Doi: 10.30829/jumantik.v9i2.20136

Research Article

The Effect of Swedish Foot Massage on Reducing Fatigue and Muscle Cramps in Hemodialysis Patients at Royal Prima Hospital

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Abstract

Hemodialysis is an alternative treatment for chronic kidney sufferers. Hemodialysis patients often experience fatigue and muscle cramps. One therapy to reduce fatigue and muscle cramps is Swedish massage. The aimed to determine the effect of Swedish foot massage on reducing fatigue and muscle cramps in hemodialysis patients at the Royal Prima General Hospital. The method uses a quasi-experimental with a one-group pre-test and post-test design, using the Wilxocon test. The results on fatigue before the Swedish massage treatment were that 72.2% of respondents experienced fatigue after treatment 97.2% of respondents were not tired. The muscle cramps before Swedish massage treatment, 72.2% of the frequency of cramps every week, 97.2% of the severity was very painful, 100% of the duration lasted 1-10 minutes, and 75.0% of the time the cramps during the day. After the Swedish massage treatment, the frequency of cramps 100% every week. severity level 100% slightly painful, 94.4% cramp duration lasts ≤1 minute, 100% cramp time during the day. Based on p-value fatigue 0.00, frequency 0.02, pain level 0.00, duration 0.00, and time 0.03, there was a significant difference before and after Swedish massage treatment on the legs in reducing fatigue and muscle cramps in hemodialysis patients.

Keywords: Hemodialysis, Fatigue, Muscle cramps, Swedish Massage

Introduction

The main risk factor for cardiovascular death is chronic kidney disease. Chronic kidney disease should be treated on a par with coronary heart disease (Arıcı, 2023) . Kidney failure occurs when kidney damage is severe and kidney function decreases very low (Centers for Disease Control and Prevention, 2023) . Kidney disease is more common in adults and may present with new symptoms of hypertension or lower extremity edema. Renal failure may occur in up to 30% of cases and on urinalysis, proteinuria, and hematuria are common findings (Arıcı, 2023).

The prevalence of chronic kidney failure according to Riskesdas in 2018 in patients aged ≥15 years was greater in patients aged 65-74 years amounting to 0.82% with a total of 38,574 patients. Meanwhile, the highest prevalence in patients undergoing hemodialysis is in the province of DKI Jakarta with a total of 38.71%, while the lowest prevalence is in the province of Southeast Sulawesi with a total of 1.99% (Indonesian Ministry of Health, 2018).

The general approach to the management of chronic kidney disease includes patient education (e.g. lifestyle modification), treatment of the primary disease (e.g. high blood pressure, diabetes), prevention and treatment of complexities (e.g. cardiovascular disease, anemia), and renal replacement therapy (Yang & He, 2020). One therapy for kidney replacement that is often applied to people with

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Summited: 22-05-2024 Revised: 25-06-2024
Accepted: 30-06-2024 Published: 01-08-2024

chronic kidney failure is hemodialysis (Pramono et al., 2019).

Study Darmawan et al. (2019) stated that 29% of fatigue occurs due to the long period of undergoing hemodialysis. Research by Ho et al. (2022) showed that fatigue and poor sleep quality can mediate the relationship between depression and kidney function. Predialysis respiratory frequency has a significant relationship to intradialysis muscle cramps. During the hemodialysis procedure muscle cramps can occur due to oxidative stress during intradialysis (Nekada & Judha, 2019).

According to Muliani et al. (2021) effect of intradialytic exercise: chronic renal failure patients undergoing hemodialysis have good fatigue scores. According to Kurniawati et al. (2022) intradialytic exercise practically holds promise for minimizing CKD-related fatigue in patients undergoing hemodialysis. Hemodialysis nurses or other healthcare providers can utilize this evidence as a program to reduce CKD-related fatigue.

Complementary and alternative medicine approaches to dealing with fatigue can use massage therapy (Wang et al., 2021) . Intradialytic massage is useful for kidney failure sufferers undergoing hemodialysis to reduce cramping pain in the legs (Nurfitriani et al., 2020). The benefits of foot reflexology massage (Pamungkas et al., 2021) and hand massage (Çeçen & Lafcı, 2021) can reduce fatigue in hemodialysis patients.

Other research conducted by Heidari et al. (2022) , said that different massage approaches also effectively improve multiple sclerosis (MS) symptoms such as fatigue, pain, anxiety, depression, and spasticity Implications for rehabilitation. Foot massage, as a simple method, can also reduce fatigue due to chemotherapy (Alizadeh et al., 2021).

