain killing powder drugs among workers following the ban of caffeine use: a case study in Phasodsai community, Chiang Mai municipality, Chiang Mai province', Masters thesis, Chiang Mai University.

Chaisittivong, P 2006, 'Effects of aromatic oil massage on the level of pain in post abdominal surgical patients', Masters thesis, Mahidol University.

Charoencholvanich, K & Pongcharoen, B 2005, 'Oxford knee score and SF-36: translation and reliability for use with total knee arthroscopy patients in Thailand', *Journal of The Medical Association of Thailand,* vol. 88, no. 9, pp. 1194-1202.

Chaudakshetrin, P 1993, 'Thailand: status of cancer pain and palliative care', *Journal of Pain Symptom Management,* vol. 8, no. 6, pp. 434-436.

Chawarangkool, S 1995, 'Relationship between selected factors and quality of life of the elderly in Surattani Province', Masters thesis, Mahidol University.

Cherniack, EP, Senzel, RS & Pan, CX 2001, 'Correlates of use of alternative medicine by the elderly in an urban population', *Journal of Alternative & Complementary Medicine,* vol. 7, no. 3, pp. 277-280.

Chiaree, C 1990, 'The relationship between social support, self care behavior and quality of life in patient with congestive heart failure', Masters thesis, Mahidol University.

Chikeaw, K 1994, 'Relationship among self-concept self-care agency and quality of life of cervical cancer patients receiving radiotherapy', Masters thesis, Chiang Mai University.

Chinuntuya, P 1993, 'Elderly quality of life in Din Daeng elderly', Masters thesis, Mahidol University.

Chopra, P & Smith, H 2006, 'Acute and chronic pain in the elderly', in *Clinical management of the elderly patient in pain,* eds G McCleane & H Smith, The Haworth Medical Press, New York.

Cline, ME, Herman, J, Shaw, E & Morton, RD 1992, 'Standardization of the visual analogue scale', *Nursing Research,* vol. 41, pp. 378-379.

Closs, SJ 2007, 'Assessment of pain, mood, and quality of life', in *Pain in older people,* eds P Crome, CJ Main & F Lally, Oxford University Press Inc., New York.

Commission of the National Economic and Social Development 2010, *Number of population from population projections by age group and sex: 1990-2020,* National Statistics Office, viewed 30 March 2010, <http://service.nso.go.th/nso/nsocenter/project/table/files/0101200/2563/000/00_0101200_2563_000_000000_00200.xls>.

Commonwealth of Australia 1999, *National statement on ethical conduct in research involving humans,* Commonwealth of Australia, Canberra.

Cooke, M 2007, 'Relating socio-economic issues to older people and pain: independence, dignity and choice', in *The management of pain in older people*, ed P Schofield, John Wiley & Sons, Ltd, England.

Croft, P, Rigby, AS, Boswell, R, Schollum, J & Silman, A 1993, 'The prevalence of chronic widespread pain in the general population', *Journal of Rheumatology*, vol. 20, no.4, pp. 710-713.

Cuijpers, P, van Lammeren, P & Duzijn, B 1999, 'Relation between quality of life and chronic illnesses in elderly living in residential homes: a prospective study', *International Psychogeriatrics*, vol. 11, no. 4, pp. 445-454.

Cummins, RA 1999, *Beyond rural health to well-being: an appraisal of the comprehensive quality of life scale – fifth edition*, 5th national rural health conference, Adelaide, South Australia, 14-17 March 1999, viewed 25 March 2010, <http://acqol.deakin.edu.au/instruments/comQol_A5.pdf>.

D'Arcy, Y 2008, 'Pain assessment', *The Nurse Practitioner*, vol. 33, no. 3, pp. 18-24.

Dellasega, C & Keiser, CL 1997, 'Pharmacologic approaches to chronic pain in the older adult', *The Nurse Practitioner*, vol. 22, no. 5, pp. 20-35.

Dougans, I 2002, *Complete illustrated guide to reflexology*, Harper Collins Publishers, London.

Drago, R 2007, 'Management of a pain by pharmacological intervention in older adults', in *The management of pain in older people,* ed P Schofield, John Wiley & Sons, Ltd, England.

Duangkosum, D 1998, 'The effect of preferred music on pain in extracorporeal shock wave lithotripsy patients', Masters thesis, Khon Kaen University.

Dunn, C, Sleep, J & Collett, D 1995, 'Sensing an improvement: an experimental study to evaluate the use of aromatherapy, massage and periods of rest in an intensive care unit', *Journal of Advanced Nursing*, vol. 21, no. 1, pp. 34-40.

Editors of the American Heritage Dictionaries 2002, *American Heritage Stedman's Medical Dictionary*, Houghton Mifflin company, Boston, USA.

Eggen, AE 1994, 'Pattern of drug use in a general population: prevalence and predicting factors, the Tromso study', *International Journal of Epidemiology*, vol. 23, no. 6, pp. 1262-1272.

Eisenberg, DM, Davis, RB, Ettner, SL, Appel, SMS, Wilkey, S, Van Rompay, M & Kessler, RC 1998, 'Trends in Alternative Medicine Use in the United States, 1990-1997: Results of a Follow-up National Survey', *The Journal of the American Medical Association,* Volume 280(18), 11 November, pp 1569-1575.

Ejindu, A 2007, 'The effects of foot and facial massage on sleep induction, blood pressure, pulse and respiratory rate: crossover pilot study', *Complementary Therapies in Clinical Practice*, vol. 13, pp. 266-275.

Erdogan, M, Erdogan, A, Erbil, N, Karakaya, HK & Demircan, A 2005, 'Prospective, Randomized, Placebo-controlled Study of the Effect of TENS on postthoracotomy pain and pulmonary function', *World Journal of Surgery*, vol. 29, no. 12, pp. 1563-1570.

Evans, SL, Nokes, LDM, Weaver, P, Maheson, M & Morrell, P 1998, 'Effect of reflexology treatment on recovery after total knee replacement', *Journal of Bone & Joint Surgery*, vol. 80, p. 172.

Farnsworth, P 1995, *The Australian College of Tactile Therapies: Reflexology Seminar*, The Australian College of Tactile Therapies, Adelaide, Australia.

Fayers, PM & Machin, D 2000, *Quality of life: assessment, analysis and interpretation*, John Wiley & Sons, Ltd, West Sussex, England.

