

5. Discussion and conclusion

5.1 Introduction

This chapter discusses the results gained from the study and the literature in relation to the research hypotheses. It details the conclusions reached from the results, and makes recommendations for future research.

5.2 Primary hypothesis

Null hypothesis: there is no difference in mean blood pressure level between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

Alternative hypothesis: there is a difference in mean blood pressure level between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

Analysed data using independent t-test (unadjusted mean) indicated that there was not a statistically significant difference in mean blood pressure between the foot reflexology group and light foot massage group at the end of four weeks of treatment. After careful adjustment for confounding variables by using analysis of covariance (adjusted mean), however, the mean diastolic blood pressure in the light foot massage group (73.4 ± 1.1) was statistically significantly lower than in the foot reflexology group (73.6 ± 1.1) ($p = 0.049$). Clinically however, the difference of 0.2 mmHg is meaningless.

These blood pressure results are very similar to those outlined by Frankel (1997) who found that, between foot reflexology and foot massage, there was no significant

difference in resting blood pressure after intervention. Frankel also explored the effects of foot reflexology on the baroreceptor reflex, which controls blood pressure. He found that baroreceptor reflex sensitivity was significantly lowered in the intervention groups (foot reflexology and foot massage), compared with the control group. Baroreceptor reflex sensitivity was measured using sinus arrhythmia and phase IV of the Valsalva manoeuvre, a period in the Valsalva manoeuvre during which blood pressure is substantially raised above the baseline (The American Heritage Stedman's Medical Dictionary 2002).

Frankel's study and this study shared some similarities in structure: using the Ingham method for foot reflexology and working within a 45 minute session all over the feet; providing foot massage as a comparison intervention. There were also some differences between the two studies: this study carried out the intervention in patients with hypertension twice a week for four weeks, whereas Frankel carried out his intervention in patients without hypertension only twice in each subject; Frankel's sample size was much smaller – 10 in the foot reflexology group, 10 in the foot massage group, and 4 in the control group, whereas this study had more participants – 64 in the foot reflexology group, and 64 in the light foot massage group.

The results of this study did not support the hypothesis that foot reflexology decreases blood pressure in patients with hypertension. In this study, the results in relation to blood pressure and LDL cholesterol are comparable to those of Park and Cho (2004) who found in their research that there were no significant differences in diastolic blood pressure and LDL cholesterol between the foot reflexology group and the control group (who received no intervention). In contrast with this study,

however, Park and Cho found that systolic blood pressure and triglyceride levels significantly decreased in their foot reflexology group compared to their control group. In addition, life satisfaction was significantly improved in the foot reflexology group.

Compared to Park and Cho's study (2004), this study was performed using a bigger sample size and with light foot massage as a comparison intervention (Park and Cho provided foot reflexology only in a small group of 34 hypertensive patients – 18 in the foot reflexology group and 16 in the control group who received no intervention). From both studies, we can conclude that foot reflexology has not been proved to lower diastolic blood pressure and LDL cholesterol. However, its effects on triglycerides and quality of life or life satisfaction in patients with hypertension are ambiguous.

This study showed (at a statistically significant level, although not at a clinically significant level) that light foot massage was more likely to reduce diastolic blood pressure than foot reflexology. Previous studies supporting these results were a study by Hayes and Cox (1999) and another by Jirayingmongkol *et al.* (2002) However, these two studies used different measurement and foot massage procedures to test blood pressure. Hayes and Cox (1999) used mean arterial blood pressure as an indicator of measurement of physiological and psychological stress in patients in a critical care unit. They found that there was a significant decrease in heart rate, mean arterial blood pressure and respirations during the foot massage intervention in participants in the foot massage group compared to those in the control group who received no intervention. Jirayingmongkol *et al.* (2002) used Thai foot massage

which is quite different in style and procedure from the current study to measure vital signs in older subjects. They found that Thai foot massage significantly decreased blood pressure, pulse rate and respiratory rate in these people. Given the differences in measuring, procedures and samples, we can not conclude that foot massage can lower blood pressure in patients with hypertension.

From the previous studies and the current study, the null hypothesis is confirmed – there is no difference in mean blood pressure level between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

5.3 Secondary hypothesis one

Null hypothesis: there is no difference in mean LDL cholesterol and triglyceride levels between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

Alternative hypothesis: there is a difference in mean LDL cholesterol and triglyceride levels between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

In this study, the results showed no significant difference in mean LDL cholesterol and triglyceride levels between groups at the end of four weeks of treatment. In contrast, a study by Park and Cho (2004) showed a significant decrease in triglyceride levels in participants in the foot reflexology group compared to those in the control group who received no intervention. The same study showed that LDL cholesterol in both groups was not significantly decreased. Bearing in mind the limitations of Park and Cho's study as discussed earlier, we can not assume that foot

reflexology can decrease LDL cholesterol and triglyceride levels in patients with hypertension.