The Swedish massage technique stimulates the efferent nerves to release histamine and acetylcholine which provides reflex vasodilation of veins and arterioles and reduces sympathetic nerve activity resulting in a decrease in peripheral vascular resistance which affects reducing blood pressure and pulse rate (Savitri & Intarti, 2021) . Swedish massage done regularly and consistently is very useful for lowering blood pressure for sufferers of primary hypertension (Prajayanti & Sari, 2022).

Based on the data obtained, patients undergoing hemodialysis experience several symptoms such as fatigue and muscle cramps which disrupt the activities of hemodialysis patients. Massage is a therapy that can reduce fatigue levels. In this study, researchers used Swedish massage as an intervention to treat fatigue and muscle cramps because in previous studies Swedish massage was only used to treat fatigue in hypertensive patients and had not been done in hemodialysis patients. The researchers were interested in doing Swedish foot massageto find out the effect of fatigue and muscle cramps in hemodialysis patients. Several previous research results and based on surveys conducted before the research was conducted, patients said that they often experienced muscle cramps which caused the patient to feel uncomfortable. Warm compresses are an action that is often used to reduce pain, fever, and muscle cramps. Warm compresses are usually applied to hypertension patients to prevent stroke and to rheumatoid arthritis patients to reduce pain. Warm compresses are very easy to do and applied either at home or in other health facilities which can increase the feeling of comfort. Warm compresses have never been used on patients with leg muscle cramps in hemodialysis patients, so researchers want to know how warm compresses impact leg muscle cramps in patients undergoing hemodialysis at the Royal Prima General Hospital.

Based on the data obtained, patients undergoing hemodialysis experience several symptoms such as fatigue and muscle cramps which disrupt the activities of hemodialysis patients. Massage is a therapy that can reduce fatigue levels. In this study, researchers used Swedish massage as an intervention to treat fatigue and muscle cramps because in previous studies Swedish massage was only used to treat fatigue in hypertensive patients and had not been done in hemodialysis patients. The researchers were interested in doing Swedish

foot massageto find out the effect of fatigue and muscle cramps in hemodialysis patients. So this design aims to see the effect of Swedish foot massage on reducing fatigue and muscle cramps in patients undergoing hemodialysis

Method

This type of research uses quantitative methods with a quasi-experimental design using a one-group pre-test post-test design approach (Polit & Beck, 2018). This research was conducted by giving a pre-test before the intervention and a post-test after the intervention. This design aims to see the effect of Swedish foot massage on reducing fatigue and muscle cramps in patients undergoing hemodialysis.

The research will be carried out at the Royal Prima Hospital which has a sufficient population and sample size of respondents, making it easier for researchers to conduct research. The research will be carried out in March 2024. The population is all individuals or objects that have the same characteristics, certain qualities, and characteristics (Polit & Beck, 2018) . The population in this study involved 36 patients receiving hemodialysis at Royal Prima Hospital. According to Polit and Beck (2018) the sample is part of the population to be studied. In nursing research, the elements (basic units) are usually humans. In this study, the samples taken were 36 hemodialysis patients at Royal Prima Hospital. All populations were taken as samples because this research used saturated sampling techniques. This is done when there are too few members of the population so that all members of the population are used as the research sample (Sahir, 2022) . This research used a sample of 36 people and the research was carried out in March 2024 on patients undergoing hemodialysis at the Royal Prima General Hospital.

Data collection in this research used an instrument in the form of an observation sheet. The research began by sending an initial research survey permission letter from the Faculty of Nursing and Midwifery to the Royal Prima Hospital, to obtain research permission. After the researcher obtained permission, the researcher first explained to the research respondents the objectives, benefits, procedures, and conditions for conducting the research. After the respondent has received information about the research, the researcher gives Informed Consent and the respondent has the right to accept or refuse to be a research respondent.

After the respondent agrees and is willing to be a sample in the research, the researcher gives a letter of consent to the respondent to be signed by the respondent. The pretest was carried out using an instrument fatigue Assessment Scale (Zuraida & Chie, 2014) and muscle cramps using the Cramp Questionnaire instrument which has been slightly modified from the published questionnaire (Wong & Baker, 1998; Chatrath et al., 2012; Hu et al., 2022) when researchers observed the fatigue and muscle cramps experienced by patients before the intervention.

