The Effect of Foot Self-Massage on Peripheral Neuropathic Pain, Peripheral Skin Temperature and Patient Comfort in Individuals with Diabetes: A Randomized Controlled Trial

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Objective: The aim of this study was to evaluate the effect of foot self-massage on peripheral neuropathic pain, peripheral skin temperature and patient comfort in individuals with diabetes.

Methods: The sample of the study consisted of 52 individuals with type 2 diabetes (26 self foot massage group and 26 control group) between August 2021 and July 2022. Individuals in the foot self-massage group performed a foot massage for 30 minutes (15 minutes for each foot) three times a week for four weeks after training. Data were collected using an Individual Description Form, a Visual Analog Scale (VAS), the DN4 Pain Questionnaire and the General Comfort Scale-Short Form and peripheral skin temperature was measured. The data were evaluated using the Independent Sample-t test, Paired Sample-t test, Mann-Whitney U test, and Wilcoxon test. Continuity correction and Pearson-$\chi 2$ (chi-square) tests were used to compare categorical variables.

Results: In this study, it was found that foot self-massage did not affect the peripheral neuropathic pain level of the patients, but the mean pain (VAS) scores of the patients in the foot massage group significantly decreased compared to the patients in the control groups. In addition, it was found that foot self-massage did not affect patients' peripheral skin temperature and patient comfort.

Conclusion: It is recommended that foot massage, which can be applied by itself without time and place restrictions, be learned by patients and supported by health professionals because it is easy to apply, practical and economical.

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Key words: Type 2 Diabetes, Foot Self-Massage, Peripheral Neuropathic Pain, Skin Temperature, Comfort

Diabetes mellitus (DM) is an important metabolic disease that can affect almost every organ system in the body. Although diabetes causes many macrovascular and microvascular complications, one of the rare microvascular complications is peripheral neuropathy (1). Diabetic peripheral neuropathy is characterized by progressive nerve loss, which is more prominent in the feet, but causes loss of sensation and strength that starts in the hands and feet and then spreads to the legs and arms. These problems lead to restlessness and insomnia in patients, resulting in a decrease in work efficiency and quality of life, and an increase in health care costs (2,3).

In the management of diabetic peripheral neuropathy, patients turn to various complementary and integrative practices for reasons such as side effects due to long-term drug use, undesired response in treatment, high treatment costs, more individual control in medical care, and a holistic health care approach (4-6). One of the commonly used complementary and integrative practices is foot massage. The American Massage Therapy Association defines massage as "manual soft tissue manipulation, including holding, causing movement, and/or applying pressure to the body" (7,8). Dalal et al. (2014) states that foot reflexology applied to patients with diabetic neuropathy causes improvement in pain, glycemic control, nerve conductivity, and heat and vibration sensitivities (1). Hamidi et al. (2016) applied reflexology and yumeiho massage to a group of women with diabetic peripheral neuropathy three days a week for six weeks. As a result, a significant improvement in pain and balance levels was found in the reflexology and yumeiho massage group compared to the control group (9). When the literature is examined, although there are studies on foot massage in cancer (10), chemotherapy-induced peripheral neuropathy (11), hypertension (12), acute coronary syndrome (13) and hemodialysis patients (14, 15) there are a limited number of studies evaluating the effectiveness of self-applied foot massage by diabetic individuals. The aim of this study was to evaluate the effect of foot self-massage on peripheral neuropathic pain, peripheral skin temperature and patient comfort in individuals with diabetes.

Materials and Methods

This study was carried out to examine the effect of foot self-massage on peripheral neuropathic pain, peripheral skin

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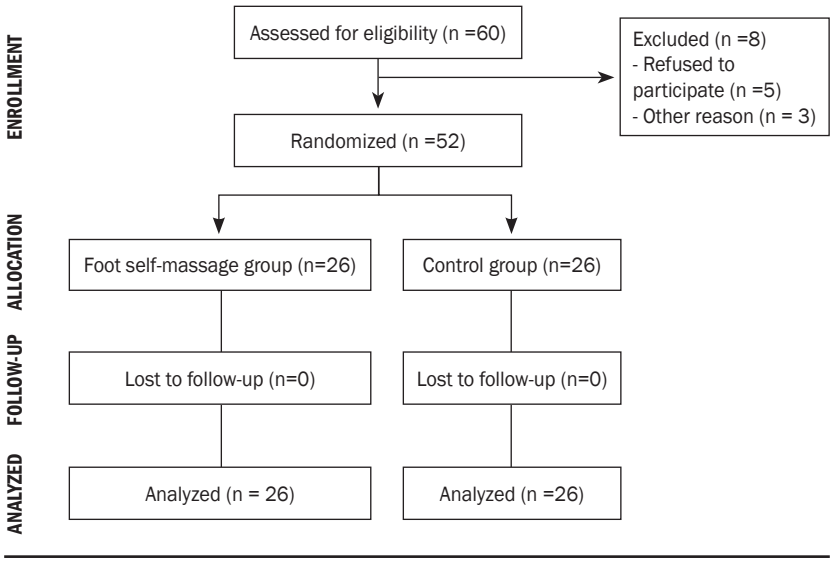
temperature and patient comfort in individuals with diabetes. This study was conducted as a randomized controlled trial.