Federman, AD, Litke, A & Morrison, RS 2006, 'Association of age with analgesic use for back and joint disorders in outpatient settings', *The American Journal of Geriatric Pharmacotherapy*, vol. 4, no. 4, pp. 306-315.

Feine, JS & Lund, JP 1997, 'An assessment of the efficacy of physical therapy and physical modalities for the control of chronic musculoskeletal pain', *Pain,* vol. 71, no. 1, pp. 5-23.

Ferrell, BA 1991, 'Pain management in the elderly people', *Journal of the American Geriatrics Society,* vol. 39, pp. 64-73.

Ferrell, BA 1995, 'Pain evaluation and management in the nursing home', *Annals of Internal Medicine,* vol. 123, no, 9, pp. 681-687.

Ferrell, BA, Ferrell, BR & Osterweil, D 1990, 'Pain in the nursing home', *Journal of the American Geriatrics Society,* vol. 38, no. 4, pp. 409-414.

Fields, HL, Basbaum, AI & Heinricher, MM 2006, 'Central nervous system mechanisms of pain modulation', in *Wall and Melzack's Textbook of Pain,* eds S McMahon & M Koltzenburg, Elsevier Churchill Livingstone, Philadelphia, USA.

Fifield, J, Reisine, ST & Grady, K 1991, 'Work disability and the experience of pain and depression in rheumatoid arthritis', *Social Science & Medicine,* vol. 33, no. 5, pp. 579-585.

Fine, PG 2001, 'Opioid analgesic drugs in older people', *Clinics in Geriatric Medicine,* vol. 17, viewed 8 November 2007, <http://www.mdconsult.com/das/articel/body/81320635-3/jorg=journal&source=MI&sp=11990005&sid>.

Foppa, I & Noack, RH 1996, 'The relation of self-reported back pain to psychosocial, behavioural, and health-related factors in a working population in Switzerland', *Social Science & Medicine,* vol. 43, no. 7, pp. 1119-1126.

Frankel, BSM 1997, 'The effects of reflexology on baroreceptor reflex sensitivity, blood pressure and sinus arrhythmia', *Complementary Therapies in Medicine,* vol. 5, pp. 80-84.

Gagliese, L & Farrell, M 2005, 'Epidemiology of pain in older persons', in *Pain in older persons: progress in pain research and management volume 35,* eds SJ Gibson & DK Weiner, IASP Press, Seattle, USA.

Gagliese, L & Melzack, R 1997, 'Chronic pain in elderly people', *Pain,* vol. 70, pp. 3-14.

Gagliese, L & Melzack, R 2006, 'Pain in the elderly', in *Wall and Melzack's Textbook of Pain,* eds S McMahon & M Koltzenburg, Elsevier Churchill Livingstone, Philadelphia, USA.

Gambles, M, Crooke, M & Wilkinson, S 2002, 'Evaluation of a hospice based reflexology service: a qualitative audit of patient perceptions', *European Journal of Oncology Nursing,* vol. 6, pp. 37-44.

Gerdner, LA, Nisly, NL & Glick, RM 2002, 'Complementary and alternative medicine modalities', in *Persistent pain in older adults*, eds D Weiner, K Herr & T Rudy, Springer Publishing Company, New York.

Gerstle, DS, All, AC & Wallace, DC 2001, 'Quality of life and chronic non-malignant pain', *Pain Management Nursing*, vol. 2, no. 3, pp. 98-109.

Gibson, SJ 2007, 'IASP global year against pain in older persons: highlighting the current status and future perspectives in geriatric pain', *Expert Review of Neurotherapeutics*, vol. 7, no. 6, pp. 627-635.

Gloth, FM 2004, *Handbook of Pain Relief in Older Adults*, Humana Press, New Jersey.

Gordon, DB 1999, 'Pain management in the elderly', *Journal of PeriAnesthesia Nursing*, vol. 14, no. 6, pp. 367-372.

Gorin, Y 1993, 'Quality of life of elderly with osteoarthritis', Masters thesis, Mahidol University.

Greaves, CJ & Farbus, L 2006, 'Effects of creative and social activity on the health and well-being of socially isolated older people: outcomes from a multi-method observational study', *The Journal of the Royal Society for the Promotion of Health*, vol. 126, no. 3, pp. 134-142.

Gregorio, G, Moreno, P, Rodriguez, A & Zarco, MJ 2007, 'Pain management in elderly people in primary care', *Revista Clinica Espanola,* vol. 207, no. 4, pp. 166-171.

Grueggultorn, T 1993, 'A study of social support and adaptation of the elderly in Moung Saraburi Municipal area', Masters thesis, Mahidol University.

Guay, DR, Lackner, TE & Hanlon, JT 2002, 'Pharmacologic management: non-invasive modalities', in *Persistant pain in older adults,* eds D Weiner, K Herr & T Rudy, Springer Publishing Company, New York.

Gulsatitporn, S 2006, *Physical therapy in the elderly,* 2nd edn, OffsetPress, Bangkok, Thailand.

Haines, R, Blair, A, & Osborn, M 1999, 'The challenges of assessing outcome in chronic pain', *British Journal of Clinical Governance,* vol. 4, no. 3, pp. 109-113.

Healey, J 2002, *Stress,* The Spinney Press, NSW, Australia.

Hellstrom, Y, Persson, G & Hallberg, IR 2004, 'Quality of life and symptoms among older people living at home', *Issues and Innovations in Nursing Practice,* vol. 48, no. 6, pp. 584-593.

Helme, RD & Gibson, SJ 2001, 'Age-related differences in pain perception and report', *Clinics in Geriatric Medicine,* vol. 17, no. 3, pp. 433-456.

Hicks, TJ 2000, 'Ethical implications of pain management in a nursing home: a discussion', *Nursing Ethics,* vol. 7, no. 5, pp. 392-398.

Hitchcock, LS, Ferrell, BR & McCaffery, M 1994, 'The experience of chronic non-malignant pain', *Journal of Pain and Symptom Management,* vol. 9, no. 5, pp. 312-318.

Hoare, J 2004, 'The best medicine', *Nursing Standard*, vol. 19, no. 14-16, pp. 18-19.

Honari, S, Patterson, DR, Gibbons, J, Martin-Herz, SP, Mann, R, Gibran, NS & Heimbach, DM 1997, 'Comparison of pain control medication in three age groups of elderly patients', *Journal of Burn Care & Rehabilitation,* vol. 18, no. 6, pp. 500-504.