Next, the researcher intervened with the respondents. The intervention began by explaining the benefits of Swedish massage to respondents to reduce fatigue and muscle cramps. The activity time is 1 week to do Swedish massage 2 times a week for 15-20 minutes (Hakam et al., 2021) . The post test assessment was carried out after the Swedish massage treatment on the patient's feet using a questionnaire fatigue Assessment Scale which is used to measure fatigue, and the Cramp Questionnaire a measuring tool used to measure muscle strength. The action process starts with arranging the patient's position as comfortably as possible with the patient lying down, the researcher performs a Swedish massage on the feet. The initial movement is pressing, kneading which starts from the toes and slowly continues towards the hips, percussion, vibration, then moving the foot inward to the position of a quick circle by holding the toes, then pressing the knee up, out, and down until describing a circle at the joint, then bending and stretching the leg, then a movement of lifting the leg to the side where the researcher holds the ankle and holds it (Nissen, 1889).

At the posttest stage, researchers used observation sheets with instruments *Fatigue Assessment Scale* which is used to measure fatigue, and the Cramp Questionnaire a measuring tool used to measure muscle strength where the results of the two observations are compared before and after the implementation of the Swedish massage therapy to reduce fatigue and muscle cramps.

Aspects of measuring the effectiveness of using Swedish massage which is carried out using special movements for fatigue and muscle cramps. The instruments used in this research were demographic data including name, age, religion, gender, and occupation. Measurements before the Swedish massage (pre-test) was carried out with the Fatigue Assessment Scale for fatigue and Cramp Questionnaire (Wong & Baker, 1998; Chatrath et al., 2012; Hu et al., 2022) for muscle cramps. After the respondent is given the intervention, the researcher will perform a Swedish foot massagefor 15-20 minutes (Hakam et al., 2021) . The time can be adjusted according to an agreement between the researcher and the respondent and is given according to the researcher's directions, namely once a day. After the Swedish massage was carried out, the Fatigue Assessment Scale for fatigue and Cramp Questionnaire for muscle cramps were then measured (post-test).

Fatigue assessment using the Fatigue Assessment Scale includes several categories such as being very bothered by feeling tired, feeling tired easily, not doing activities during the day, having enough energy to carry out daily activities, feeling physically tired, finding it difficult to start doing something, finding it difficult to think, are lazy to do various activities, feel mentally tired, and when doing activitie it is easy to concentrate fully. The Cramp Questionnaire assessment includes several categories such as frequency, level of redness, duration, and time. Additional observations include experiencing muscle cramps in the last 3 months, where the cramps are located, what factors make the cramps worse, whether the patient takes medication, what is done to relieve muscle cramps, and whether the patient's quality of life decreases due to muscle cramps.

Data analysis in this study used univariate and bivariate, univariate data analysis was carried out to test the demographic data of respondents. Meanwhile, bivariate data analysis was carried out to test the pre and post fatigue and muscle tension scales. Bivariate analysis was carried out to analyze the relationship between two variables. Before bivariate analysis, first test the normality of the data. Normality test using Shapiro-Wilk. If the distribution is normal, the researcher uses the Paired Simple T-Test statistical test. If the data is not normally distributed, then normality is tested using the Wilcoxon test. If it is significant $p>0.05$, then Ho is accepted, and if $p<0.05$, then Ho is rejected (Polit & Beck, 2018).

Results

Univariate Analysis

The results of research conducted regarding the effect of Swedish foot massageon reducing fatigue and muscle cramps in hemodialysis patients can be seen in the following table. Based on the results in Table 1, it can be concluded that the majority age is aged 58-67 with a percentage of 38.9% years and the minority is aged ≤79 years with a percentage of 2.8%. Based on the gender table, the majority are 19 women (52.8%) and the minority are 17 men (47.2%).

The majority of respondents were married with a percentage of 91.7% or 33 respondents and the minority were unmarried, namely 3 respondents (8.3%). Judging from the final educational background, the majority are high school (SMA) with a percentage of 38.9% and the minority are tertiary institutions with a percentage of 13.9%. Based on job characteristics, the majority 38.9% are housewives and the minority are self-employed with a percentage of 5.6%. The majority had been suffering from the disease for >2 years with 25 respondents (69.4%) and the minority <1 year with 3 respondents (8.3%).

The results obtained in Table 2 show that the majority of respondents experienced fatigue

before treatment or giving Swedish foot massage, 26 patients (72%), and the minority who did not experience fatigue, 10 patients (27.8%).

The results obtained in Table 3 after carrying out Swedish foot massage, the majority of respondents experienced a decrease in fatigue with 35 respondents (97.2%) in the non-fatigue category and 1 respondent (2.8%) in the minority as fatigue.