Figure 1. Flow chart of inclusion of patients



Study sample and Participants

The study was conducted with 52 individuals with type 2 diabetes (26 in the self-foot massage group, 26 in the control group) who applied to the internal medicine outpatient clinic of a hospital located in the central region of Turkey between August 2021 and July 2022. Those included in the study were 18 years of age or older, and had been diagnosed with type 2 diabetes at least six months previously. They had a glycosylated hemoglobin A (HbA1c) level of >6.5%, could take care of themselves independently, and had no peripheral circulation problems, or physical or cognitive health levels which would prevent them from answering the forms and participating in the study. Patients with peripheral neuropathy for a different reason (chemotherapy, neurological problems, etc.), those with extremity damage (gangrene or foot amputation), those with a disease that might cause a change in peripheral skin temperature (Raynaud's disease, etc.), or with speech or hearing difficulties that prevent data collection were excluded from the study. Using G-Power V3.1.9.7 statistical software in calculating the sample size, it was determined that 26 participants should be placed in each group with 0.80 power effect and 0.68 effect size (α=0.05). Participants who were eligible and willing to participate in the study were identified. For random assignment to the experimental group or the control group, two groups were formed by an independent researcher who was not involved in the study, each group consisting of 26 individuals with diabetes, using the randomization method in a computer environment (www.randomizer.org) (Fig.1).

Interventions

Patients who met the inclusion criteria were randomly assigned to two groups, a foot self-massage group and a control group.

Foot self-massage group

The address and contact information of the individuals in the foot massage group were obtained after the first interview, the purpose of the study was explained in the first home visit, and the initial data forms were filled. Then, at the beginning of the study, 25-30 minutes of foot self-massage training was given individually. In the training, it was explained in detail what foot massage is, and how and for how long it should be done. After the training, the patient's questions were answered and feedback was received. Then, individuals in the foot massage group were asked to massage for 30 minutes (15 minutes for each foot) three times a week. They were asked to continue the self-massage process for a total of 12 sessions over a period of four weeks. Telephone monitoring was performed once a week by the researcher to encourage the continuation of the intervention. At the end of four weeks, data collection forms were filled again.

Control group

The purpose of the study was explained and informed to the patients in the control group. The patients in the control group did not self-administer the foot massage intervention. Instead, these patients received routine health care and standard treatment. Data collection forms were applied at the beginning of the study and at the end of four weeks.

Data Collection Tools

Data were collected using an Individual Description Form, a Visual Analogue Scale (VAS), the DN4 Pain Questionnaire and the General Comfort Scale Short Form. In addition, peripheral skin temperature was measured at the beginning and end of the study.

Individual Description Form

The individual description form consisted of questions about socio-demographic characteristics, disease-presenting characteristics and metabolic variables such as FBS fasting blood glucose (FSB), postprandial blood glucose (PPG) and HbA1c. The form was prepared by the researchers based on the literature (2,5-7).

Visual Analog Scale (VAS)

The Visual Analog Scale (VAS) used for the assessment of pain is used to digitize values that cannot be measured numerically. Two end definitions of the parameter to be evaluated are written at the two ends of a 10 cm line, and the patient is asked to indicate where on this line their situation is by drawing a line or pointing (16). This study, the patients were told that the '0' point was no pain at all, and that the '10' point was unbearable pain, and they were asked to mark their own pain intensity on the line.

DN4 Pain Questionnaire

The DN4 pain questionnaire, developed by a French neuropathic pain group, is a questionnaire that includes symptoms and signs

associated with neuropathic pain. The total scale score is calculated by giving 1 point for each "yes" answer and 0 points for each "no" answer. In the scale, the limit value for neuropathic pain was determined as 4/10 and above. Turkish validity and reliability was tested by Unal Çevik et al. (2010). The Cronbach's alpha coefficient was found to be 0.97, and the specificity and sensitivity in the diagnosis of neuropathic pain were 96.6% and 95% respectively (17).

General Comfort Scale-Short Form

Kolcaba studied comfort theory and explained it through levels and dimensions. The sub-dimensions consisted of relief (the state of the patient whose particular need was met), relaxation (the state of calm or contentment, contentment), and superiority (the state in which one overcame one's own problems or pain) (18). The General Comfort Scale-Short Form was developed by Kolcaba in 2006. It includes the sub-dimensions of comfort and relief (9 items), relaxation (9 items), and overcoming problems (10 items). In the evaluation of the scale, which consists of positive and negative items, negative items are collected by reverse coding. The average value is found by dividing the total score obtained by the number of scale items. The Turkish validity and reliability testing of the scale was performed by Sarıtaş et al. (2018) (19). In this study, the Cronbach's alpha internal consistency coefficient was determined to be 0.860 in the pre-test and 0.810 in the post-test.

