

EFFECT THE COMPLEMENTARY FOOT MASSAGE THERAPY AS A “LOSS OF PROTECTIVE SENSATION (LOPS)” DIABETIC NEUROPATHY PATIENTS IN PALU CITY, INDONESIA

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ABSTRACT

Health policies related to Diabetes Mellitus (DM) control in the community have not been maximized, and the lack of early detection and public awareness to carry out independent care at home has led to an increase in DM cases. Knowing effected the implementation of complementary foot massage therapy in reducing Lost of Protective Sensation (LOPS) in diabetic neuropathy patients. The population in this study were DM patients who visited the Kawatuna Health Center in Palu City with a total sample of 30 people obtained based on a purposive sampling technique. The analysis of this study using The Paired Samples Test. Independent variable complementary foot massage therapy is done by giving foot massage three times a week with a duration of 30 minutes for one month, the dependent variable Lost of Protective Sensation is done by measuring using the monofilament test, and data is analyzed using the Paired Sample Test. Statistically, the results of LOPS based on Paired Samples Correlations showed a value of > 0.948 , that the two variables had a very strong correlation. Foot massage intervention was effective (46.7%) in the second week of therapy in reducing LOPS, based on the results monofilament test with a frequency distribution of scores from mild to no neuropathy (56.7%). LOPS in people with Diabetes Mellitus Type II has a higher risk at age >65 years with a

duration of suffering from DM >10 years by 10%. Foot massage therapy is an effective alternative to reduce the symptoms of neuropathy and prevent complications, especially LOPS in diabetics with a long history of suffering from 5-10 years and ages 45-65 years.



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1. Introduction

Diabetes mellitus (DM) is a chronic disease with a high prevalence and causes acute and chronic complications [1]. The World Health Organization (WHO) estimates that there will be an increase in DM cases in all countries in the world as many as 463 million people with an age range of 20-79 years [2]. The high prevalence worldwide causes a higher DM cases in Southeast Asia than in other countries including Indonesia [2]. In Indonesia, the high prevalence is caused by heredity, which is dominated by ages 20-59 years [3], [4]. The International Diabetes Federation (IDF) states that the diabetes epidemic is showing an increase in Indonesia, which is included in the seven countries with the largest number of DM cases which have contributed to the increase in the prevalence of DM cases in Southeast Asia with a total of 10.7 million cases [4], [5].

Central Sulawesi ranks 10th in the province with the most DM cases in Indonesia [4], [6]. Data from the Central Sulawesi Provincial Health Office report that Palu City is one of the areas with the second highest prevalence of cases. In 2015 there were 16.456 cases of DM, which continues to increase every year until 2021 where 26.204 cases when were reported [7]. One of the areas with a high prevalence of diabetes mellitus cases in Palu City, documentation of PKM Kawatuna, 2022 recorded an increase in cases over the last 5 years by 40.4%, in 2022 there were 470 patients with a medical diagnosis of diabetes mellitus [8].

The urgency in the Palu City area with DM cases which continues to increase every year is an indicator of low health program performance achievements due to low self-awareness of DM sufferers to carry out routine checks. The lack of public understanding of health management, as well as the lack of community compliance in managing therapy and early detection of increased blood sugar, and the lack of public awareness and knowledge about self-care have led to an increase in DM cases in the Palu City area every year [7], [8]. Health policies related to DM control in the community have so far not been maximized due to the high-risk factors or trigger factors that contribute to the incidence of disease and complications in DM patients [4].

Complications in the form of other neurological disorders such as diabetic neuropathy that occur in diabetic patients reach 60 to 70% [9], [10]. Lost of Protective Sensation (LOPS) or loss of protective sensations causes the body to easily experience injury without feeling or realizing it, either from threats or physical trauma, or temperature [1]. Early detection of neuropathy is very important in DM patients because preventive interventions can be applied to reduce morbidity by identifying a decrease in protective sensation in the feet early so as to prevent diabetic injuries [11], [12].

Foot massage is part of the recovery action for patients who experience Lost of Protective Sensation in the feet with impaired peripheral sensation and foot care and is effective in increasing foot sensitivity [10], [13]. Foot massage is an alternative complementary therapy that can be given to DM patients in society [11], [12]. Complementary therapy management in the form of foot massage has not been optimally carried

out as an alternative management for people with DM in the community. The results of initial observations conducted by researchers at the Kawatuna Health Center, Internal Medicine Polyclinic showed that 40% of the total DM patients had diabetic neuropathic disease, 60% said they complained of burning or stabbing pain in their feet, and 20% experienced hyperglycemia (Documentation of PKM Kawatuna, 2022).

