

Research Article

The Effect of Reflexology on the Blood Pressure Reduction

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Abstract: Background: The background of this study is the changes in the causes of death from infectious diseases to non-communicable diseases. One of the non-communicable diseases which become the dominant health problem in developed and developing countries is hypertension. Risk factors for increased blood pressure include age, heredity, smoking habits, excessive salt consumption, cholesterol, stress, and overweight or obesity. Reflexology is a practice of massaging specific points on the hands and feet, which gives a sense of comfort and helps relieve stress. Hypertension in the older person occurs due to the thickening of the arterial wall resulting in a buildup of collagen in the muscle layer, so that the blood vessels gradually constrict and become stiff. The constriction of the circulatory system results in an increase in blood pressure above normal values. Reflexology is a type of treatment that adopts the strength and endurance of the body by providing a massage. However, there is still insufficient research on reflexology to reduce hypertension in the elderly. **Purpose:** Purpose of this study is to describe and analyze the effect of reflexology before and after provided to hypertensive patients. **Methods:** This study was Quasi-experimental research using One-Group Pretest-Posttest design Without Control Group. The blood pressure was measured twice before and after Reflexology was performed to the patients with hypertension. The reflexology is performed in the feet, every morning after breakfast for around 20 minutes, for 6 days. This study was conducted at the Werdha Wening Wardoyo Nursing Home, Ungaran Semarang, Central Java. Inclusion criteria are the hypertensive elderly without medication. Exclusion criteria are hypertensive elderly with complications. The research instrument was a calibrated mercury sphygmomanometer. The data were analyzed using a Wilcoxon test, because the data are not normally distributed. **Results:** before given the therapy was 145.41 mg/dl, and after treatment was 134.32 mg/dl, and the average of diastolic blood pressure before therapy was 91.22 mg/dl and after was 82.70mg/dl. The data negative rank is 37 with $p\ 0,00 < 0.05$ of the error level. **Conclusion:** it means that there was an effect of the reflexology on the blood pressure reduction.

Keywords: Reflexology; smoking habits; Blood Pressure; cholesterol, stress.

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BACKGROUND

There has been a shift in the cause of death from infectious diseases to non-communicable diseases (Kesehatan, 2013). One of the non-communicable diseases which become the dominant health problem in developed and developing countries is hypertension. It is the sixth-most significant disease out of the top ten non-communicable diseases. The complications of hypertension can affect the kidneys, eyes, and heart (Junaedi, n.d.).

Hypertension in the older person occurs due to the thickening of the arterial wall resulting in a buildup of collagen in the muscle layer, so that the blood vessels gradually constrict and become stiff. The constriction of the circulatory system results in an increase in blood pressure above normal values of systolic pressure which is ≥ 140 mmHg, meanwhile, the diastolic pressure is ≥ 90 mmHg (Novitaningtyas,

2014). Reflexology is a type of treatment that adopts the strength and endurance of the body by giving a massage to the certain points of the body according to the therapeutic zone. (Putri, 2015). Hypertension is a disorder in the blood vessels which inhibit the blood flow to carry the supply of oxygen and nutrients to the tissues of the body. About 20% of the adult population carried hypertension, and more than 90% of them suffer from primary hypertension without any noticeable symptoms. (Chanif, 2017). Hypertension is a condition with unnoticeable symptoms, where abnormally high pressure in the arteries causes an increased risk of aneurysm stroke, heart failure, heart attack and kidney damage. (Triyanto, 2014). Up to now, hypertension replaces the position of cholera and tuberculosis which in the past became the leading cause of death for the people at an early age (Dewi S, 2010).

Risk factors for increased blood pressure include age, heredity, smoking habits, excessive salt consumption, cholesterol, stress, and overweight or obesity. People with hypertension usually have no specific symptoms to mild symptoms such as dizziness, anxiety, nosebleed, and headache. The increase in blood pressure will only be noticeable after medical examination. (Sutanto, 2010) Thus, it is necessary to do alternative therapies to reduce hypertension.