Hulme, J, Waterman, H & Hillier, VF 1999, 'The effect of foot massage on patients' perception of care following laparoscopic sterilization as day case patients', *Journal of Advanced Nursing,* vol. 30, no. 2, pp. 460-468.

Hunter, M 1992, 'The women's health questionnaire: a measure of mid-aged women's perceptions of their emotional and physical health', *Psychology and Health,* vol. 7, pp. 45-54.

International Association for the Study of Pain 2007, *Global year against pain in women: real women, real pain,* viewed 8 October 2008, <http:www.iasppain.org>.

International Association for the Study of Pain 2008, International Association for the Study of Pain website, viewed 8 October 2008, <http:www.iasp-pain.org/AM/PrinterTemplate.cfm?Section=2004_2005_ Right_to_Pai…>.

Inty, B 1994, 'Pain killing drug consumption behaviors of the rural labourers', Masters thesis, Chiang Mai University.

Jakobsson, U 2004, 'Pain management among older people in need of help with activities of daily living', *Pain Management Nursing*, vol. 5, no. 4, pp. 137-143.

Jakobsson, U, Hallberg, IR & Westergren, A 2007, 'Exploring determinants for quality of life among older people in pain and in need of help for daily living', *Journal of Nursing and Healthcare of Chronic Illness in association with Journal of Clinical Nursing*, vol. 16, no. 3a, pp. 95-104.

Jirarattanaphochai, K, Jung, S, Sumananont, C & Saengnipanthkul, S 2005, 'Reliability of the medical outcomes study short-form survey version 2.0 (Thai version) for the evaluation of low back pain patients', *Journal of The Medical Association of Thailand*, vol. 88, no. 10, pp. 1355-1361.

Jitapunkul, S 2004, *Thai older people health: situation of Thai older people 2004*, viewed 29 July 2010, <http://www.m-society.go.th/document/edoc/edoc_892.pdf>.

Kaada, B & Torsteinb∅, O 1989, 'Increase of plasma β-endorphins in connective tissue massage', *General Pharmacology,* vol. 20, no. 4, pp. 487-489.

Karnjanavorawong, P 1997, 'Quality of life in the elderly with osteoarthritis of the knee', Masters thesis, Mahidol University.

Keefe, FJ & France, CR 1999, 'Pain: biopsychosocial mechanisms and management', *American Psychological Society,* vol. 8, no. 5, pp. 137-141.

Keith, K, Heal, LW & Schalock, RL 1996, 'Cross-cultural measurement of critical quality of life concepts', *Journal of Intellectual and Developmental Disability,* vol. 21, no. 4, pp. 273-293.

Kelner, M & Wellman, B 1997, 'Health care and consumer choice: medical and alternative therapies', *Social Science & Medicine,* vol. 45, no. 2, pp. 203-212.

Kempen, GIJM, et al. 1999, 'Morbidity and quality of life and the moderating effects of level of education in the elderly', *Social Science & Medicine,* vol. 49, pp. 143-149.

Khlongyant, P 2001, 'Pain experiences, depression, and pain management of the hospitalized elderly patients', Masters thesis, Mahidol University.

Khumpheng, W 1997, 'Factors related to the quality of life of rural elderly at Nakornratchasima province', Masters thesis, Mahidol University.

Kohara, H, Miyauchi, T, Suehiro, Y, Ueoka, H, Takeyama, H & Morita, T 2004, 'Combined modality treatment of aromatherapy, footsoak, and reflexology relieves fatigue in patients with cancer', *Journal of Palliative Medicine,* vol. 7, no. 6, pp. 791-796.

Kongsakon, R & Silpakit, C 2000, 'Thai version of the medical outcome study 36 items short form health survey: an instrument for measuring clinical results in mental disorder patients', *Ramathibodi Medical Journal*, vol. 23, pp. 8-19.

Kowalak, JP, Chohan, ND & Follin, SA 2003, *Nurse's handbook of alternative & complementary therapies*, Lippincott Williams & Wilkins, Philadelphia.

Krittayaphong, R, Raungratananmporn, O, Chaowalit, N, Kangkagate, C, Bhuripanyo, K, Chotinaiwatarakul, C, Punlee, K & Chaithiraphan, S 2000, 'Reliability of Thai version of SF-36 questionnaire for the evaluation of quality of life in cardiac patients', *Journal of the Medical Association of Thailand,* vol. 83 (suppl. 2), pp. S130-S136.

Kuhn, MA 1999, *Complementary therapies for health care providers*, Lippincott Williams & Wilkins, Philadelphia.

Kumarnjan, W 2000, 'Quality of life among the elderly in the upper southern region', Masters thesis, Chiang Mai University.

Kunz, B & Kunz, K 1999, *The complete guide to foot reflexology*, 2nd edn, Harper Collins, London.

Kutner, NB & Kutner, MH 1979, 'Race and sex as variables affecting reaction to disability', *Archive Physical Medical Rehabilitation,* vol. 60, pp. 62-66.

Lang, T, Barker, R, Steinlechner, B, Gustorff, B, Puskas, T, Gore, O & Kober, A 2007, 'TENS relieves acute posttraumatic hip pain during emergency transport', *Journal of Trauma, Injury, Infection and Critical Care,* vol. 62, no. 1, pp. 184-188.

Launso, L, Brendstrup, E & Arnberg, S 1999, 'An exploratory study of reflexological treatment for headache', *Alternative Therapies in Health and Medicine,* vol. 5, no. 3, pp. 57-65.

Le Fevre, P, Devereux, J, Smith, S, Lawrie, SM & Cornbleet, M 1999, 'Screening for psychiatric illness in the palliative care inpatient setting: a comparison between the hospital anxiety and depression scale and the general health questionnaire', *Palliative Medicine,* vol. 13, pp. 399-407.

Leveille, SG, Fried, L & Guralnik, JM 2002, 'Disabling symptoms: what do older women report?', *Journal of General Internal Medicine,* vol. 17, no. 10, pp. 766-773.

Li, SF, Greenwald, PW, Gennis, P, Bijur, PE & Gallagher, EJ 2001, 'Effect of age on acute pain perception of a standardized stimulus in the emergency department', *Annals of Emergency Medicine,* vol. 38, no. 6, pp. 644-647.

Lim, LL, Seubsman, S & Sleigh, A 2008, 'Thai SF-36 health survey: tests of data quality, scaling assumptions, reliability and validity in healthy men and women', *Health and Quality of Life Outcomes,* vol. 6, no. 52, pp. 1-9.

