

A Literature Review: Effectiveness of Swedish Foot Massage Therapy on Quality of Sleep in Elderly with Essential Hypertension

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ABSTRACT

Background: Aging processes in the elderly lead to degenerative diseases, one of them being essential hypertension. The elderly with hypertension often complains about sleeping problems, difficulty staying awake, often waking up in the middle of the night, and later difficulty going back to sleep, waking up too early, and sleeping poorly. Treatment of sleeping problems may include pharmacology and non-pharmacology. One nonpharmacological treatment was a complementary therapy called foot massage with Swedish techniques. The purpose is to determine the effect of Swedish foot massage therapy on sleep quality in the elderly with essential hypertension. **Method:** Literature Review. Data Sources: Science Direct, Springer Nature, Hindawi, Researchgate, and Sinta. The research method used is Literature Review with the PICO Analyst method (Problem, Intervention, Comparison, and Outcome) from 2011 to 2021 with the keywords "Swedish foot massage" AND "sleep quality" AND "hypertension". Based on the purpose of this study, the researcher reviewed 256 articles, and 251 were excluded. **Results:** Based on the results of the analysis of 5 journals, the duration of the research intervention varies widely, ranging from 2 days to 1 month. The average frequency of an intervention is 1-2 times a day. The duration of each meeting ranges from 20-40 minutes. **Conclusions:** Based on the results of the analysis of 5 journals, the intervention of Swedish foot massage therapy significantly improves the sleep quality of hypertensive patients. The researchers recommend Swedish foot massage therapy to improve the quality of sleep for people with essential hypertension.



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Introduction

The highest number of elderly people in Indonesia is in the Yogyakarta province. Based on data from the Central Statistics Agency shows four provinces with the highest percentage of the elderly population, namely Yogyakarta (13.6%), Central Java (11.7%), East Java at 11.5%, and Bali at 10.4%. Bantul is an area that has the most elderly people in the Yogyakarta province. Based on 2013 data, the number of elderly people in Bantul Regency is 162,518 people [1]. With the increasing number of elderly people, the life expectancy of the elderly in Indonesia has also increased from 68.6 years in 2004 to 73 years in 2015 [2].

According to the World Health Organization (WHO), the elderly is someone who has entered the age of 60 years and over. The aging process is a natural process by humans where in the elderly there is a natural decline or change in physical, psychological, and social. One of the physical changes in the elderly during the aging process is change in the cardiovascular system, which resulted in the development of degenerative diseases. Based on the measurement results, the common diseases

suffered by the elderly are hypertension, arthritis, and stroke, whereas hypertension is rank first as the most common disease found in the elderly [3]. The prevalence of hypertension tends to increase every year. Data from [3] showed that the national prevalence of hypertension is 26.9%, with the proportion of cases diagnosed with hypertension by health workers reaching 35.4% and essential hypertension reaching 80-95% [7]. The prevalence of essential hypertension in the elderly in Indonesia is between the ages of 65-74 years (57.6%) and >75 years (63.8%) [8].

In the United States (US), hypertension-related cardiovascular disease death rates are increasing [4]. In middle-aged and older Americans, elevated mortality was observed for conditions with a contributing cause of hypertension including chronic obstructive pulmonary disease, diabetes, Alzheimer's, and Parkinson's. Geographically, increases in Average Annual Percent Change (AAPCs) and mortality rates were observed for 25/51 States between 2011 and 2016. There was a notable acceleration in the AAPC of hypertension mortality between 2011 and 2016 (2.7% per year). This increase was due to a significant uptick in mortality for individuals >55 years of age with the greatest AAPC occurring in individuals 55-64 (4.5%) and 65-74 (5.1%) years of age [5]. In Indonesia, 60% of individual with hypertension ends up with a stroke, and 40% with heart disease, kidney failure, and blindness [6].