Reflexology is a type of treatment that adopts the strength and endurance of the body by providing a massage to the certain points of the body according to the therapeutic zone. (Putri, 2015). Reflexology is a practice of massaging specific points on the hands and feet which help reducing the pain, increasing endurance, providing a sense of comfort, and relieving stress. Applying pressure on the feet helps to rebuild the body balance, reduce pain, increase blood flow and ease muscle tension, and stimulate relaxation and comfort.(Chanif, 2017) Due to the limitation of reflexology therapy, especially in the elderly, makes this study to bring benefit and novelty.

OBJECTIVE

The purpose of this study is to describe and analyze the effect of foot massage therapy to patients with hypertension. Purpose of this study is to describe and analyze the effect of reflexology before and after provided to hypertensive patients.

METHODS

Research design was Quantitative, Quasi-experimental with the design of "One-Group Pretest-

Posttest design Without Control Group." The blood pressure was measured twice before and after the foot reflexology was performed. The reflexology is performed in the feet, every morning after breakfast for around 20 minutes, for 6 days. **Place** the research was conducted at Werdha Wening Wardoyo Nursing Home Ungaran Semarang Central Java Indonesia, with a population of 37 older person. The objectives were the elderly with hypertension. The inclusion criteria were elderly with hypertension who did not consume blood pressure medications, will to become research respondents and sign an agreement. The exclusion criteria were elderly patients of hypertension with complications. Overview of Research Location The study was conducted at the Werdha Wening Wardoyo Nursing Home Ungaran, which is located at Jl. Kutilang Raya No.25, Kuncen, Ungaran, Kec. Ungaran Barat, Semarang, Central Java 50517, Indonesia. Research Instruments was observation sheets, calibrated mercury sphygmomanometer and researcher themselves. Data normality test has been conducted with a Shapiro-Wilk test because the sample was less than 200; the significance value is $0.00 < 0.05$, then the data was not normally distributed. Henceforth, the researcher used the Wilcoxon test and the mean \pm Standard deviation (SD) to spread the average of blood pressure. The Ethical approval to this study was approved by the institutional ethics committee.

RESULTS

Results describe the major findings of the study. It should be clear, concise and can be reported on texts or graphics. Please provide some introduction for the information presented on tables or images.

1. Characteristics of Respondents based on gender, age, education, occupation

Table1. Characteristics of Respondents

Gender	Frequency	Percent
Male	5	13,5
Female	32	86,5
Total	37	100
Age	Frequency	Percent
56-65 Years	32	86,5
> 65 Years	5	13,5
Total	37	100
Educational Background	Frequency	Percent
No Education	3	8,1
Elementary School	15	40,5
Junior High School	17	45,9
Senior High School	2	5,4
Total	37	100
Working History	Frequency	Percent
Unemployed	19	51,4
Private Sector Retirees	16	43,2
Government Sector Retiree	2	5,4
Total	37	100

Based on table 1, of the 37 respondents who suffered from hypertension, the majority is female which consists of 32 people (86.5%). The educational background of the respondents showed that out of 37 people, 17 people are junior high school graduates (45.9%), and 15 people are elementary school graduates

(40.5%). Based on the age of the respondents, from 37 respondents, there are 32 people aged between 56-65 years old (86.5%). Based on the Employment history of 37 respondents, 19 of them had no working history or unemployed (51.4%).

2. Overview of Blood Pressure before Reflexology

Table 2. Overview of Systolic and Diastolic Blood Pressure Before Reflexology

Systolic Blood Pressure	Frequency	Percent (%)
130	2	5.4
140	23	62.2
150	4	10.8
160	7	18.9
180	1	2.7
Total	37	100.0
Diastolic Blood Pressure	Frequency	Percent (%)
80	9	24.3
90	14	37.8
95	1	2.7
100	13	35.2
Total	37	100.0

Based on table 2, the examination of systolic blood pressure before given the reflexology therapy showed that from 37 respondents, systolic bloodpressure of the majority was at 140 (62.2%). The

examination of diastolic blood pressure before given the reflexology therapy showed that 14 respondents were at 90 mg/dl (37.8%). Meanwhile, there were 13 respondents with 100 mg/dl (35.1%) diastolic pressure.