Lin, EHB, Katon, W, Von Korff, M, Tang, L, Williams, JW Jr., Kroenke, K, Hunkeler, E, Harpole, L, Hegel, M, Arean, P, Hoffing, M, Penna, RD, Langston, C & Unutzer, J 2003, 'Effect of improving depression care on pain and functional outcomes among older adults with arthritis' *JAMA,* Vol. 290, no. 18, pp. 2428-2434.

Loder, EW & Witkower, AB 2002, 'A pilot study of pain and attitudes toward pain in a rehabilitation population', *Pain Medicine,* vol. 3, no. 4, pp. 333-338.

Long, L, Huntley, A & Ernst, E 2001, 'Which complementary and alternative therapies benefit which conditions? A survey of the opinions of 223 professional organizations', *Complementary Therapies in Medicine,* vol. 9, pp. 178-185.

Lordon, SP, Cope, DK & Fine, PG 2002, 'Invasive pharmacologic and nonpharmacologic modalities', in *Persistent pain in older adults,* eds D Weiner, K Herr & T Rudy, Springer Publishing Company, New York.

Lovheim, H, Sandman, PO, Kallin, K, Karlsson, S & Gustafson, Y 2006, 'Poor staff awareness of analgesic treatment jeopardises adequate pain control in the care of older people', *Pain in Geriatric Care,* vol. 35, pp. 257-261.

Lynch, EP, Lazor, MA, Gellis, JE, Orav, J, Goldman, L & Marcantonio, ER 1998, 'The impact of postoperative pain on the development of postoperative delirium', *Anesthesia & Analgesia,* vol. 86, pp. 781-785.

Mackereth, PA & Tiran, D 2002, *Clinical reflexology: a guide for health professionals,* Churchill Livingstone, London.

Mangoni, AA & Jackson, SHD 2003, 'Age-related changes in pharmacokinetics and pharmacodynamics: basic principles and practical applications', *British Journal of Clinical Pharmacology,* vol. 57, no. 1, pp. 6-14.

Mann, E & Carr, E 2006, *Pain management,* Blackwell Publishing Ltd, United Kingdom.

Mannix, LK, Chandurkar, RS, Rybicki, LA, Tusek, DL & Solomon, GD 1999, 'Effect of guided imagery on quality of life for patients with chronic tension-type headache', *Headache*. Vol. 39, no. 5, pp. 326-334mi.

Mayers, AG, Grabau, EAS, Campbell, C & Baldwin, DS 2009, 'Subjective sleep, depression and anxiety: inter-relationships in a non-clinical sample', *Human Psychopharmacology,* vol. 24, pp. 495-501.

McCleane, G 2006, 'Pain and the elderly patient', in *Clinical management of the elderly patient in pain,* eds G McCleane & H Smith, The Haworth Medical Press, New York.

McDowell, I 2006, *Measuring Health: a guide to rating scales and questionnaires,* 3rd edn, Oxford university press, Inc., New York.

McGregor, KJ & Peay, ER 1996, 'The choice of alternative therapy for health care: testing some propositions', *Social Science & Medicine,* vol. 43, no. 9, pp. 1317-1327.

McGuire, DB 1988, 'Measuring pain', in *Instruments for clinical nursing research,* ed M Frank-Stromborg, Appleton an Lange, Norwalk, Connecticut.

Melzack, R 1987, 'The Short-Form McGill Pain Questionnaire: major properties and scoring methods, *Pain,* vol. 30, pp. 191-197.

Melzack, R 2005, 'Evolution of the neuromatrix theory of pain: the Prithvi Raj lecture, presented at the third world congress of world institute of pain, Barcelona 2004', *Pain Practice,* vol. 5, no. 2, pp. 85-94.

Mercadante, S, Ferrera, P, Villari, P & Casuccio, A 2006, 'Opioid escalation in patients with cancer pain: the effect of age', *Journal of Pain and Symptom Management,* vol. 32, no. 5, pp. 413-419.

Meyer, RA, Ringkamp, M, Campbell, JN & Raja, SN 2006, 'Peripheral mechanisms of cutaneous nociception', in *Wall and Melzack's textbook of pain*, 5th edn, eds SB McMahon & M Koltzenburg, Elsevier Churchill Livingstone, London, United Kingdom.

Meyler, WJ, de Jongste, MJL & Rolf, CAM 1994, 'Clinical evaluation of pain treatment with electrostimulation: a study on TENS in patients with different pain syndromes', *The Clinical Journal of Pain*, vol. 10, pp. 22-27.

Mikes, LM, et al. 2003, 'Health status of patients with chronic pain attending a pain center', *Pain Management Nursing*, vol. 4, no. 2, pp. 70-76.

Mitchell, J & Condon, J 2005 'Pain management', in *Lewis's medical-surgical nursing: assessment and management of clinical problems*, eds D Brown, H Edwards, SM Lewis, MM Heitkemper & SR Dirksen, Elsevier Mosby, New South Wales, Australia.

Morris, P, Raphael, B & Bordujenko, A 1999, *Stress and challenge: health and disease*, Commonwealth of Australia, Brisbane.

Morrison, RS & Siu, AL 2000, 'A comparison of pain and its treatment in advanced dementia and cognitively intact patients with hip fracture', *Journal of pain and symptom management*, vol. 19, no. 4, pp. 240-248.

Morrow, L, Saxton, J & Rodriguez, EG 2002, 'Persistent pain and neuropsychological function', in *Persistent pain in older adults,* eds D Weiner, K Herr & T Rudy, Springer Publishing Company, New York.

Murphy, K, Shea, EO & Cooney, A 2007, 'Quality of life for older people living in long-stay settings in Ireland', *Journal of Clinical Nursing,* vol. 16, pp. 2167-2177.

Murray, MD & Brater, DC 1990, 'Nonsteroidal anti-inflammatory drugs', *Clinics in Geriatric Medicine,* vol. 6, no. 2, pp. 365-397.

Najm, W, Reinsch, S, Hoehler, F & Tobis, J 2003, 'Use of complementary and alternative medicine among the ethnic elderly', *Alternative Therapies in Health and Medicine,* vol. 9, no, 3, pp. 50-56.

Nakpach, O 2007, 'Effects of health information and therapeutic music program on pain and sleep quality in patients with leg fixation', Masters thesis, Chulalongkorn University.

