

**Effects of foot reflexology
on reducing blood pressure
in patients with hypertension**

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

A thesis submitted in total fulfilment of the requirements for the
Degree of Master of Science (in Nursing)

School of Nursing and Midwifery

Flinders University

Adelaide, Australia

January 2006

Table of Contents

Table of contents.....	i
Abstract.....	viii
Declaration.....	xiii
Acknowledgements.....	xiv
1. Introduction.....	1
1.1 Background.....	1
1.2 Complementary therapies.....	2
1.2.1 Reasons for using complementary therapies.....	2
1.2.2 The difference between an alternative therapy and a complementary therapy.....	3
1.2.3 The origins of alternative and complementary therapies.....	3
1.3 Complementary therapies and nursing.....	4
1.4 Reflexology.....	5
1.4.1 Foot reflexology.....	7
1.4.2 Benefits of reflexology.....	7
1.5 Massage.....	10
1.5.1 Foot massage.....	10
1.6 Hypertension.....	11
1.6.1 The incidence of hypertension.....	11
1.6.2 Definition and causes of hypertension.....	12
1.6.3 The impact of hypertension.....	12
Physiological impact.....	12
Psychological impact.....	13
Socioeconomic impact.....	14

1.7	Hyperlipidaemia.....	15
1.7.1	The incidence of hyperlipidaemia.....	15
1.7.2	Definition and causes of hyperlipidaemia.....	15
1.7.3	The impact of hyperlipidaemia	16
1.8	Treatments for hypertension and hyperlipidaemia.....	16
1.8.1	Pharmacological treatments	16
1.8.2	Non-pharmacological treatments	19
1.9	Quality of life	20
1.10	The research problem.....	21
1.11	Outline of the thesis	22
2.	Literature review	23
2.1	Background to the literature review	23
2.2	Risk factors for hypertension and hyperlipidaemia	26
2.2.1	Age and gender	26
2.2.2	Genetics.....	28
2.2.3	Diet and weight	29
	Obesity and body mass index.....	29
	Consumption of food high in salt or sodium	30
	Alcohol consumption	31
2.2.4	Smoking	32
2.2.5	Lack of activity	33
2.2.6	Co-morbidity	33
2.3	Mediating factors for hypertension and hyperlipidaemia	34
2.3.1	Economic factors.....	34
2.3.2	Stress and personality.....	35
2.3.3	Hypertension medications	36
	Diuretics	36
	Adrenergic inhibitors	37
	Vasodilators	38
2.3.4	Hyperlipidaemia medications	39
2.3.5	Lifestyle modifications.....	40
	Weight loss.....	41
	Exercise.....	42

	Dietary sodium reduction, low fat diet.....	43
	Reduction in alcohol intake and smoking	44
2.3.6	Complementary therapies.....	46
2.3.7	Foot reflexology	46
	Effects on hypertension and baroreceptor reflex	46
	Effects on anxiety and pain	48
	Effects on symptoms management for patients with cancer.....	52
	Effects on premenstrual syndrome and menopausal syndrome	53
	Effects on encopresis and constipation	54
	Effects on multiple sclerosis	55
	Effects on asthma	55
2.3.8	Foot massage	56
2.3.9	Comparison of complementary therapies as mediating factors	61
2.4	Outcomes	61
2.4.1	Negative changes in quality of life.....	62
	Antihypertensive agents	62
	Economic factors (financial difficulties).....	64
	Stress	64
	Co-morbidity	65
2.4.2	Positive changes in quality of life	65
	Antihypertensive agents	65
	Foot reflexology	68
2.5	Conclusion	69

3.	Methods.....	70
3.1	Introduction.....	70
3.2	Aim.....	70
3.3	Hypotheses.....	70
3.3.1	Primary hypothesis.....	70
3.3.2	Secondary hypothesis one.....	71
3.3.3	Secondary hypothesis two.....	71
3.4	Research design.....	71
3.4.1	Setting.....	72
3.4.2	Power calculation.....	72
3.4.3	Inclusion criteria.....	72
3.4.4	Exclusion criteria.....	73
3.5	Research methods.....	73
3.5.1	Recruitment.....	73
3.5.2	Intervention.....	74
3.6	Data collection.....	76
3.6.1	Study instruments.....	76
	Demographic data questionnaire.....	76
	Quality of life questionnaire.....	76
	Automatic sphygmomanometer.....	77
	Blood work.....	77
3.6.2	Factors affecting blood pressure.....	77
3.7	Data analysis.....	79
3.8	Ethical considerations.....	80
4.	Results.....	81
4.1	Demographic characteristics of participants.....	81
4.1.1	Demographic characteristics of age and gender.....	82
4.1.2	Demographic characteristics of marital status, education and economic Factor.....	83
4.1.3	Duration experiencing hypertension.....	85
4.1.4	Duration having treatment for hypertension.....	86
4.1.5	Lifestyle characteristics of fat/salty foods intake, smoking and alcohol Intake.....	87
4.1.6	Lifestyle characteristics of exercise and recreation/relaxation.....	89

