

Effects of Warm Water Foot Soak Therapy on Blood Pressure in Hypertension Sufferers: A Narrative Review

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Abstract : Soaking feet in warm water is a combined therapy method of thermotherapy and hydrotherapy which functions to release histamine and bradykinin. The release of histamine and bradykinin causes vasodilation of blood vessels. Research objective: to identify the effect of soaking feet in warm water on reducing blood pressure. This research is a quantitative research method Narrative Reviews . Research design of the 9 journals used are design Randomised controlled Trials (RCTs) . The sampling technique and the number of samples used various variety. Results: From 9 studies, the average p-value was <0.05. p-value of diastolic blood pressure is 0.00 and p-value of systolic blood pressure is 0.00. Warm water therapy can be included in the complementary therapy group of care for people with hypertension. However, the temperature and duration of soaking feet in warm water must be considered to avoid hypotension or low blood pressure.

Keywords: Foot Bath Therapy , Thermotherapy , Hydrotherapy , Hypertension , Blood Pressure

INTRODUCTION

In Indonesia, the number of hypertension cases is rising every year. Management pharmacology as antihypertensive and non- pharmacological has endeavored. Non- pharmacological implementation held to decrease effect side pharmacology from case hypertension. one _ non - pharmacological therapy that has been conducted is with implementation therapy soak feet in warm water. Soak your feet in warm water Becomes innovation for the lower effects side from antihypertensive and also as therapy relaxation in the suffering patient hypertension. Based on a number of study therapy warm water relaxation this capability lowered pressure blood systolic and diastolic in the patient hypertension.

Hypertension is a condition where there is a change in the structure and function of the circulatory system so that the systolic blood pressure is ≥ 140 mmHg and the diastolic blood pressure is ≥ 90 mmHg . (World Health Organization, 2021). There are two types of hypertension, namely primary hypertension and secondary hypertension. Secondary hypertension is caused by other accompanying diseases such as kidney failure, hormonal disorders, and neurological diseases, while primary hypertension is caused by heredity and environmental factors (Kumar et al., 2019). ACC/AHA (American College of Cardiology / American Heart Association) defines hypertension stage 1 as individuals with risk of high cardiovascular disease (CVD). (Wu et al., 2022).

Journey disease hypertension is very slow. Sufferer hypertension possibly does not show symptoms during years. This latent period envelops development disease until significant organ damage. When there are symptoms that are usually non- specific, for example sick head and dizziness. If hypertension is permanent, not known and not treated, resulting in death why sucks heart, infarction myocardium, stroke, or failed kidney. Non - pharmacological treatment of effective interventions could support lower total morbidity and mortality) (Price & Lorraine, 2015). Treatment hypertension develops in a manner significant from time to time. Focus treatment hypertension is characteristic of patients and target rate pressure must be blood _ lowered to avoid risk cardiovascular disease (CVD).

Decline level pressure blood can use pharmacology or non- pharmacology. Already many non-pharmacological techniques have gone through the testing process and some still controversy (Flack & Adekola Bemi, 2020).

According to data from the *World Health Organization* (WHO) the death rate caused by cases of hypertension and its complications is increasing every year and in 2019 hypertension is the first cause of death in the world. In 2015 there were around 1.12 billion people suffering from hypertension in the world. It is estimated that by 2025 there will be an increase of 1.5 billion people suffering from hypertension. In the *United State of America* in 2017 the death rate due to hypertension and its complications was ranked first (WHO Mortality Database, 2019).

According to Indonesian Basic Health Research (Risikesdas) data, the prevalence of hypertension cases is increasing every year. In 2013, the prevalence of hypertension was around 25.8%. However, in 2018 the prevalence of hypertension increased to 34.1%. This shows that there has been an increase of 8.3% in the last 5 years. According to the Ministry of Health, only one third of hypertension cases have been diagnosed and the rest have not been diagnosed. The highest number of cases of hypertension was in urban areas, namely 364,630 people and the rest were in rural areas, namely 192,220 people (Tim Risikesdas, 2019).

According to data from the Social Security Administrative Body (BPJS) for Health, in 2016 BPJS spent a budget for hypertension cases of 2.3 trillion Rupiah. In 2017 this figure has increased to 3 trillion Rupiah. But in 2018 this figure settled at 3 Trillion Rupiah. This data can be used as material for evaluating health workers in Indonesia by innovating hypertension control through pharmacology and non-pharmacology (Kementerian Kesehatan Republik Indonesia, 2019).