Based on Table 4, before the Swedish foot massage, the majority of respondents experienced muscle cramps. The majority of respondents often experience muscle cramps every week with 26 respondents (72.2%) and a minority of respondent experience muscle cramps every month 10 respondents (27.8%). Judging from how painful the pain felt due to muscle cramps, the majority of respondents said it was very painful with 35 respondents (97.2%) and the minority said it was a little painful with 1 respondent (2.8.%). The majority of respondents said the cramps lasted 1-10 minutes, and 36 respondents (100.0%). The majority of patients experienced cramps during the day with 27 respondents (75.0%) and a minority of patients experienced cramps during the day and night, namely 9 respondents (25.0%).

Based on the table above, after the Swedish foot massage, the majority of respondents often experience muscle cramps every week with a total of 36 respondents (100%). Judging from how painful the pain felt due to muscle cramps, all respondents said it was a little painful. The majority of respondents said the cramps lasted ≤1 minute with 34 respondents (94.4%) and the minority of respondents said the cramps lasted 1-10 minutes with 2 respondents (5.6%). The patient said he often experienced cramps during the day.

Bivariate Analysis

Based on the results of the analysis in Table 6, it can be seen that as many as 36 people between the fatigue variables before (pre-test) and after (post-test) were given Swedish foot massageto reduce fatigue, the Z value was -5000 with a Sig value. (2-tailed), namely 0.00 <0.05, it can be concluded that there is a significant difference in fatigue before and after Swedish foot massage of hemodialysis patients.

Based on the results of the analysis in Table 7, it is known that 36 people between the cramp variables before (pre-test) and after (post-test) underwent Swedish foot massage to reduce muscle cramps, obtained a Z frequency value of -3.162 with a Sig value. (2-tailed) 0.02<0.05, the Z value of pain level is -5.916, and the Sig value is (2-tailed) 0.00<0.05, the Z duration value is -5.831, and the Sig value is (2-tailed) 0.00<0.05 and the Z time value is -3,000 with a Sig value (2-tailed) 0.03<0.05. Based on the table above, it can be concluded that there is a significant difference in leg muscle cramps before and after Swedish foot massage of hemodialysis patients.

Discussion

Fatigue Before Swedish Foot Massage

The results of the research before the Swedish foot massage showed that the majority of respondents experienced fatigue. Fatigue that occurs during hemodialysis is one of the complications of hemodialysis (Rahimi et al., 2022) . Fatigue is a major and serious problem that can affect the quality of life in hemodialysis patients (Rezaei et al., 2020). Apart from fatigue, the impact of hemodialysis is physical fatigue and lack of energy (Putri et al., 2023) . The prevalence of fatigue is high in patients undergoing hemodialysis and is directly related to physical and general health (Burdelis & Cruz, 2023).

Based on the Standard Operating Procedures (SOP) in the Nissen (1889) entitled a manual of instruction for giving Swedish movement and massage treatment, researchers conducted an intervention with respondents for 15-20 minutes. Before carrying out the intervention, the researcher carried out therapeutic communication with the respondents where the researcher explained the technique of Swedish massage and the aims and benefits of the procedure to be carried out. The researcher arranged the patient's position as comfortably as possible and performed a Swedish foot

massagestarting from the toes and carried out on both of the respondent's feet.

Based on researchers' assumptions, the average respondent is 58-67 years old, female, and has a high school education (SMA). Before the Swedish massage was carried out on the feet, the majority of respondents experienced fatigue. The patient said he felt tired easily and was very disturbed by the fatigue he felt. During the day the patient does not do much activity and does not have enough energy to carry out daily activities. Due to fatigue, respondents found it difficult to do things, were lazy about carrying out activities, and had difficulty thinking clearly.

Fatigue After Swedish Foot Massage of Hemodialysis Patients

The results of the research after the intervention were carried out showed that the respondents did not experience fatigue. This shows that Swedish foot massage of hemodialysis patients is very effective in reducing fatigue experienced by hemodialysis patients.

According to Lestari and Hudiyawati, (2022) foot massage can increase blood circulation and stimulate the production of endorphins, reduce fatigue, relieve tension, and increase comfort in hemodialysis patients. Foot reflexology massage can be applied to chronic kidney failure patients undergoing hemodialysis who experience fatigue because foot reflexology massage has benefits such as reducing fatigue, increasing energy levels, and sleep quality (Ayu & Rahman, 2020; Robby et al., 2022).