In fact, hypertension can be prevented with several methods. Increasing physical activity and reducing body weight in individuals with overweight or obesity reduced the risk of hypertension, but further evidence is needed on the long-term efficacy of this strategy. Sodium intake restriction reduces blood pressure, particularly in patients with hypertension, and the Dietary Approaches to Stop Hypertension (DASH) diet is the most effective dietary approach to prevent hypertension and reduce blood pressure in individuals with pre-hypertension or hypertension. Shift work, short sleep duration or poor sleep, and other forms of circadian disruption might increase the risk of hypertension [9]. Bioactive compounds that occur in small quantities in foods such as onions, fish, and red wine are being intensively studied to uncover their vasoprotective, antioxidant, anti-proliferative, and anti-inflammatory effects which are beneficial to attenuate chronic disease and protect human health [10].

Hypertension in the elderly triggers various problems that can interfere with health, including sleep quality disorders. A study [11] showed that 63.93% of elderly patients with hypertension had sleep disorders. Sleep disorders are more experienced in people with hypertension than people with normal blood pressure when identified with the PSQI questionnaire. Thus, complaints of sleep problems that affect poor sleep quality in hypertensive patients can pose a risk of stroke and heart complications [12]. Disruption of the quantity and quality of sleep causes discomfort and interferes with the desired quality of life. Lack of sleep quality causes the elderly to have difficulty sleeping, difficulty staying awake, often wake up in the middle of the night then have difficulty going back to sleep, wake up too early, and don't sleep well [13]. These conditions thus decrease the quantity of sleep, which is the overall sleep time of an individual [14]. Furthermore, a study has identified a strong correlation between potassium levels and REM sleep in men ($r = 0.158$, $p = 0.028$). Low potassium levels may disturb the homeostasis of the sleep architecture, and gender may interfere with their links in the hypertensive population [15]. Lack of sleep can also cause decreased cognitive function, increased depression and anxiety, difficulty in mobility, and increased risk of falling to the risk of death [16]. The resilience factor, indicated by the Index of Self-Regulation of Emotion (ISE) and religious health beliefs, emerged as the strongest independent predictor of sleep disturbance for the African population [17].

Good sleep quality can be achieved through pharmacological and non-pharmacological treatment. Non-pharmacological therapy is an option because it is cheaper and more effective than pharmacological therapy, whereas pharmacological therapy can cause side effects such as dizziness, hypotension, respiratory distress, and recurrence of the disease after discontinuation of the drug [18]. One form of non-pharmacological therapy is complementary therapy. Complementary therapy is an additional therapy to help conventional therapy. Complementary therapies are categorized into 5: herbs, mind-body techniques, massage, magnetic field therapy, and ancient medical systems [19].

Study reported that massage therapy with lemongrass can reduce insomnia in the elderly [20]. One of the non-pharmacological therapies that can be applied to improve sleep quality is Swedish

Foot Massage, a combination of Swedish massage and foot massage. Swedish massage is the manipulation of body tissues with special techniques. Swedish massage technique consists of a combination of five 6 basic movements, namely: effleurage, petrissage, tapotement, friction, and vibration [21]. Foot massage is defined as massage therapy and reflexology on the feet. Foot Massage can provide a relaxing effect, reduce anxiety, and physical discomfort, and increase sleep in a person so that it can restore muscle tension and increase blood circulation [22]. It is stated that Swedish foot massage is a long and smooth massage therapy on the feet with the Swedish technique.

Materials and Method

This study is a literature review, while the strategy in searching for articles uses the following steps: 1) Determine the framework used. The PICOS framework was used to search for articles, the PICOS in this study was described as follows: Population/ problem: Elderly with essential hypertension, Intervention: Swedish foot massage, Comparison: No comparison of interventions, and Outcome: Sleep quality. 2) Keywords. The keywords used in this study were “Swedish foot massage” “sleep quality” AND “hypertension”. 3) Database or Search engine Secondary data sources in the form of articles or journals relevant to the topic through the following five databases: Science Direct, Springer Nature, Hindawi, Research Gate, and Sinta (Figure 1). This article was conducted by reviewing relevant research articles between 2011 to 2021 on the topic through the search engine.