Nanthamongkolchai, S, Makapat, A, Charupoonphol, P & Munsawaengsub, C 2007, 'Self-esteem of the elderly in rural areas of Nakhon Sawan Province', *Journal of the Medical Association of Thailand,* vol. 90, no. 1, pp. 155-159.

National Center for Complementary and Alternative Medicine 2007, *CAM basics,* National Center for Complementary and Alternative Medicine, viewed 30 April 2010, <http://nccam.nih.gov/health/whatiscam/D347.pdf>.

Nikolaus, T & Zeyfang, A 2004, 'Pharmacological treatments for persistent non-malignant pain in older persons', *Drugs Aging,* vol. 21, no. 1, pp. 19-41.

Niv, D & Kreitler, S 2001, 'Pain and quality of life', *Pain Practice,* vol. 1, no. 2, pp. 150-161.

Nuchsangplee, M 1989, 'Factors that influence life satisfaction of old age: a case study of old age in Bonkai Community, Bangkok', Masters thesis, Thammasat University.

Ochum, K 2006, 'The effect of pain management program with music listening on pain of post emergency abdominal surgical patients', Masters thesis, Chulalongkorn University.

Oermann, MH & Templin, T 2000, 'Important attributes of quality health care: consumer perspectives', *Journal of Nursing Scholarship,* vol. 32, no. 2, pp. 167-172.

Office for National Statistics 2009, *National population projections, 2008-based,* Office for National Statistics, viewed 12 January 2010, <http://www.statistics.gov.uk/pdfdir/pproj1009.pdf>.

Okuyama, T, Akecho, T, Kugaya, A, Okamura, H, Shima, Y, Maruguchi, M, Hosaka, T & Uchitomi, Y 2000, 'Development and validation of the cancer fatigue scale: a brief, three-dimensional, self-rating scale for assessment of fatigue in cancer patients', *Journal of Pain and Symptom management,* vol. 19, pp. 5-14.

Oleson, T & Flocco, W 1993, 'Randomized controlled study of premenstrual symptoms treated with ear, hand, and foot reflexology', *Obstetrics and Gynaecology,* vol. 82, pp. 906-911.

Ong, BN & Jordan, K 1997, *Health experiences of elderly people in an outer London area,* Sociological Research Online, viewed 28 January 2010, <http:// www.socresonline.org.uk/2/1/5.html>.

Othaganont, P, Sinthuvorakan, C & Jensupakarn, P 2002, 'Daily living practice of the life-satisfied Thai elderly', *Journal of Transcultural Nursing,* vol. 13, no. 1, pp. 24-29.

Panawattanakul, S 1991, 'Self concept, self-care agency and quality of life in elderly persons', Masters thesis, Mahidol University.

Panichacheewakul, P 1994, 'Development of a multidimensional quality of life instrument for the rural elderly', PhD thesis, Mahidol University.

Panyim, W 2000, 'Effects of reflex zone therapy on pain and distress in abdominal hysterectomy patients', Masters thesis, Mahidol University.

Park, HS & Cho, GY 2004, 'Effects of foot reflexology on essential hypertension patients', *Daehan Ganho Haghoeji*, vol. 34, no. 5, pp. 739-750.

Parmelee, PA, Katz, IR & Lawton, MP 1991, 'The relation of pain to depression among institutionalized aged', *Journal of Gerontology*, vol. 46, no. 1, pp. p15-p21.

Payaksiri, P 2001, 'The effects of music on patients' pain level during open wound dressing', Masters thesis, Mahidol University.

Perneger, TV, Whelton, PK & Klag, MJ 1994, 'Risk of kidney failure associated with the use of acetaminophen, aspirin, and Nonsteroidal Antiinflammatory Drugs', *New England Journal of Medicine*, vol. 331, no. 25, pp. 1675-1679.

Perrot, S 2006, 'Management strategies for the treatment of non malignant chronic pain in the elderly', *Psychologie & Neuropsychiatrie du Vieillissement*, vol. 4, no. 3, pp. 163-170.

Pitkala, K, Standberg, T & Tilvis, R 2002, 'Management of non-malignant pain home-dwelling older people: a population-based survey', *Journal of the American Geriatrics Society*, vol. 50, pp. 1861-1865.

Plianbangchang, P, Junpratat, S & Thongpheom, T 2001, 'Steroid tablet inappropriate selling behaviour among drug stores in Muang district, Phitsanulok', *Journal of Health Science*, vol. 10, no. 4, pp. 594-601.

Plianbumroong, D 1997, 'Self-care behavior and quality of life of the elderly in Southern border provinces of Thailand', Masters thesis, Mahidol University.

Pongchareon, C 2001, 'The effects of massage on pain level in post abdominal operative patients', Masters thesis, Mahidol University.

Pongpiyapiboon, T 2005, 'Effects of symptom management with reflexology program on pain and frequency of pain medication taking in elderly patient with prostatectomy', Masters thesis, Chulalongkorn University.

Portenoy, RK 1996, 'Opioid therapy for chronic non-malignant pain: a review of the critical issues', *Journal of pain and symptom management*, vol. 11, no. 4, pp. 203-217.

Puthumrugsa, N 2005, 'The effectiveness of Thai traditional massage (Ayuravedic) on neck pain in clinic Rajamangala Institute of Technology Pathumthani campus ampoe Thanyaburi changwat Pathum Thani', Masters thesis, Kasetsart University.

Rankin-Box, D 2001, *The nurse's handbook of complementary therapies*, Harcourt Publishers Ltd, London.

Rapley, M 2003, *Quality of life research: a critical introduction*, SAGE Publications Ltd, London.

Rattana-amornchai, D 1992, 'The relationship of demographic characteristics, perceived health status, and perceived control of health on lifestyle of the elderly in Angthong province', Masters thesis, Mahidol University.

Reyes-Gibby, CC, Aday, L & Cleeland, C 2002, 'Impact of pain on self-rated health in the community-dwelling older adults', *Pain*, vol. 95, pp. 75-82.

Rhiner, M, Ferrell, BR, Ferrell, BA & Grant, MM 1993, 'A structured nondrug intervention program for cancer pain', *Cancer Practice*, vol. 1, no. 2, pp. 137-143.

Riise, T, Moen, BE & Nortvedt, MW 2003, 'Occupation, lifestyle factors and health-related quality of life: the Hordaland health survey', *Journal of Occupational and Environmental Medicine*, vol. 45, pp. 324-332.