4.1.7	Top six co-morbidities of the two study groups.....	90
4.1.8	Top ten medical treatments of the two study groups.....	91
4.2	Outcomes and results	92
4.2.1	Baseline results of blood pressure, LDL cholesterol, triglycerides, and the quality of life.....	92
4.2.2	Post intervention results.....	94
4.3	Participants' comments	95
5.	Discussion and conclusion	97
5.1	Introduction	97
5.2	Primary hypothesis	97
5.3	Secondary hypothesis one	100
5.4	Secondary hypothesis two.....	101
5.5	Summary	103
5.6	Limitations of the study.....	103
5.7	Conclusion and recommendations.....	104
6.	References	106
7.	Appendices.....	147
Appendix 1.	Diagrams	148
	Diagram 1: Zones of the body and feet.....	148
	Diagram 2: Reflex points on feet	149
	Diagram 3: Reflex points on ears.....	151
	Diagram 4: Reflex points on hands.....	152
Appendix 2.	Foot reflexology procedures.....	153
Appendix 3.	Light foot massage procedures.....	189
Appendix 4.	Demographic data questionnaire.....	194
Appendix 5.	The World Health Organization quality of life questionnaire: BREF	201
Appendix 6.	Approvals, consent form and information sheets (English and Thai)	210
Appendix 7.	Tables.....	228
	Table 1. Other co-morbidities of the two study groups	228
	Tables 2-4. Other medical treatments of the two study groups.....	229
Appendix 8.	Participants' comments.....	232

List of Figures

Figure 1.1	Feet mapping	6
Figure 2.1	Study framework	25
Figure 3.1	Flow chart of study research design and methods	75
Figure 4.1	Duration experiencing hypertension.....	85
Figure 4.2	Duration having treatment for hypertension.....	86
Figure 4.3	Top six co-morbidities of the two study groups	90

List of Tables

Table 1.1	Hypertensive agents and their side effects.....	18
Table 3.1	Protocols for taking blood pressure	78
Table 4.1	Demographic characteristics of age and gender	82
Table 4.2	Demographic characteristics of marital status, education and economic factors	84
Table 4.3	Lifestyle characteristics of fat/salty foods intake, smoking and alcohol intake.....	88
Table 4.4	Lifestyle characteristics of exercise and recreation.....	89
Table 4.5	Top ten medical treatments of the two study groups.....	91
Table 4.6	Baseline results of blood pressure, LDL cholesterol, triglycerides and the quality of life.....	93
Table 4.7	Post intervention results.....	94
Table 4.8	Participants' comments about treatments they received.....	96

Abstract

Background

The incidence of hypertension is increasing in developing countries such as Thailand (Chaiteerapan *et al* 1997; Ministry of Public Health 2001; National Library of Thailand Cataloguing in Publication Data 2001) as a result of sociological, political and economic changes. These changes are producing enormous alterations in people's lifestyles, following similar trends in western countries (National Economic and Social Development Board 1997). Negative changes in food consumption, alcohol consumption, level of physical activity, smoking, stress and tension have led to an increase in chronic health problems for Thai people (National Economic and Social Development Board 1997). Age, gender, ethnicity, genetic background, family health history and hyperlipidaemia are likely to influence hypertension (Kaplan, Lieberman & Neal 2002; Mancia *et al* 2002; Manger & Gifford 2001; National Heart Foundation of Australia 2003).

It has been found that health care professionals and patients with chronic disease have increased their use of complementary therapies to help relieve uncomfortable symptoms and suffering (Long, Huntley & Ernst 2001). Foot reflexology is a well known complementary therapy which claims to help the body achieve homeostasis (Byers 2001; Dougans 2002). It is believed that pressing specific areas on the feet related to specific glands or organs of the body can help these glands and organs to function at their peak, allowing the body to heal itself (Byers 2001; Dougans 2002). The principle difference between massage or touch and foot reflexology is that foot reflexology provides not only the relaxation effect obtained from massage or touch is said to also improve body's immunity contributing to healing process (Byers 2001;

Dougans 2002). Foot reflexology has been scientifically researched in many studies to explore the claimed benefits (Bishop 2003; Kohara *et al* 2004; Oleson & Flocco 1993; Siev-Ner *et al* 2003; Yang 2005). Some studies have supported its ability to reduce anxiety and pain (Gambles, Crooke & Wilkinson 2002; Launso, Brendstrup & Arnberg 1999; Stephenson, Dalton & Carlson 2003; Stephenson, Weinrich & Tavakoli 2000). However, there has been little scientific evidence to support the claim that foot reflexology can reduce blood pressure and serum lipids, and can improve the quality of life in patients with hypertension (Hodgson 2000; Milligan *et al* 2002; Park & Cho 2004). The purpose of this study was to begin to fill this gap by investigating the influence of foot reflexology on blood pressure, serum lipids and quality of life.