Based on the researchers' assumptions, Swedish foot massage has an effect on reducing the fatigue felt in hemodialysis patients, which can be seen from the results of Table 3. The frequency distribution after the Swedish foot massage for fatigue showed that the majority of respondents did not experience fatigue.

Muscle Cramps Before Swedish Foot Massage of Hemodialysis Patients

Based on the research results, before the Swedish foot massage of hemodialysis patients, the majority of respondents experienced muscle cramps. Chronic kidney failure sufferers often experience physical suffering and anxiety. One of the side effects that is often associated with hemodialysis patients is muscle cramps (Anung et al., 2023). Muscle ram occurs in 33% to 78% of patients undergoing dialysis (Xu et al., 2022). According to research Bagchi (2020) also stated that patients undergoing hemodialysis often experience muscle cramps in the muscles of the calves, feet, toes, and thighs.

Based on the researchers' assumptions, before the Swedish foot massage of hemodialysis patients, the majority of respondents experienced muscle cramps every week with the severity assessed by the Visual Analogue Scale (VAS)>3, which lasted 1-10 minutes and occurred during the day.

Muscle Cramps After Swedish Foot Massage of Hemodialysis Patients

After the intervention was carried out, the results showed that the majority of respondents experienced a decrease in muscle cramps. The majority of respondents experienced muscle cramps every week and lasted ≤1 minute. This shows that Swedish massage is effective in reducing muscle cramps in patients undergoing hemodialysis.

Hemodialysis often causes muscle cramps and fatigue (Sabry Attia Hassan et al., 2023) . Leg cramps in hemodialysis patients are considered a cause of stress which results in psychological and physiological problems for patients. Reflexology massage on the feet can significantly reduce the frequency, intensity, and duration of leg cramps experienced by hemodialysis patients (ELmetwaly et al., 2023). According to Robby et al., (2022) foot massage using hitting, rubbing, or squeezing techniques can increase circulation, improve muscle tone, and also provide a relaxing effect. Foot massage can help improve blood circulation and also stimulate the production of endorphins which can reduce tension and increase comfort, thereby reducing fatigue in hemodialysis patients(Lestari & Hudiyawati, 2022).

Based on the researchers' assumptions, Swedish foot massage affected reducing muscle

cramps in hemodialysis patients. The patient said that after the massage the feet felt more relaxed and the muscle cramps were reduced.

The Effect of Swedish Foot Massage on Reducing Fatigue in Hemodialysis Patients

Based on the research results, it was found that there was a difference between fatigue before and after Swedish foot massage of hemodialysis patients. Based on the p-value parameter, it was found that 0.00 <0.5 means that there is an influence of Swedish foot massageon fatigue in hemodialysis patients. According to the researchers' observations, the changes that occurred were because the patient followed the Swedish massage procedure well and correctly and the patient was very active in discussing it so that the patient was able to practice it independently.

The results of the study showed that before the Swedish massage treatment against fatigue, the majority of respondents experienced fatigue as much as 72.2%. After Swedish massage treatment for fatigue, the majority of respondents were not tired, 97.2%. This shows that there is an influence of Swedish foot massageon fatigue in hemodialysis patients.

According to Khamid & Rakhmawati. (2022) prolonged dialysis can cause stress and various psychological problems such as fatigue and social problems. Fatigue is a common feeling experienced by 60-97% of patients undergoing hemodialysis. Foot massage can reduce fatigue in patients undergoing hemodialysis where foot massage can increase blood circulation and stimulate the production of endorphins, reduce fatigue, relieve tension, and increase comfort in hemodialysis patients (Lestari & Hudiyawati, 2022).

The Effect of Swedish Foot Massage on Reducing Muscle Cramps in Hemodialysis Patients

The results of the study showed that there was a significant difference in muscle cramps before and after the intervention. Based on the parameters p-value frequency 0.02<0.5, p-value pain level 0.00<0.5, p-value duration 0.00<0.5, and p-value time 0.03<0.5, which means that there is an effect of Swedish foot massageon muscle cramps in hemodialysis patients.

The results of the study showed that before the Swedish massage treatment, muscle cramps occurred, 72.8% of the frequency of cramps occurred every week and after the Swedish massage treatment, the frequency of cramps occurred 100% of those experiencing cramps every week. The severity level before the Swedish massage treatment was 97.2% of patients said it was very painful and lasted 1-10 minutes and after the Swedish massage treatment 100% of patients said it was a little painful which lasted ≤1 minute. This shows that there is an influence of Swedish foot massageon muscle cramps in hemodialysis patients.