Developmental management in the form of foot masses can be an alternative strategy for preventing neuropathy which is quite effective for people with diabetes mellitus with Lost of Protective Sensation. Seeing the importance of preventing peripheral neuropathy disorders, researchers are interested in conducting research on *"how is the management of complementary foot massage therapy in reducing the loss of protective sensation in diabetic neuropathy patients?"*

2. Method Research

2.1 Types and Research Design

The design used in this study used a Pre-Experimental research design using the One Group Pretest-Posttest design, this research design did not have a comparison group. The form of this research design is as follows in Figure 1:



Figure 1. Form of Research Design

Description;

Pre Test: monofilament test to measure Lost of Protective Sensation before the massage

Intervention: implementation of foot massage (three times a week for one month)

Post Test: monofilament test to measure Lost of Protective Sensation after massage

The pretest was carried out in the first week of the study, namely assessing the sensitivity of the feet using a monofilament test to determine pain in the feet, the second week to the fourth week of intervention in the form of giving foot massage which was carried out 3 times a week with a duration of 30 minutes. After that, a post-test was carried out to determine the effectiveness of foot massage by giving a questionnaire and examining foot sensitivity using a monofilament test in the last week to find out whether the family's ability to care for the feet of diabetic neuropathy patients was effective by observing changes in the level of sensation of neuropathic feet in patients through monofilament tests.

2.2 Time and Location of Research

The research was carried out in the Kawatuna Health Center work area, which is one of the areas with the most cases of diabetes mellitus in the Palu City area with a total of 470 DM patients with a total of 39 visits per month during June-August 2021.

2.3 Population and Sample of Research

The population in this study were DM patients who visited the Kawatuna Health Center with an average number of visits a month of 39 people. Sampling was carried out using the probability sampling method.

The purposive sampling technique to determine the sample size in this study used the formula for estimating proportions so that a total sample of 30 people was obtained according to the criteria used.

Criteria include:

1. No diabetic foot ulcer
2. The age range of respondents is >45 years
3. Long suffering from diabetes > 5 years
4. Patients with type II diabetes mellitus are willing to be respondents

2.4 Research Variables and Data Collection

In this study the variables used are:

1. Independent Variable: Complementary therapy for foot massage, namely alternative therapy with foot massage using certain methods based on operating procedures for foot massage units (SOP).
2. Dependent Variable: Lost of Protective Sensation, which is a condition of loss of protective sensation ability in DM patients as measured using a monofilament test at a certain point on the foot, with a measurement result if the monofilament test result score ≤ 8 indicates mild neuropathy, a score of 9-11 indicates moderate neuropathy, and a score ≥ 12 indicates severe neuropathy. This study used research instruments in the form of questionnaires and research observation sheets to determine the results of the monofilament test. Foot sensitivity test using a monofilament test. This test consists of 10 points on each leg using a monofilament test score. If the patient feels monofilament pressure on the leg the score is 0 (zero), if the patient does not feel monofilament pressure the score is - (minus) 1 to 20.

2.5 Data Analysis

Data was collected through pre-test and post-test stages and then processed into meaningful data before being presented in the form of data analysis. Bivariate analysis in this study used the Paired Samples Test, namely to test the effectiveness of a treatment on a certain variable size. The Paired Samples Test was carried out with the help of computer software with the SPSS statistical program application.

2.6 Ethical Clearance

The researcher uses the ethical principles of autonomy, anonymity, justice, beneficence, and non-maleficence when conducting research with a research permit based on a data collection certificate obtained from the research location in Palu City on September 1, 2021, with letter number: 465.1/139-KK/IX /2021.