The Indonesian government has sought pharmacological treatment as the main treatment for hypertension sufferers. However, most areas in Indonesia which are islands, mountains and waters experience difficulties in accessing health service facilities. Therefore, it is necessary to seek education related to non-pharmacological treatment that can be carried out by the community. One of the non-pharmacological therapies that can be chosen by the community is foot soak therapy in warm water.

Foot soak therapy with warm water is a combined therapy between hydrotherapy and thermotherapy (Arovah, 2016). Hydrotherapy is the therapeutic use of water for health purposes (Arovah, 2016; Bottomley, 2017). Thermotherapy is the application of heat to the body. Both have the benefit of reducing muscle tension and increasing blood flow by dilating blood vessels. Based on several research results, it is highly recommended to do warm water foot soak therapy to relax muscles and blood vessels (Arovah, 2016). Some of the results of these studies have proven that foot soak therapy with warm water can reduce blood pressure. This research was conducted to summarize the research results and obtain a qualitative statistical synthesis of the results. *Narrative Review* this combine a number of research and discuss influence therapy soak feet in warm water to change pressure blood in the patient with hypertension.

METHOD

The research method used in this review is *Narrative Reviews*. *The Narrative Review* method was used because this research combines several previous studies to make or produce research conclusions. The dependent variable of this study is blood pressure and the independent variable is warm water foot soaks. All data in this study uses tertiary data derived from research conducted in Indonesia and has been published in indexed publications. Researchers do not use research from outside Indonesia because researchers have not found similar articles.

This research collects and describes a number of studies with randomized research *design controlled Trials* (RCTs). The main objective is to trace the results of several experimental studies in Indonesian. All articles used in this study are *Original Empirical Research* because this research is the

result of actual observations or experiments. The writing structure of each research includes abstract, introduction, methods, results, discussion, and conclusions.

The search strategy for research articles uses databases at the Indonesian National Library such as *Google Scholar* and Indonesian Scientific Repositories. All research has been published on several publisher sites in Indonesia that have been indexed by Sinta. Keywords in finding articles are warm foot bath, hypertension, and blood pressure. Researchers use " AND " as a *Boolean operator* . *Boolean operators* are used to unify concepts and aspects that look different but aim to narrow down the search.

Inclusion data have been used to determine the criteria for *Narrative Review material* . The inclusion data in this study are as follows 1). Article with research design *Randomized Controlled Trials* (RCT), 2). Experimental research, 3). Original articles from Sinta indexed sources in Indonesia, 4). Indonesian, and 5). Using the Wilcoxon test with a confidence level of 95% ($\alpha= 0.05$). Exclusion data in this study include 1). Articles that are not soak feet in warm water, 2). Articles published over the last 5 years/before 2017, and 3). Articles related to *literature reviews* , *systematic reviews* or *meta-analyses*.

RESULTS

Search results article is a whole published journal _ in studies and published in a journal internationally reputable. There are 3.300 articles _ journal has published with part big design his research use design *Randomised controlled Trials* (RCTs). Sampling technique and amount of sample used enough variety. Temperature foot bath and length of foot bath not explained in detail. this _ possibility customized with power stand or response respondent body different respondents.