3. Overview of Blood Pressure after Reflexology

Table 3. Overview of Systolic and Diastolic Blood Pressure After Reflexology

Systolic Blood Pressure	Frequency	Percent (100%)
120	2	5.4
130	23	62.2
140	7	18.9
150	4	10.8
160	1	2.7
Total	37	
Diastolic Blood Pressure	Frequency	Percent (100%)
70	5	13.5
80	17	45.9
90	15	40.5
Total	37	100.0

Based on Table 3, after given the reflexology therapy, majority there were 23 respondents with 130 mg/dl systolic blood pressure (62.2%). The results show that the diastolic blood pressure of 37 respondents after given the reflexology therapy was at most 80 mg/dl represented by 17 respondents (45.9%).

4. Overview of Blood Pressure before and after Reflexology

Table 4. Overview of Blood Pressure before and after Reflexology

	Mean	Deviation Standard	Minimum	Maximum
Systolic Pre Reflexology	145,41	10,434	130	180
Diastolic pre Reflexology	91,22	7,764	80	100
Systolic post Reflexology	134,32	8,673	120	160
Diastolic post Reflexology	82,70	6,932	70	90
	Systolic Post-pre	Diastolic Post-Pre		
Z	-5,822 ^b	-5,578 ^b		
Asymp. Sig. (2-tailed)	,000	,000		

Based on table 4, the description of blood pressure before and after performing the therapy showed that the average of systolic blood pressure before given the therapy is 145.41 mg/dl. Otherwise, the average of systolic blood pressure after given the therapy is 134.32 mg/dl. The result of the average of

DISCUSSION

Based on the characteristics of the respondents; gender, 37 respondents who had hypertension, the majority were female (32.5%). Gender was much related to the occurrence of hypertension, especially for women who reached menopause. Women who do not reach menopause yet are protected by estrogen systems which play a role in increasing levels of High-Density Lipoprotein (HDL). (Angraini, 2011) It is in line with the other studies which state that there is a significant relationship between gender and the incidence of hypertension. It indicates that estrogen system levels influence the occurrence of hypertension in women. The decline in estrogen system of the women who reached menopause makes them more susceptible to hypertension (Kusumawaty, Hidayat, & Ginanjar, 2016).

Based on the educational background of 37 respondents showed that 17 respondents are junior high school graduates (45.9%) and 15 respondents are elementary school graduates (40.5%). Low education level can influence the occurrence of hypertension caused by lifestyle, environment, and system. Education level is closely related to the lifestyle. Low educated people tend to have an awareness to behave in a less healthy lifestyle. Besides, the psychological aspects regarding workload and work environment can trigger a person's health problems especially those related to diseases such as hypertension (Sinuraya *et al.*, 2017).

Based on the age of the respondents, out of 37 respondents, there are 32 people aged between 56-65 years old (86.5%). It was following the research conducted by Kusumastuty, which explained that the majority of hypertensive patients (62%) are aged 50 - 60 years old. (Kusumawaty *et al.*, 2016) Hypertension mostly occurs in the age of 31 - 55 years and is generally at higher risk for the generation of more than 40 years old. It can be even higher at the age of more than 60 years. Physiologically, the relationship between age and increased blood pressure happened due to changes in elasticity of blood vessel walls over time, collagen proliferation, and calcium deposits associated with atherosclerosis. (Kusumawaty *et al.*, 2016) The persistence of high blood pressure may cause stiffness in the central atrial. According to Muhammadun that the prevalence of hypertension in urban areas is higher at susceptible 45 years. (Kusumawaty *et al.*, 2016) Structural changes in large blood vessels due to the increased systolic blood pressure cause lumen to be stiffer and reduce the elasticity of the blood vessels. The

diastolic blood pressure before therapy is 91.22 mg / dl and after therapy is 82.70 mg / dl. Based on table 4, the Z value obtained was -5,822 and -5,578 with a p value of 0,000 <0.05 so that the hypothesis indicated that there was an influence of reflexology on blood pressure reduction in the elderly with hypertension.

more rigid blood vessels and decreased elasticity of blood vessels will generate the heart rate to work more than usual.