In summary, the null hypothesis is confirmed, that is there is no difference in mean LDL cholesterol and triglyceride levels between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

5.4 Secondary hypothesis two

Null hypothesis: there is no difference in mean quality of life between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

Alternative hypothesis: there is a difference in mean quality of life between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

Results from this study showed no significant difference in mean quality of life for both groups. These results differed markedly from study results of Park and Cho (2004) and Hodgson (2000). Park and Cho (2004) showed that foot reflexology significantly improved life satisfaction in 34 patients with hypertension. Compared to the current study, however, different tools were used to measure quality of life, and the sample size was much smaller, limiting the ability to reach any meaningful statistical conclusions or generalize to a wider population. This study, with a more robust design, did not support Park and Cho's (2004) conclusions.

Similarly, Hodgson (2000) found that foot reflexology could improve quality of life. However, Hodgson's study was based on cancer patients and is difficult therefore to compare with the effects of foot reflexology on quality of life in patients with

hypertension. In addition, the sample size in her study was small – only twelve subjects including six in the foot reflexology group, and six in the gentle foot massage group. Hodgson used the visual analogue scales for cancer patients to measure quality of life, as contrasted from the current study's use of the WHOQOL-BREF (World Health Organization 1996) which is suitable for use with people who have a general chronic disease.

In conclusion, the null hypothesis is confirmed; there is no difference in mean quality of life between the foot reflexology and light foot massage groups at the end of four weeks of treatment. The evidence relating to foot reflexology, quality of life and patients with hypertension did not indicate that foot reflexology can improve quality of life in patients with hypertension.

However, the results from open-ended questionnaire (Table 4.8 in Chapter 4) showed the benefits from these complementary therapies. These results could well reflect the real benefits of foot reflexology and foot massage – to help people feel more comfortable and relaxed, and improve blood circulation in the feet. The results are supported by a study by Long, Huntley & Ernst (2001) who surveyed 223 complementary/alternative medicine organizations about the benefits of complementary therapies, including reflexology and massage. There was a 34% response rate to their survey, and the results showed that both reflexology and massage were suitable treatments for relieving stress or anxiety, headaches or migraines, and back pain.

5.5 Summary

In summary, in this study all null hypotheses were confirmed:

1. There is no difference in mean blood pressure level between the foot reflexology and light foot massage groups at the end of four weeks of treatment.
2. There is no difference in mean LDL cholesterol and triglyceride levels between the foot reflexology and light foot massage groups at the end of four weeks of treatment.
3. There is no difference in mean quality of life between the foot reflexology and light foot massage groups at the end of four weeks of treatment.

5.6 Limitations of the study

1. *Setting*: with limited space, we were unable to have a private room to carry out the treatments. Treatments were provided in rooms at the outpatient department where many patients came to see doctors. Sometimes it was quite noisy. These factors might make it difficult for participants to feel relaxed and therefore achieve the desired effect.
2. *Different reflexology methods*: this study used the Ingham method of foot reflexology – ‘the original western modern foot reflexology method’ (Dougans 2001). Other studies may have used different methods, eg the eastern foot reflexology method from China, and returned different results.
3. *Different operators*: two therapists trained in foot reflexology provided the treatments for patients. Although they both used the same procedures, it is possible that slight differences in technique may have led to inconsistent results.
4. *Differences between groups*: because this study used a randomized controlled trial design, we could not select participants with equal characteristics for each

group eg the duration of hypertension and the length of time receiving treatment for hypertension was substantially longer for participants in the light foot massage group than for those in the foot reflexology group. This might affect self-care administration of medication to control blood pressure and serum lipids, and also might affect quality of life.

5. *Duration of treatment:* treatments took place twice a week for four weeks. Results might show a positive effect of foot reflexology on blood pressure if treatment was performed over a longer period of time.
6. *Treatment received in tandem with this study:* participants in the study continued to receive their usual medical treatment while the study interventions took place. In addition, lifestyle modifications were practised by individuals. These factors might limit the outcomes related to the study treatments.
7. *Outcome measures:* a standardised tool validated for this setting and populations, such as the WHOQOL-BREF (World Health Organization 1996), might not be sensitive enough to show the positive relationship between a provided complementary therapy and quality of life.

5.7 Conclusion and recommendations

This study did not support the claim that foot reflexology can reduce blood pressure, LDL cholesterol and triglyceride levels in patients with hypertension, or that foot reflexology could improve quality of life in these patients.

Future research, which addresses the limitations of this study, could continue the investigations of these claims.

Further, some experts on complementary and alternative medicine (Broom, Barnes & Tovey 2004) suggest that it might not be suitable to use only one methodology for complementary and alternative medicine research. Qualitative research might be used in combination with quantitative research to determine details of patients' feelings, interactions, attitudes, cultural influences and satisfaction after intervention. It is recommended that future research in this field combines both methodologies.