Conclusion

Based on the research that has been carried out, it can be concluded that before the Swedish massage was carried out on respondents, it was found that the majority of respondents experienced fatigue and muscle cramps. After the Swedish massage treatment, data was obtained that the majority of respondents were not tired and the muscle cramps they felt were slightly painful and lasted for a few seconds. Swedish massage has become a non-pharmacological therapy that can be used to reduce fatigue and muscle cramps. Researchers can conclude that there is an effect of Swedish foot massageon reducing fatigue and muscle cramps in hemodialysis patients.

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Doi: 10.30829/jumantik.v9i2.20136

Table 1. Frequency Distribution of Respondent Characteristics in Hemodialysis Patients

No	Respondent Characteristics	Frequency (f)	Percentage (%)
1.	**Age** years old		
	17-27	4	11.1
	28-37	4	11.1
	38-47	5	13.9
	48-57	8	22.2
	58-67	14	38.9
	≤79	1	2.8
2.	**Gender**		
	Man	17	47.2
	Woman	19	52.8
3.	**Marital status**		
	Not married yet	3	8.3
	Marry	33	91.7
4.	**Last education**		
	Elementary School	7	19.4
	Junior High School	10	27.8
	Senior High School	14	38.9
	College	5	13.9
5.	**Work**		
	Civil servants	3	8.3
	IRT	14	38.9
	Self-employed	2	5,6
	Private sector employee	4	11.1
	Other	13	36.1
6.	**Suffering from illness for a long time**		
	<1 year	3	8.3
	1-2 years	8	22.2
	>2 years	25	69.4

Table 2. Frequency Distribution Fatigue Before Swedish Foot Massage in Hemodialysis Patients

No	Fatigue Scale (Pre-test)	Frequency (f)	Percentage (%)
1.	Not tired (normal)	10	27.8
2.	Fatigue	26	72.2

Table 3. Frequency Distribution Fatigue After Swedish Foot Massage in Hemodialysis Patients

No	Fatigue Scale (Post-test)	Frequency	Percentage (%)
1.	No Fatigue (normal)	35	97.2
2.	Fatigue	1	2.8

Table 4. Frequency Distribution Muscle Cramps Before Swedish Foot Massage in Hemodialysis Patients

No	Cramp Questionnaire	Frequency (f)	Percentage (%)
1.	**Frequency**		
	Each month	10	27.8
	Every week	26	72.2
	Once in 3 months	0	0.0
2.	**Severity level**		
	VAS>3	35	97.2

	VAS≤3	1	2.8
3.	**Duration**		
	Lasts ≤1 minute	0	0.0
	Lasts 1-10 minutes	36	100.0
	Lasts ≥10 minutes	0	0.0
4.	**Time**		
	Afternoon	27	75.0
	Evening	0	0.0
	Day and night	9	25.0

Table 5. Frequency Distribution Muscle Cramps After Swedish Foot Massage in Hemodialysis Patients

No	Cramp Questionnaire	Frequency (f)	Percentage (%)
1.	**Frequency**		
	Each month	0	0.0
	Every week	36	100.0
	Once in 3 months	0	0.0
2.	**Severity level**		
	VAS>3	0	0.0
	VAS≤3	36	100.0
3.	**Duration**		
	Lasts ≤1 minute	34	94.4
	Lasts 1-10 minutes	2	5,6
	Lasts ≥10 minutes	0	0.0
4.	**Time**		
	Afternoon	36	100.0
	Evening	0	0.0
	Day and night	0	0.0

Table 6. Effect of Swedish Foot Massage on Fatigue in Hemodialysis Patients

Variable	N	*Mean*	*Std. Deviation*	Z	*Sig. (2-tailed)*
Pre-test	36	1.72	0.454	-5,000	0.00
Post-test	36	1.03	0.167		

Table 7. Effect of Swedish Foot Massage on Reducing Cramps Muscles in Hemodialysis Patients

Variable	N	*Mean*	*Std. Deviation*	Z	*Sig. (2-tailed)*
Frequency					
Pre-test	36	1.72	0.454	-3,162	0.02
Post-test	36	2.00	0,000		
Pain Level					
Pre-test	36	1.03	0.167	-5,916	0.00
Post-test	36	2.00	0,000		
Duration					
Pre-test	36	2.00	0,000	-5,831	0.00
Post-test	36	1.06	0.323		
Time					
Pre-test	36	1.50	0.878	-3,000	0.03
Post-test	36	1.00	0,000		