Aim

The aim of this study was to investigate the effect of foot reflexology on reducing blood pressure in patients with hypertension. To this end, patients receiving reflexology were compared with patients receiving a light foot massage, thus controlling for any effects contributed by massage or touch alone.

Null hypotheses

1. There is no difference in mean blood pressure level between the foot reflexology group and the light foot massage group at the end of four weeks of treatment.
2. There is no difference in mean low density lipoprotein (LDL) cholesterol and triglyceride levels between the foot reflexology group and the light foot massage group at the end of four weeks of treatment.

3. There is no difference in mean quality of life scores between the foot reflexology group and the light foot massage group at the end of four weeks of treatment.

Sample

A sample size of 128 was required to yield a power of 80%, if the difference in mean diastolic blood pressure between the two groups was 5 mmHg. One hundred twenty eight patients with hypertension who attended the hypertensive clinic in the medical outpatients department of Phramongkutklao Hospital, Bangkok, Thailand were enrolled and participated in the study.

Methods

Data collection

This study used a randomized controlled trial design. Participants were randomly allocated into one of two groups – 64 participants in the foot reflexology group (intervention) and 64 in the light foot massage group (control). Data collection took place over 4½ months between 26 July and 9 December 2004. Ethics approval was obtained from both the university and hospital ethics committees.

Prior to randomization, participants were asked to complete a demographic data questionnaire and the World Health Organization Quality of Life-BREF (WHOQOL-BREF) (World Health Organization 1996) questionnaire. Blood was drawn to test LDL cholesterol and triglyceride levels. Using an intervention protocol based on previous literature (Byers 2001), participants in the foot reflexology group received their usual medical treatment and a 50-minute foot reflexology treatment twice a week for four weeks. Participants in the light foot massage group received their usual

medical treatment and a 30-minute light foot massage session without pressure on specific reflexology areas twice a week for four weeks. Blood pressure was recorded before and after each treatment. At the end of the study, participants were asked to complete the WHOQOL-BREF (World Health Organization 1996) again and blood was once more drawn to test LDL cholesterol and triglyceride levels.

Data analysis

An independent samples t-test followed by analysis of covariance was used to test for difference in mean diastolic blood pressure between treatment groups both unadjusted and adjusted for baseline values respectively. Descriptive statistics were used to present the demographic data.

Results

Demographic data

Control and intervention groups were similar in gender, age, educational background, economic factors, lifestyle characteristics, co-morbidities and medical treatments.

Demographic data which were substantially different between groups were marital status, the length of time experiencing hypertension and the length of time having treatment for hypertension. The study showed that fewer participants in the foot reflexology group (57.8%) were married than in the light foot massage group (70.3%). The foot reflexology group also had a higher rate (32.8%) of 'divorced/separated/widowed' compared with the light foot massage group (20.3%). Participants in the light foot massage group had almost nine times the number of participants who had had hypertension for more than 15 years, and almost eight

times the number of participants who had been having treatment for hypertension for more than 15 years, compared with those in the foot reflexology group.

Outcome variables

For both the unadjusted and adjusted analyses, there was no statistically significant difference between treatment groups post-intervention.

Conclusions

The results from this study did not support the claim that foot reflexology can decrease blood pressure, LDL cholesterol and triglyceride levels. Similarly, there was no evidence that it could improve the quality of life in patients with hypertension.

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.

Candidate:

.....

Jeranut Somchock

Acknowledgements

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

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

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

Dr Adrian Esterman and Ms Lesley Cuthbertson, my co-supervisors for advice and encouragement.

Col Thanom Supaporn, MD, my co-researcher in Thailand, and officers at the Phramongkutklao Hospital especially in the medical outpatients department, for giving me assistance and friendship.

Mrs Anong Payungwong and Mr Wongsilp Cheiwchengchon, Thai masseurs, for being my research assistants.

Ms Susan Arthure for her patience in editing my work.

Finally, my mom and dad, my big family in Thailand, and also my boyfriend for being by my side always.