3. Results and Discussion

3.1 Results

Characteristics of Respondents

The distribution of respondents based on characteristics is grouped according to Table 1. below:

Table 1. Characteristics of Respondents

Characteristics	(N)	(%)
<i>Age Respondents</i>		
46-55 years old (early elderly)	10	33.3
56-65 years old (late elderly)	9	30
> 65 Years (Elderly)	11	36.7
Total	30	100
<i>Long Suffered</i>		
5-7 years	13	43.3
8-10 years	9	30

>10 years	8	26.7
Total	30	100
Degree of Neuropathy Based Monofilament Test		
Before implementation of foot massage		
Mild neuropathy (<8)	14	46.7
Moderate neuropathy (9-11)	4	13.3
Severe neuropathy (>12)	12	40
Total	30	100
After implementation of foot massage		
Mild neuropathy (<8)	17	56.7
Moderate neuropathy (9-11)	12	40
Severe neuropathy (>12)	1	0.3
Total	30	100

Table 1. above showed the frequency distribution based on age, duration of DM, and degree of neuropathy. The majority of respondents were in the age group > 65 years, namely 36.7%, with a distribution based on the length of time they had DM, namely 5-7 years, namely 43.3%, and mild degree of neuropathy namely 46.7%.

Table 2. Lost of Protective Sensation After Foot Massage

Paired Samples Statistics

<i>Lost of Protective Sensation</i>	Mean	N	Std. Deviation	Sig. (2-tailed)
Before Therapy	-8.00	30	5.207	.000
Week 1 of therapy	-5.40	30	5.358	.000
Week 2 of therapy	-3.50	30	4.478	.000
Week 3 of therapy	-2.60	30	1.075	.000
Week 4 of therapy	-4.50	30	1.716	.000

Based on the results of the analysis of Table 2. Paired Samples Statistics showed Lost of Protective Sensation in Type II Diabetes Mellitus patients after foot massage after 2 weeks of treatment obtained monofilament test results with frequency distribution obtained scores from no neuropathy to mild neuropathy of (56.7%) or there was an increase in the sensation felt by DM patients by (-3.50).

Table 3. Lost of Protective Sensation before and after foot massage

Paired Samples Correlations

Lost of Protective Sensation	N	Correlation	Sig.
Before and After Foot Massage	30	.948	.000

Table 3. Paired Samples Correlations show the effectiveness of the implementation of a between the independent variable, namely complementary foot massage therapy, and the dependent variable Lost of Protective Sensation in type II diabetes mellitus patients with a correlation value of > 0.948 which indicates that the two variables have a very strong correlation.

3.2 Discussion

Statistically, paired samples correlations show the effectiveness of the implementation of complementary foot massage therapy, and Lost of Protective Sensation in type II diabetes mellitus patients with a

correlation value of > 0.948 indicating that the two variables have a very strong correlation. Following is a discussion of Lost of Protective Sensation before and after foot massage action;

1. Loss of Protective Sensation Before Foot Massage

Massage has received special attention as a non-drug, safe, and feasible therapy method from ancient times and until now as a complementary therapy that provides the effectiveness of Lost of Protective Sensation in diabetic neuropathy patients [11], [14]. The results of this study show (Table 1) the factors that influence the degree of neuropathy in DM patients. Researchers assume that the Lost of Protective Sensation in diabetic neuropathy patients in this study is influenced by several predisposing factors for the occurrence of neuropathy, including age and duration of diabetes.

Characteristics of people with diabetes mellitus based on age are most commonly found in the age group over 65 years (advanced elderly) as much as 36.7%. Apart from the age factor, according to the researchers, the condition of neuropathy in DM patients in this study was also influenced by the duration of suffering for more than 5-10 years, as much as 90%. The duration of suffering from DM will affect the condition of blood vessels and the instability of blood sugar conditions [12].

Hyperglycemia causes blood circulation to become obstructed so that it cannot circulate blood that carries oxygen and nutrients to all areas of the feet, causing symptoms of neuropathy in the form of reduced or lost taste sensations [11], [14]. Complications in the form of other neurological disorders such as diabetic neuropathy that occur in diabetic patients reach 60 to 70% [1], [5], [15]. Other studies state that the severity of diabetic neuropathy is caused by the duration of suffering from DM, hyperglycemia will be exacerbated by the duration of the disease [15- 17]. The age factor will affect the condition of neuropathy due to prolonged hyperglycemia in DM patients [12], [18]. The low ability to care for feet in patients with diabetic neuropathy is shown by the results of the monofilament test in respondents with the respondent's level of neuropathy being in the mild category of 36.7% and severe neuropathy of 40%. The purpose of doing a foot sensory examination is to find out whether there is sensory disturbance in the feet that underlies the sensory disturbance, by knowing the sensations felt by DM patients.