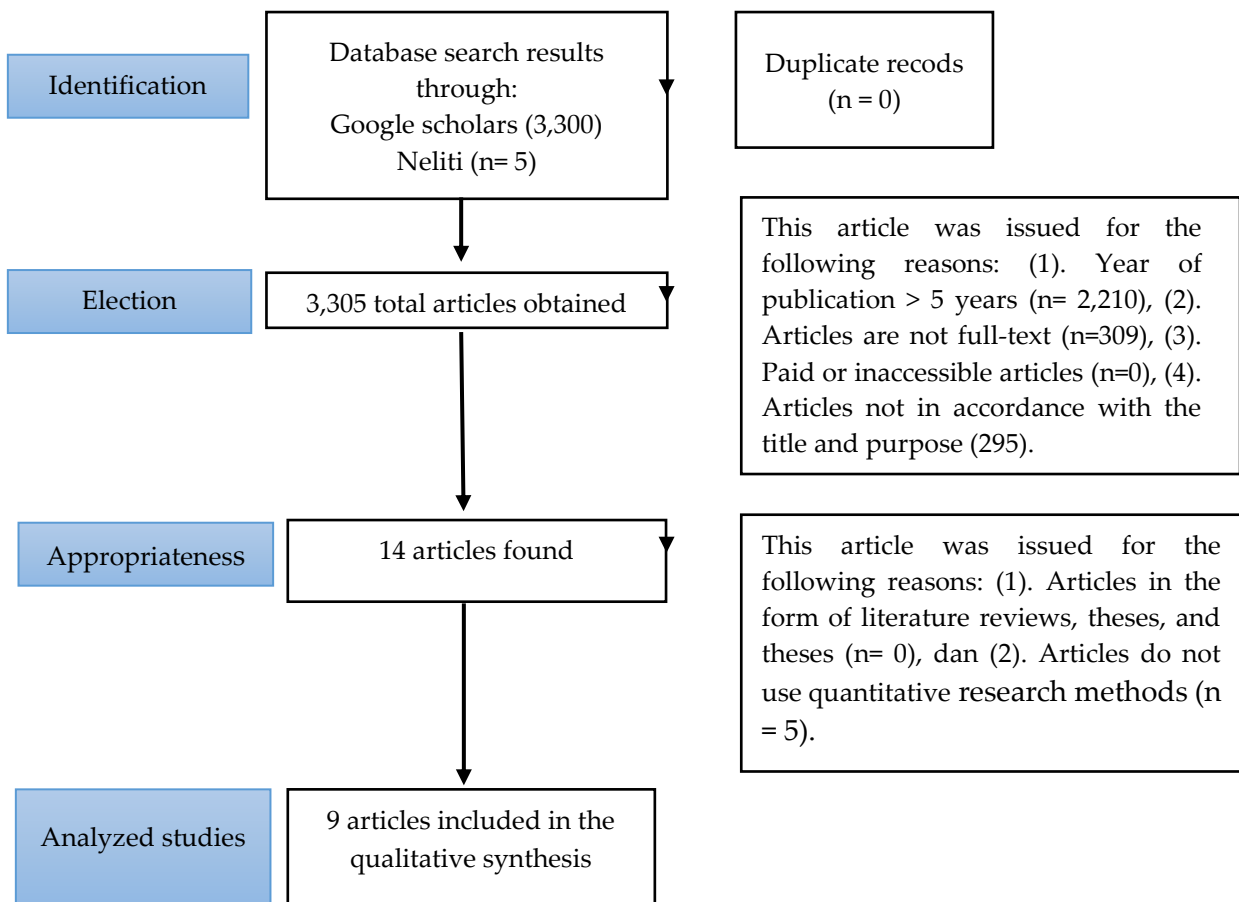


Chart 1. Procedure selection article in study review narrative

The identification process carried out in the previous stage resulted in 9 research articles which were included in the study. Research articles included within five years and below, starting from 2017, 2018, 2019, 2020, and 2021. All research was conducted in Indonesia, in the Indonesian language, and has been published in indexed publication places. Then an abstraction is carried out to provide information from each of the studies involved in this study.

Table 1 Distribution of the characteristics of respondents based on gender

No	Researcher	n	%	Man	%	Woman	%
1	(Nurpratiwi & Novari, 2021)	17	100 %	2	11.8 %	15	88.2
2	(Nazaruddin et al., 2021)	31	100	14	45.2	17	54.8
3	(Rina et al., 2020)	40	100	10	25	30	75
4	(Gunawan et al., 2017)	49	100	18	37	31	63
5	(Uyuun et al., 2020)	18	100	4	22.2	14	77.8
6	(Try Putra Parmana et al., 2020)	34	100	7	20.6	27	79.4
7	(Masi & Rottie, 2017)	17	100	7	41.2	10	58.8
8	(Anselmu Arianto Malibel et al., 2020)	30	100	13	43.3	17	56.7
9	(Arafah, 2019)	15	100	5	33.3	10	66.7
	Total	251	900	80		171	

Based on table 2 it can be seen that the distribution of respondents based on female and male gender is 251 respondents (900). There were 171 respondents (620.4%) of the female calamine type, more than the male sex, namely 80 respondents (279.6%). Where the difference between the sexes of women and men is 91 respondents (340.8%).

Table 2 Distribution of the characteristics of respondents by age

No	Researcher	Age
1	(Nurpratiwi & Novari, 2021)	26 -> 65 years
2	(Nazaruddin et al., 2021)	30 -70 years
3	(Rina et al., 2020)	50 -> 70 years
4	(Gunawan et al., 2017)	20 - 90 years
5	(Uyuun et al., 2020)	61 --> 70
6	(Try Putra Parmana et al., 2020)	Mature age, old age, and elderly
7	(Masi & Rottie, 2017)	40 -> 60 years
8	(Anselmu Arianto Malibel et al., 2020)	Most are aged 50-59 years
9	(Arafah, 2019)	45 -50 years

Based on table 3 it can be seen that the distribution of respondents by age is 26-90 years old. However, there were 2 studies that did not specifically mention the age of the respondents.