Robinson, CL 2007, 'Relieving pain in the elderly', *Health Progress*, vol. 88, no. 1, pp. 48-53.

Rogers, WH, Wittink, H, Wagner, A, Cynn, D & Carr, DB 2000, 'Assessing individual outcomes during outpatient multidisciplinary chronic pain treatment by means of an augmented SF-36', *Pain Medicine*, vol. 1, no. 1, pp. 44-54.

Ronrittivichai, C & Thongjaruern, V 2005, *Principle of gerontological nursing*, Boonsiri Press, Bangkok, Thailand.

Ross, CS, Hamilton, J, Macrae, G, Docherty, C, Gould, A & Cornbleet, MA 2002, 'A pilot study to evaluate the effect of reflexology on mood and symptom rating of advanced cancer patients', *Palliative Medicine*, vol. 16, no. 6, pp. 544-545.

Rubin, DI 2007, 'Epidemiology and risk factors for spine pain', *Neurologic Clinics*, vol. 25, no. 2, pp. 353-371.

Rudy, TE, Hanlon, RB & Markham, JR 2002, 'Psychosocial issues and cognitive-behavioural therapy: from theory to practice', in *Persistent pain in older adults*, eds DK Weiner, K Herr & TE Rudy, Springer Publishing Company, NewYork.

Rudy, TE, Weiner, DK,Lieber, SJ,Slaboda, J &Boston JR 2007, 'The impact of chronic low back pain on older adults: a comparative study of patients and controls', *Pain*, vol. 131, no. 3, pp. 293-301.

Ruesch, P, Graf, J, Meyer, PC, Rossler, W & Hell, D 2004, 'Occupation, social support and quality of life in persons with schizophrenic or affective disorders', *Social Psychiatry and Psychiatric Epidemiology*, vol. 39, pp. 686-694.

Rungchucheun, W 2006, 'Effects of Thai traditional massage on pain among non-cancer patients with back pain', Masters thesis, Prince of Songkla University.

Sakauye, K 2004, 'Cultural influences on pain management in the elderly', *Complementary Therapy,* vol. 31, no. 1, pp. 78-82.

Sanitchone, S 2002, 'The effect of Thai North-eastern traditional music on pain and anxiety in patients with open reduction and internal fixation', Masters thesis, Khon Kaen University.

Saraburi Provincial Health Office 2007, *Population by sex and age: Lamsompung, Muaklek, Saraburi 2007,* Saraburi Provincial Health Office, viewed 9 April 2008, <http://203.157.115.9/provis/civil/civil4ageyear.php?provincecode=19&reportid=civil4a...>.

Sasat, S 2006, *Gerontological nursing: common problems and caring guideline,* ChulaPress, Bangkok, Thailand.

Sauro, M & Greenberg, RP 2005, 'Endogenous opiates and the placebo effect: a meta-analytic review', *Journal of Psychosomatic Research,* vol. 58, pp. 115-120.

Schofield, P 2007, 'Complementary approaches', in *The management of pain in older people,* ed P Schofield, John Wiley & Sons, Ltd, England.

Seaward, BL 1999, *Managing stress: principles and strategies for health and wellbeing,* Jones and Barlett Publishers International, London.

Selvaratnam, DP & Tin, PB 2007, 'Lifestyle of the elderly in rural and urban Malaysia', *Annals of the New York Academy of Sciences,* vol. 1114, pp. 317-325.

Serlin, RC, Mendoza, TR, Nakamura, Y, Edwards, KR & Cleeland, CS 1995, 'When is cancer pain mild, moderate or severe? Grading pain severity by its interference with function', *Pain,* vol. 61, pp. 227-284.

Sertoz, OO, Asci,G, Toz, F, Duman, S, Elbi, H & Ok, E 2009, 'Planning a social activity to improve psychological well-being and quality of life of hemodialysis patients: a pilot study', *Therapeutic Apheresis and Dialysis,* vol. 13, no. 4, pp. 366-372.

Sheffield, D, Biles, PL, Orom, H, Maixner, W & Sheps, DS 2000, 'Race and sex differences in cutaneous pain perception', *Psychosomatic Medicine,* vol. 62, pp. 517-523.

Shreffler-Grant, J, Weinert, C, Nichols, E & Ide, B 2005, 'Complementary therapy use among older rural adults', *Public Health Nursing,* vol. 22, no. 4, pp. 323-331.

Siev-Ner, I, Gamus, D, Lerner-Geva, L & Achiron, A 2003, 'Reflexology treatment relieves symptoms of multiple sclerosis: a randomized controlled study', *Multiple Sclerosis,* vol. 9, no. 4, pp. 356- 361.

Silverstein, FE, Gerald, F, Goldstein, JL, Simon, LS, Pincus, T, Whelton, A, Makuch,R, Glenn, E, Agrawal, NM, Stenson, WF, Burr, AM, Zhao, WW, Kent, JD, Lefkowith, JB, Verburg, KM & Geis, SG 2000, 'Gastrointestinal toxicity with Celecoxib vs nonsteroidal anti-inflammatory drugs for osteoarthritis and rheumatoid arthritis: the class study a randomized controlled trial', *The Journal of the American Medical Association,* vol. 284, no. 13, pp. 1247-1255.

Sinchai, S 1989, 'Factors related to life satisfaction of the aged in homes for the aged, public welfare department', Masters thesis, Chulalongkorn University.

Skevington, SM 1998, 'Investigating the relationship between pain and discomfort and quality of life, using the WHOQOL', *Pain*, vol. 76, no. 3, pp. 395-406.

Slade, L 2010, *How does reflexology work?,* Universal College of Reflexology, Alberta, Canada, viewed 16 March 2010, <http://www. universalreflex.com/article.php/20040309175204417>.

Smith, C, Birnbaum, G, Carter, JL, Greenstein, J & Lublin, FD 1994, 'Tizanidine treatment of spasticity caused by multiple sclerosis: results of a double-blind, placebo-controlled trial: US Tizanidine Study Group', *Neurology*, vol. 44, no. 11 Supp l 9, pp. S34-42.

Snyder, M & Lindquist, R 2006, '*Complementary/alternative therapies in nursing*', 5th edn, Springer Publishing Company, New York.

Somboonsit, J 1992, 'The relationship between demographic factors, daily-life activities and satisfaction with life among aging', Masters thesis, Mahidol University.