Early detection of neuropathy is very important in DM patients because preventive interventions can be applied to reduce morbidity by identifying a decrease in protective sensation in the feet early so as to prevent diabetic injuries [11], [12]. Complementary therapy management in the form of foot massage can help expedite and increase blood circulation in the feet [16], [17]. A good foot massage can prevent diabetic foot complications from an early age [14], [17]. Prevention of complications of diabetes mellitus can help increase the life expectancy of diabetics with peripheral sensation disorders and is effective in increasing foot sensitivity [16], [17].

2. Loss of Protective Sensation After Foot Massage

Statistically, the correlation of paired samples shows the effectiveness of complementary foot massage therapy and Lost of Protective Sensation in type II diabetes mellitus patients with a correlation value of > 0.948 which indicates that the two variables have a very strong correlation. There was a change in the degree of diabetic neuropathy in the intervention group which received regular massage for 2 weeks, so that massage therapy had a significant effect on the degree of diabetic neuropathy [18], [22].

The results of the study (Table 2) showed that before therapy with an average mean of -8.00 and a standard deviation of 5.207, after the foot massage intervention was carried out in the second week there was a decrease in foot sensation based on the results of the monofilament test with an average value of -5.40 and a standard deviation of 4.478. The results showed that after doing foot massage for a month, it was effective to show changes in the second week of the foot massage intervention with a decrease in the degree of diabetic neuropathy in the type II intervention group. DM respondents obtained results as much as 56.7% of respondents stated that they experienced mild Lost of Protective Sensation and 40% of other respondents stated moderate neuropathy.

The results of the study show that massage can reduce the symptoms of neuropathy [18], [22]. There is a significant effect of diabetic foot massage on Lost of Protective Sensation in type II DM patients with diabetic peripheral neuropathy [11], [23]. Based on the description above, the researchers concluded that massage therapy as a complementary therapy in reducing the Lost of Protective Sensation of the feet in diabetic neuropathy patients is an effective alternative for reducing neuropathy symptoms or increasing the sensation felt by DM patients.

Foot massage performed three times a week for a month with a duration of 30 minutes in type II DM respondents in this study proved to be effective as a complementary therapy that can prevent diabetic neuropathy sufferers from Lost of Protective Sensation. However, various conditions such as the quality and quantity of pressure and duration, as well as the number of sessions, types of massage, and the patient's psychophysical state can change the results of massage therapy [18]. Appropriate massage methods can play a major role in relieving DM symptoms if they are adapted to the pathogenesis of DM and the patient's clinical condition [10], [18], [24]. Hyperglycemia conditions will exacerbate nerve damage, due to changes in excess glucose into sorbitol which accumulates in the nerves and changes the conduction of nerve damage which can result in loss of pain sensation or other sensory damage [12]. Massage movements accompanied by pressure on the surface of the skin will cause blood vessels to become vasodilated resulting in an increase in blood circulation which causes oxygen to carry blood and absorb nutrients to the peripheral nerves. The dilating effect on the capillaries to the edges effectively increases the feeling of protection in the feet thereby reducing the symptoms of neuropathy [11], [21], [24]. Previous research stated that regular foot massage for 2-4 weeks showed a significant increase in ROM after treatment for the first two weeks [21].

4. Conclusion

Management of massage as a complementary therapy in reducing the effectiveness of Lost of Protective Sensation in diabetic neuropathy patients in this study was influenced by several predisposing factors for neuropathy including age and long history of suffering from DM. Appropriate and effective routine massage showed changes in the second week of foot massage intervention with a decrease in the degree of diabetic neuropathy in the intervention group. Foot massage therapy is an effective alternative to reduce the symptoms of neuropathy and prevent complications, especially Lost of Protective Sensation in diabetics 5-10 years and age of 45-65 years. Foot massage therapy was carried out three times a week with a duration of 30 minutes and the psychophysical condition of the patients without ulcers was effective in reducing the degree of diabetic neuropathy with Lost of Protective Sensation in patients in this study (10%).

Further researchers can examine other factors that also affect research results related to Lost of Protective Sensation on the feet such as increased blood sugar levels of respondents, motion exercises carried out by respondents, and massage techniques for nurses who perform independent actions. The limitations of this study are the limited number of samples used in experimental research with a small number of samples and a short research time.

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