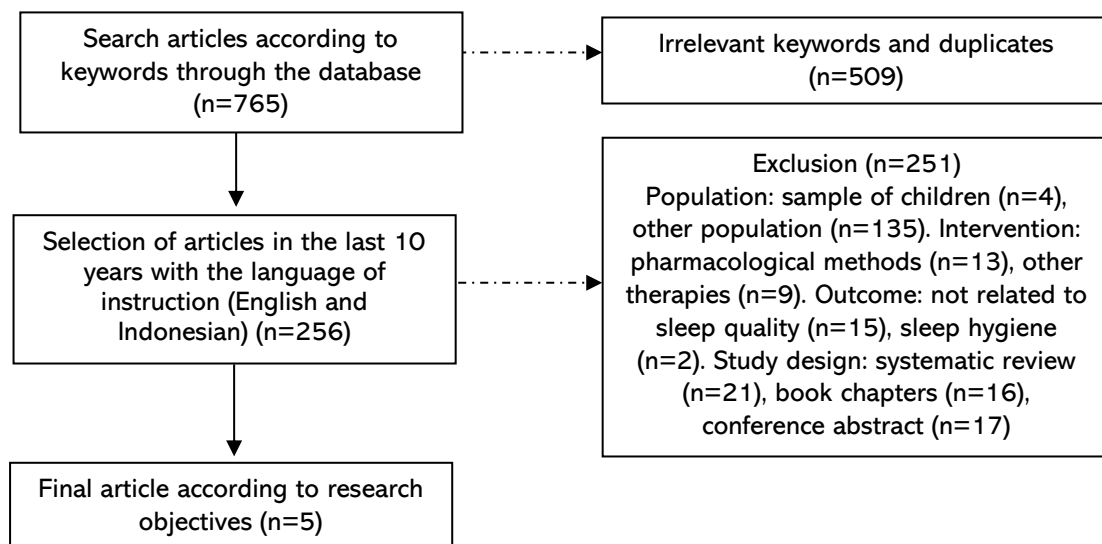


Figure 1. Flowchart for the Keywords Used in the Literature Review

Results and Discussion

Results

In total, there were 765 articles found using the relevant keyword for screening. After published year filtering (10 years), removing the duplicates, a title, and abstract screening, and removing the exclusion criteria, there were 5 articles reviewed (Table 1).

Table 1. The Article Included Based on the Inclusion Criteria

Keywords	N
“Swedish foot massage” “sleep quality” AND “hypertension”	5

The population used in these 5 research journals varies widely, including patients in hospitals, social protection centers, posyandu, and health centers. The total number of respondents used in each study is in the range of 8-90 people. Sample inclusion and exclusion criteria varied widely, based on the specific objectives of each study. The majority of studies provide interventions to the control group (12, 23, 25). The 5 research results that have been reviewed, prove that the majority of observations in the intervention group are better than those in the control group (12, 23, 25).

The tools used in the intervention were a sphygmomanometer to measure blood pressure and the Pittsburgh Sleep Quality Index (PSQI) questionnaire, Richard Campbell Sleep Questionnaire (RCSQ), and St. Mary's Hospital Sleep Questionnaire (SMHSQ). Of the 5 research journals analyzed, the majority of research interventions were provided by competent and trained people (12, 23, 25). The duration of the research intervention varies widely, ranging from 2 days to 1 month. The average frequency of an intervention is 1-2 times a day. The duration of each meeting ranges from 20-40 minutes. More details can be seen in Table 2.