Somchock, J 1997, 'Quality of life in the elderly with Diabetes Mellitus', Masters thesis, Mahidol University.

Somchock, J 2006, 'Effects of foot reflexology on reducing blood pressure in patients with hypertension, Masters thesis, Flinders University.

Somogyi-Zalud, E, Zhong, Z, Lynn, J & Hamel, MB 2000, 'Elderly persons' last six months of life: findings from the hospitalized elderly longitudinal project', *Journal of the American Geriatrics Society*, vol. 48, viewed 21 November 2007, <http://www.mdconsult.com/das/article/body/82200816-2/jorg=journal & source =& sp=>.

Sorkin, BA, Rudy, TE, Hanlon, RB, Turk, DC & Stieg, RL 1990, 'Chronic pain in old and young patients: differences appear less important than similarities', *Journal of Gerontology*, vol. 45, pp. P64-P68.

Spencer, M 2003, *Pain relief in Thailand*, Pain and palliative care in the developing world, the Haworth Press, Inc, viewed 2 March 2009, <http://www.haworthpress. com/store/product.asp?sku=J354>.

Stephenson, N, Dalton, JA & Carlson, J 2003, 'The effect of foot reflexology on pain in patients with metastatic cancer', *Applied Nursing Research*, vol. 16, no. 4, pp. 284-286.

Stephenson, NLN, Weinrich, SP & Tavakoli, AS 2000, 'The effects of foot reflexology on anxiety and pain in patients with breast and lung cancer', *Oncology Nursing Forum*, vol. 27, no. 1, pp. 67-72.

Sukamwang, K 1997, 'A causal model of quality of life among the elderly with osteoarthritis', PhD thesis, Mahidol University.

Swinscow, TDV 1997, *Statistics at square one*, viewed 16 March 2004, <http://bmj.bmjjournals.com/collections/statsbk/index.shtml>.

Tambon Administration Organisation 2007, *General information of Lamsompung administration organisation*, Tambon Administration Organisation, <http://www. saraburi.go.th/file/a_Lamsompung50.doc>.

Tang, NKY, Salkovskis, PM, Hodges, A, Soong, E, Hanna, MH & Hester, J 2009, 'Chronic pain syndrome associated with health anxiety: a qualitative thematic comparison between pain patients with high and low health anxiety', *British Journal of Clinical Psychology*, vol. 48, pp. 1-20.

Tangtrakulwanich, B, Wiwatwongwana, S, Chongsuvivatwong, V & Geater, AF 2006, 'Comparison of validity and responsiveness between general and disease-

specific quality of life instruments (Thai version) in knee osteoarthritis', *Journal of The Medical Association of Thailand,* vol. 89, no. 9, pp. 1454-1459.

Tansiri, S 1992, 'The effects of group process on the reduction of depression at Wasanawesa home for the aged, Phranakorn Si Ayutthaya province', Masters thesis, Mahidol University.

Teewanda, D & Sanjai, M 2002, *The role and need of caregivers and need of health care of the elderly in region 7*, view 15 October 2007, <http://advisor.anamai. moph.go.th/ 253/25309.html>.

Thoits, PA 1982 'Conceptual, methodological, and theoretical problems in studying social support as a buffer against life stress', *Journal of Health and Social Behavior,* vol. 23, pp, 145-159.

Thomas, E, Dunn, K & Jinks, C 2007, 'The epidemiology of pain', in *Pain in older people,* eds P Crome, CJ Main & F Lally, Oxford University Press Inc., New York.

Thomas, E, Mottram, S, Peat, G, Wilkie, R & Croft, P 2007, 'The effect of age on the onset of pain interference in a general population of older adults: prospective findings from the North Staffordshire Osteoarthritis Project (NorStOP)', *Pain,* vol. 129, pp. 21-27.

Thomas, E, Peat, G, Harris, L, Wilkie, R & Croft, PR 2004, 'The prevalence of pain and pain interference in a general population of older adults: cross-sectional findings from the North Staffordshire Osteoarthritis Project (NorStOP)', *Pain,* vol. 110, pp. 361-368.

Thomas, VJ & Rose, FD 1991, 'Ethnic differences in the experience of pain', *Social Science & Medicine,* vol. 32, no. 9, pp. 1063-1066.

Thoren, P, Floras, J, Hoffmann, P & Seals, D 1990, 'Endorphins and exercise: physiological mechanisms and clinical implications', *Medicine and Science in Sports and Exercise,* vol. 22, no. 4, pp. 417-428.

Tovey, P 2002, 'A single-blind trial of reflexology for irritable bowel syndrome', *British Journal of General Practice,* vol. 52, pp. 19-23.

Tsai, YF, Tsai, HH, Lai, YH & Chu, TL 2004, 'Pain prevalence, experiences and management strategies among the elderly in Taiwanese nursing homes', *Journal of pain and symptom management,* vol. 28, no. 6, pp. 579-584.

Tuanwong, W 1997, 'Self-care behaviour and quality of life of the elderly in Bangkok', Masters thesis, Mahidol University.

Turk, DC, Swanson, KS & Tunks, ER 2008, 'Psychological approaches in the treatment of chronic pain patients when pills, scalpels, and needles are not enough', *Canadian Journal of Psychiatry,* vol. 53, no. 4, pp. 213-223.

Turner, JA, Jensen, MP & Romano, JM 2000, 'Do beliefs, coping, and catastrophizing independently predict functioning in patients with chronic pain?', *Pain*, vol. 85, pp. 115-125.

Udomsappayakul, U 1992, 'Factors affecting life satisfaction among the elderly: urban area of Suphanburi', Masters thesis, Mahidol University.

Uren, N, Davey, P & Collins, S 2008, *Vascular disease*, Netdoctor, viewed 30 July 2010, < http://www.netdoctor.co.uk/diseases/facts/vasculardiseases.htm>.

U.S. Census Bureau 2008, *Resident population projections by sex and age: 2010 to 2050*, U.S. Census Bureau, viewed 12 January 2010, <http://www.census.gov/compendia/statab/2010/tables/10s0008.pdf>.

U.S. Census Bureau, International Data Base 2008, U.S. Census Bureau website, United State of America, viewed 07 October 2008, <http://www. census.gov/cgi-bin/ipc/idbpyry.pl?cty=TH&maxp=3278991&maxa=80&y>.