Table 3 . The effect of soaking in warm water on reducing blood pressure in hypertensive patients

No	Researcher	n	Diastolic <i>p-value</i>	Systolic <i>p-value</i>
1	(Nurpratiwi & Novari, 2021)	17	0.048	0.001
2	(Nazaruddin et al., 2021)	31	0.00	0.00
3	(Rina et al., 2020)	40	0.00	0.00
4	(Gunawan et al., 2017)	49	0.00	0.00
5	(Uyuun et al., 2020)	18	0.00	0.00
6	(Try Putra Parmana et al., 2020)	34	0.001	0.006
7	(Masi & Rottie, 2017)	17	0.00	0.00
8	(Anselmu Arianto Malibel et al., 2020)	30	0.00	0.00
9	(Arafah, 2019)	15	0.00	0.00

All Research included in the Narrative Review produces a *p-value* that is almost the same on average, namely <0.05 and it can be concluded that of the 9 studies used in *systematic this review* has a homogeneous value with heterogeneous data from each study. Based on the research data included in this study, it can be concluded that soaking the feet using warm water can lower blood pressure in people with hypertension.

DISCUSSION

Sual hot sensation given in general care. This sensation causes vasodilation (enlargement / widening of the cavity of the blood vessels) and increases blood flow to a certain area. But heat can also increase the delivery of oxygen, nutrients, and various blood cells to the body's tissues. Vasodilation also helps remove waste materials from tissues such as debris and phagocytosis. The purpose of implementing heat is 1). Relieve local pain, stiffness, or soreness, especially in muscles and joints, 2). Helps wound recovery, 3). Reducing inflammation and infection, 4). make shivering clients more comfortable, 4). Elevate body temperature to help maintain normothermia, and 5). Improves drainage i.e. draws infected material out of the wound (Rosdahi & Kowalski, 2014).

Heat therapy is the application of heat to the body to relieve pain associated with muscle tension But this therapy also can help widen blood vessels and increase blood flow to the skin. This is because heat therapy can relax or relax muscles and reduce joint stiffness. Heat therapy can be done alone at home. However, some types of heat therapy need surveillance or must be performed in a clinic or hospital (Arovah, 2016).

Don't use heat therapy in acute phase injuries because heat can increase blood flow and can increase blood flow swelling. For example, immersing the knee in an acute injury can cause pain, increasing swelling and slows down the healing process. In the early stages , it is advisable to use cold modality therapy (*cryotherapy* or *cold therapy*). therapy y) to reduce inflammation before applying heat therapy. Heat therapy is done when signs of inflammation subside . Heat therapy is not recommended

in tissues undergoing radiation therapy or those with cancer. Likewise, this therapy is also not recommended for use on individuals who have impaired nerve sensation such as people who have diabetes (to avoid burns) . Furthermore, this therapy is also not recommended for pregnant women because it can cause teratogenic effects (causing defects in the baby) (Arovah, 2016).

One effective treatment for heat therapy at home is soaking your feet in warm water. Foot soak therapy with warm water is a combination of thermotherapy and hydrotherapy which is effective for the process of vasodilation. This is evidenced by the results of several studies which have shown that foot soak therapy with warm water is effective for lowering blood pressure. Muscle stiffness caused by ischemia can be corrected by increasing blood flow to the inflamed area . The physiological effect of warm water immersion therapy is that during the chronic phase, heat works through several mechanisms. These mechanisms include: increasing temperature, increasing metabolism, decreasing PH , increasing capillary permeability, releasing histamine , and bradykinin which cause vasodilation of blood vessels (Arovah, 2016).

The rationale for soaking in warm water is to help dilate blood vessels to increase circulation and relax the feet and legs. The length of time you soak your feet varies. Soaking the feet in warm water in hypertensive patients aims to improve circulation, increase blood supply to the affected area, and provide medication. Soaking can be done in a washbasin if the body is small or in a tub if the body is large (Rosdahi & Kowalski, 2014).

Based on research results from the nine studies included in this study, it was found that soaking feet in warm water can lower blood pressure. However, it is necessary to pay attention to the temperature of the water and the duration of the soaking process to avoid contraindications, namely hypotension or low blood pressure. All clients must be closely monitored and assisted when awake. This is done to avoid injury from soaking feet in warm water (Rosdahi & Kowalski, 2014).

CONCLUSION

The results of the study indicate that soaking feet using warm water is a complementary therapy that can be done by people with hypertension in a manner independently at home . Therapy this function to induce a relaxing and vasodilatory effect on blood vessels. However, the temperature and duration of the warm water immersion process need to be a concern in order to avoid hypotension or low blood pressure. The results of this study are expected to be applied by nurses in providing comprehensive nursing care to patients with hypertension.

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