Based on the Employment history of 37 respondents, 19 of them had no working history or unemployed (51.4%), while 16 of them are the retirees from the private sector (43.2%). Work was a service performed in favor of getting a reward or salary. It was in line with Kuntoro's research, stating that the volume of elderly work is less than that of young people. The degenerative process causes a decrease in the function of body organs due to the damage of cells in the aging process. It leads to the changes related to biology or physical thoughts and thus makes the elderly unable to be productive anymore (Livana, 2018).

Based on the systolic blood pressure of the majority before given the reflexology therapy was at 140 (62.2%). It was in line with the research conducted by Arianto on the influence of foot massage therapy on blood pressure changes in patients with hypertension. The results of his study stated that "foot reflexology therapy affects the changes in systolic blood pressure of the hypertensive patients" using a paired t-test, and the results showed that the r-value = 0.879 (Arianto, 2018).

Based the diastolic blood pressure of the 14 respondents before given the reflexology therapy was at 90 mg/dl (37.8%). Meanwhile, there were 13 respondents with 100 mg/dl (35.1%) diastolic pressure. It is supported by the research conducted by Arianto on the effect of foot reflexology therapy on changes in blood pressure in hypertensive patients stating that "foot reflexology therapy affects the changes in blood pressure of the hypertensive patients" with the Wilcoxon test which obtained the p-value = (0.00 <0.50) (Arianto, 2018).

The post reflexology therapy showed that there were 23 respondents with 130 mg/dl systolic blood pressure (62.2%). There were as many as 7 respondents with 140 mg/dl systolic blood pressure (18.9%). It is in accordance with the research conducted by Arianto on the effect of foot reflexology therapy on changes in blood pressure in hypertensive patients which states that after given the foot reflexology therapy, the blood pressure of the hypertensive respondents will decrease. There was a decrease of 4.59 mmHg from the initial examination of respondents' systolic blood pressure before given the therapy, which was from 156.50 mmHg to 151.91 mmHg (Arianto, 2018).

The results show that the diastolic blood pressure of 37 respondents after given the reflexology therapy was at most 80 mg/dl represented by 17 respondents (45.9%), and as many as 15 respondents were at 90 mg/dl (40.5%). It is supported by the Arianto's research entitled the effect of foot reflexology massage therapy on changes in blood pressure in hypertensive patients which stated that the blood pressure of hypertensive respondents after given foot reflexology therapy would decrease. There was a decrease of 4.59 mmHg from the initial examination of respondents' diastolic blood pressure before given the treatment, which was from 98.05 mmHg to 95.50 mmHg. There was a difference by 2.55 (Arianto, 2018).

The description of blood pressure before and after performing the reflexology showed that the average of systolic blood pressure before given the reflexology was 145.41 mg/dl and the average of systolic blood pressure after given the reflexology was 134.32 mg/dl. The result of the average of diastolic blood pressure before reflexology is 91.22 mg/dl and after reflexology is 82.70 mg/dl. According to Safitri, massage was an action that provides deep relaxation due to the decreased activity of the sympathetic nerve resulting in a decrease of the blood pressure. It was in line with the result of the research conducted by Zunaidi, which stated that the reflexology could reduce systolic blood pressure by 13.8 mmHg and diastolic by 13.3 mmHg (Zunaidi, Nurhayati, & Prihatin, 2014).

It showed that before the reflexology was performed on $p < 0.05$, which means that there was an effect of the reflexology on the blood pressure reduction. It was in line with the research conducted by Rezky on the influence of foot reflexology therapy on blood pressure in patients with primary hypertension which stated that there is an effect of foot reflexology therapy on blood pressure in patients with primary hypertension with a p-value of 0.012. After performing the reflexology therapy, some respondents said that their body felt lighter and the headache was reduced. This opinion was supported by Wijayakusuma who explained that foot reflexology could provide stimulation of relaxation enable to facilitate the flow of blood and body fluids in the area massaged (Rezky, Hasneli, & Hasanah, 2015). A limitation of this study is the absence of a control group.

CONCLUSION

There was an effect of the reflexology on the blood pressure reduction. The benefit of research for health workers is to be able to implement the method of foot reflexology as one of the independent interventions to reduce blood pressure in people with hypertension. For the community, people can obtain the benefit from non-pharmacological treatment through foot reflexology therapy and optimally improve the degree of health. For researchers, this study can be referred as a novelty innovation.

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