Table 2. Effect of Foot Massages Therapy on Quality of Sleep in Patients with Hypertension

Authors	Study Design	Title	Findings
Arslan, G., Ceyhan, Ö. & Mollaoğlu, M. (2021)	A randomized controlled study (n=90)	The influence of foot and back massage on blood pressure and sleep quality in females with essential hypertension: a randomized controlled study	Females with essential hypertension have applied a total of six sessions of 30 min of foot and back massage twice weekly for 3 weeks. Data were collected through personal data form (PDF) which included descriptive characteristics, Pittsburgh Sleep Quality Index (PSQI). Six sessions of foot massage and back massage were detected to lead to a reduction in systolic blood pressure (SBP) and diastolic blood pressure (DBP) values and the difference was statistically significant ($p < 0.001$). A strong statistical difference was found between the mean pretest-posttest scores of overall and sub-dimensional scores of PSQI in females in the intervention group ($p < 0.001$).
Zheng LW, Chen Y, Chen F, Zhang P, Wu LF (2014)	Quantitative-experimental two groups pretest posttest with control group (n=75)	Effect of acupressure on sleep quality of middle-aged and elderly patients with hypertension	All subjects received conventional treatment and health guidance. The experimental group also received acupressure treatment. The score of PSQI (Pittsburgh Sleep Quality Index) and blood pressure was measured and recorded before and after the treatment. After the intervention, the systolic (SBP) and diastolic blood pressure of the experimental group decreased significantly ($p < 0.01$). There was a significant difference in SBP between the groups ($p < 0.01$). After four weeks of intervention, the total PSQI score in the experimental group was significantly lower compared to the control group ($p < 0.01$).
Afianti N, Mardhiyah A (2017)	Quantitative-experimental two groups pretest posttest with control group (n=24)	The Effect of Foot Massage on the Sleep Quality of Patients in the ICU	The sleep quality instrument uses the Richard Campbell Sleep Questionnaire (RCSQ). Data were analyzed by paired t-test and unpaired t-test. The results showed that in the control group there was no significant difference in the mean sleep quality score ($p = 0.150$), while in the treatment group, there was a significant difference in the mean sleep quality score ($p = 0.002$). As for the difference in sleep quality scores in the control group and the treatment group, there was a significant difference ($p = 0.026$).
Ariani, D., & Suryanti, S (2019)	Quantitative-experimental two groups pretest posttest with control group (n=40)	The Effect of Food Massage on Sleep Quality in the Elderly at Panti Wredha Dharma Bakti Kasih Surakarta	Sleep quality instrument used Richard Campbell Sleep Questionnaire (RCSQ). Data were analyzed by paired t-test and unpaired t-test. The results showed that there was no significant difference in sleep quality. While in the treatment group, showed that there was a significant difference in sleep quality. There was a significant difference in sleep quality score in the control group and treatment group.
Ritanti R, Sari DA (2020)	Quantitative-experimental one groups pretest posttest (n=8)	Swedish Massage as an Innovation Nursing Intervention in Lowering Blood Pressure in Hypertensive Elderly	Data analysis uses Paired Sample T-Test. Results: the study showed a significant effect between Swedish massage with a decrease in blood pressure before and after the intervention (p -value = 0.000). Researchers recommend that Swedish Massage therapy nursing interventions can be used as an effective and efficient way of handling non-pharmacological hypertension at home.

Discussion

Massage is a non-pharmacological treatment effort by applying pressure or massaging the body tissues. The effect of foot massage on blood pressure is to stimulate pressure receptors under the skin, increase vagal activity, and reduce cortisol, causing many effects including lowering blood pressure. Swedish Foot Massage is a massage that is carried out with Swedish techniques. The massage carried out will manipulate body tissues with special techniques starting from a foot massage and ending with a foot massage responding to foot nerve sensors which then massage on this foot increases serotonin and dopamine neurotransmitters whose stimulation is transmitted to the hypothalamus and produces Corticotropin Releasing Factor (CRF) which stimulates the pituitary gland to increase the production of Pro-opioid melanocortin (POMC) and stimulates the adrenal medulla to increase the secretion of endorphins that activate the parasympathetic so that vasodilation occurs in vessels and facilitates blood flow thereby helping tense muscles to relax so that the RAS is stimulated to release serotonin and help stimulate sleep and stimulate sleep, thus improving sleep quality [22].