Uthidsamphankul, S, Tienwan, P, Sudtanarak, K, Aramsopha, K, Sriprasit, A & Wangboonsakul, J 1995, *Detection steroid in compound drugs which distribution at rural groceries in Buriram province*, report to the Food and Drug Administration, Bangkok, Thailand.

Vallerand, AH, Fouladbakhsh, JM & Templin, T 2003, 'The Use of Complementary/Alternative Medicine Therapies for the Self-Treatment of Pain

Among Residents of Urban, Suburban, and Rural Communities', *American Journal of Public Health*, vol. 93, no. 6, pp. 923-925.

Vlaeyen, JWS & Linton, SJ 2000, 'Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art', *Pain*, vol. 85, pp. 317-332.

Visetkamin, S 2002, 'The relationship between selected factors and quality of life of elderly in Amphur Pathiu Chumporn Province', Masters thesis, Mahidol University.

Vittayachokekittikun, N 1991, 'Self-care agency and health status in elderly person', Masters thesis, Mahidol University.

Von Korff, M, Crane, P, Lane, M, Miglioretti, DL, Simon, G, Saunders, K, Stang, P, Brandenburg, N & Kessler, R 2005, 'Chronic spinal pain and physical-mental comorbidity in the United States: results from the national comorbidity survey replication', *Pain*, vol. 113, pp. 331-339.

Wallace, KG 1992, 'The pathophysiology of pain', *Critical Care Nursing*, vol.15, no. 2, pp. 1-13.

Walsh, TD 1990, 'Prevention of opioid side effects', *Journal of Pain and Symptom Management*, vol. 5, no. 6, pp. 362-367.

Wang, XS, Cleeland, CS, Mendoza, TR, Engstrom, MC, Liu, S, Xu, G, Hao, X, Wang, Y & Ren, XS 1999, 'The effects of pain severity on health-related quality of life: a study of Chinese cancer patients', *Cancer,* vol. 86, pp. 1848-1855.

Wangsa-ard, P 1987, 'Factors relating to the mental health of the elderly in Kalasin Municipal area', Masters thesis, Mahidol University.

Ware, JE & Kosinski, M 2007, *SF-36 physical & mental health summary scales: a manual for users of version 1,* 2nd edn, Lincoln, RI: QualityMetric Incorporated, Rhode Island, USA.

Ware, JE, Kosinski, M & Gandek, B 2005, *SF-36 health survey: manual and interpretation guide,* Lincoln, RI: Quality Metric Incorporated, Rhode Island, USA.

Ware, JE & Sherbourne, CD 1992, 'The MOS 36-item short-form health survey (SF-36) I: conceptual framework and item selection', *Medical Care,* vol. 30, pp. 473-483.

Weinberger, M, Tierney, WM, Booher, P & Hiner, SL 1990, 'Social support, stress and functional status in patients with osteoarthritis', *Social Science & Medicine,* vol. 30, no. 4, pp. 503-508.

Weinberger, M, Hiner, SL & Tierney, WM 1986, 'Improving functional status in arthritis: the effect of social support', *Social Science & Medicine,* vol. 23, no. 9, pp. 899-904.

Weiner, DK 2007, 'Office management of chronic pain in the elderly', *The American Journal of Medicine,* vol. 120, pp. 306-315.

Wilkes, LM, Castro, M, Mohan, S, Sundaraj, SR & Noore, F 2003, 'Health status of patients with chronic pain attending a pain center', *Pain Management Nursing,* vol. 4, no. 2, pp. 70-76.

Williamson, AT, Fletcher, PC & Dawson, KA 2003, 'Complementary and alternative medicine: use in an older population', *Journal of Gerontological Nursing,* May, pp. 20-28.

Williamson, GM & Schulz, R 1992, 'Pain, activity restriction, and symptoms of depression among community-residing elderly adults', *Journal of Gerontology,* vol. 47, no. 6, pp. P367-P372.

Williamson, J, White, A, Hart, A & Ernst, E 2002, 'Randomized controlled trial of reflexology for menopausal symptoms', *An International Journal of Obstetrics and Gynaecology,* vol. 109, no. 9, pp. 1050-1055.

Wivatvanit, S 2002, 'The relationship between the duration of health behaviour and quality of life of the elderly', PhD thesis, Mahidol University.

Won, A, Lapane, K, Gambassi, G, Bernabei, R, Mor, V & Lipsitz, LA 1999, 'Correlates and management of non-malignant pain in the nursing home', *Journal of the American Geriatrics Society*, vol. 47, no. 8, pp. 936-942.

Wongkunchorn, S 1994, 'The relationship among selected factors and the participation of the members of the elderly club: a study of the Romklao Elderly Club, Ladkrabang, Bangkok metropolis', Masters thesis, Mahidol University.

Wongthet, P 1992, *Gender and culture*, Silpakorn University Press, Bangkok, Thailand.

Woo, J, Ho, SC, Lau, J & Leung, PC 1994, 'Musculoskeletal complaints and associated consequences in elderly Chinese aged 70 years and over', *Journal of Rheumatology*, vol. 21, no. 10, pp. 1927-1931.

Woolf, CJ & Mannion, RJ 1999, 'Neuropathic pain: aetiology, symptoms, mechanisms, and management', *Lancet*, vol. 353, no. 9168, pp. 1959-1964.

World Health Organization 1996, *WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment, field trial version December 1996*, World Health Organization, Geneva.

World Health Organization 1997, *WHOQOL measuring quality of life*, World Health Organization, Geneva.

Yang, JH 2005, 'The effects of foot reflexology on nausea, vomiting and fatigue of breast cancer patients undergoing chemotherapy', *Daehan Ganho Haghoeji,* vol. 35, no. 1, pp. 177-185.

Yu-prasert, R 2000, *Research project of a model of problem solving in using of drug packages in Thai people,* report to the Food and Drug Administration, Bangkok, Thailand. Viewed 08 March 2010, <http://elib.fda.moph.go.th /library/fulltext1/private/picture.asp?temp=12858>.

Zhang, AL, Xue, CC, Lin, V & Story, DF 2007, 'Complementary and alternative medicine use by older Australians', *Annals of the New York Academy of Sciences,* vol. 1114, pp. 204-215.

Zhao, SZ, Dedhiya, SD, Bocanegra, TS, Fort, JG, Kuss, ME & Rush, SM 1999, 'Health-related quality of life effects of oxaprozin and nabumetone in patients with osteoarthritis of the knee', *Clinical Therapeutics,* vol. 21, no. 1, pp. 205-217.