Research conducted by [25] revealed that a total of six sessions of foot and back massage for 30 minutes performed twice a week for three weeks can reduce systolic and diastolic blood pressure and improve sleep quality. Foot and back massages are effective in reducing blood pressure and improving sleep quality. Massage given in a short time and only on the legs can stimulate blood circulation which can make the patient's mood comfortable, and relaxed, and have a positive influence that will affect the patient's sleep quality. Foot massage intervention was performed on patients in the ICU before going to bed for 2 consecutive days with 10 minutes of massage for each foot. These results indicate a higher sleep quality score after being given foot massage treatment. This is supported by a significant difference in the initial pretest score between the control group and the intervention group where the intervention group has a lower sleep quality score than the control group sleep quality score, this shows that foot massage has a strong influence in helping improve the sleep quality of patients in the ICU [22]. Foot reflexology massage can effectively reduce pain anxiety levels and improve sleep quality and quantity of patients with burn injuries; therefore, this non-pharmacological therapeutic method is recommended to be used in burn ICUs [26]. In this study, 150 subjects were randomly allocated into 1) massage, 2) aromatherapy massage, and 3) control. In the massage group, the subjects received hands and feet massage using sweet almond oil. In the second group, the massage was performed on the same areas using a mixture of lavender and sweet almond oil. There was a significant difference between the mean scores of PSQI before and after the intervention in the intervention and control groups, but this difference was not statistically significant between the two intervention groups. Massage and aromatherapy massage can improve sleep quality in cardiac patients [27]. The studies showed that foot reflexology interventions were not much effective in the reduction of blood pressure among patients with hypertension [28].

Massage with the Swedish technique can reduce blood pressure [24]. Swedish massage is carried out with the Swedish technique with 4 massage movements, namely effleurage (stroking), petrissage (kneading), friction (rubbing), and tapotement (tapping). The average meeting duration is 20-30 minutes for one meeting. with a frequency of meeting 3 times a week. The results showed that the measurements of the two groups of blood pressure before and after the intervention were analyzed using the Sample Paired T-Test showing a significant difference between the results of the measurement of systolic and diastolic blood pressure before and after the Swedish massage therapy. Likewise, the elderly who often experience sleep quality disorders can be treated with massage therapy based on research [23]. Reflexology and Swedish massage, as complementary methods, can improve the restless leg syndrome and sleep quality of patients undergoing hemodialysis. However, foot reflexology massage had been more effective [29]. After a foot massage, 45% of them already have good sleep quality and 55% still have poor sleep quality. This study indicates that there is an effect of massage therapy on sleep quality in the elderly because the number of elderly who experience poor sleep quality has decreased. The cause of respondents still having poor sleep quality is anxiety, they still have sleep duration. Meta-regression reveals that an increase in total foot reflexology time ($p=0.002$) and duration ($p=0.01$) can significantly improve sleep quality. Foot

reflexology may provide additional non-pharmacotherapy intervention for adults suffering from depression, anxiety, or sleep disturbance [30].

Based on 5 studies that have been analyzed, show that foot massage therapy in research [25] can improve sleep quality in hypertensive patients. In research [22] [23] foot massage can improve sleep quality. In a study [12] massage therapy using acupressure techniques showed that after the intervention there was a decrease in blood pressure and an increase in sleep quality in the elderly. Massage techniques using Swedish research [24] the results show that there is a significant effect between Swedish massage and a decrease in blood pressure after massage with Swedish techniques. Thus, Swedish foot therapy, which is foot massage therapy using Swedish techniques, can improve sleep quality in the elderly with hypertension.

Conclusion

Based on the results of the analysis of 5 research journals, Swedish foot massage therapy is recommended to be applied by the community and health workers to treat sleep disorders in patients with hypertension. This intervention has several advantages, namely non-pharmacological methods in the form of complementary therapies that can be done independently at home, do not cost money, are short, safe, and effective in improving sleep quality in hypertensive patients.

Declaration

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Conflicts of Interest: The authors declare no conflict of interest.

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