Peripheral Skin Temperature

Peripheral skin temperature was measured before and after application on the skin in the middle of the plantar surfaces of both feet using a handheld digital skin thermometer (Weewell WTN530, Ireland). The same thermometer was used before and after the application to reduce errors caused by the thermometer. Temperature was measured twice from a point on the plantar surface of each foot immediately after patients had rested with their socks for 20 minutes during the first and last home visit, and a total of four measurements (two for each foot) were averaged for analysis.

Data analysis

Data evaluation was performed with the statistical program Statistical Package for the Social Sciences (SPSS) 24.0 (Inc., Chicago, IL, USA). Mean, standard deviation, percentage and numerical values were used in the evaluation of descriptive data. The conformity of the data to normal distribution was determined by the Shapiro Wilk test. The Independent Sample-t test was used to compare two independent groups and the Paired Sample-t test method was used to compare two dependent groups for measurements in accordance with normal distribution. The Mann-Whitney U test was used to compare two independent groups that did not fit normal distribution, and the Wilcoxon test was used to compare the two dependent groups. Continuity correction and Pearson-$\chi 2$ (chi-square) tests were used to compare categorical variables $p<0.05$ was accepted as statistically significant.

Ethical considerations

The study was conducted in accordance with the principles of the Helsinki Declaration. Written permission was received from the Aksaray University ethics committee (ref. 2020/01-16, dated 24 February 2020) and the Scientific Research Studies of the Ministry of Health of the Republic of Turkey. Permission was obtained to use the scales used in the study. Individuals with diabetes who participated in the study were informed in detail about the aims and procedures of the study and assured that they were participating voluntarily the study. The clinical trial registration number for this article is NCT04906226.

Results

The mean age of the diabetic individuals participating in the study was 60.88±6.40 (min:49, max:72) years, and the mean time since diagnosis of diabetes was 9.30±4.88 (min:2, max:25) years. It was found that 29 (55.8%) of the 52 patients were women, and most of the patients were married (90.4%). There was no statistical difference between the demographic characteristics of the study groups at the beginning of the study (Table 1).

There was no statistically significant difference between the groups in terms of pre-neuropathic pain, VAS and peripheral skin temperature mean scores of the patients in the foot self-massage and control groups ($p=0.897$; $p=0.553$; $p=0.517$). When the mean post-neuropathic pain and peripheral skin temperature scores of the patients in the foot massage and control groups were compared, the difference between the groups was found not to be statistically significant ($p=0.204$; $p=0.528$); when the mean post-pain scores of the patients in the foot massage and control groups were compared, the scores of the patients in the massage group were found to be lower, and the difference between the groups was found to be statistically significant ($z=2.441$, $p=0.015$). No significant difference was found between the pre-test and post-test mean neuropathic pain, VAS, and peripheral skin temperature scores of the patients in the foot massage and control groups ($p>0.05$) (Table 2). In other words, it can be said that there was intermittent worsening in the pain of patients in the control group as measured by VAS, but there was stability in the pain scores of patients in the intervention group (foot self-massage).

In the study, no significant difference was found between the foot self-massage and control groups in terms of fasting blood glucose (FSB), postprandial blood glucose (PPG) and HbA1c pre-test and post-test mean scores ($p>0.05$). In intragroup measurements, the patients in the massage group had lower final fasting and postprandial blood glucose scores, and the difference was statistically significant ($p<0.05$), while there was no significant difference in terms of HbA1c pre- and post-test mean scores ($p>0.05$) (Table 3).

There was no significant difference between the foot self-massage and control groups in terms of pre- and post-test comfort scores of the patients participating in the study ($p>0.05$). There was no significant difference between the mean scores of the total comfort and comfort sub-dimensions of the patients in the foot self-massage and control groups in intragroup measurements ($p>0.05$) (Table 4).

Discussion

In this study, the effect of foot self-massage on peripheral neuropathic pain, peripheral skin temperature and patient comfort in individuals with diabetes was investigated. In this study, it was

Table 1. Baseline comparison of demographics between foot self-massage and control groups

Variables	Foot self-massage (n=26) n (%)	Control (n=26) n (%)	Total (n=52) n (%)	t^a	X^{2b}	*p*
Gender						
Female	14 (48.3)	15 (51.7)	29 (55.8)		0.078	0.780
Male	12 (52.2)	11 (47.8)	23 (44.2)			
Total	26 (100)	26 (100)	52 (100)			
Education status						
Literate/not finished school	4 (7.7)	3 (5.8)	7 (13.5)		2.023	0.568
Primary school	12 (23.1)	17 (32.7)	29 (55.8)			
Secondary school	7 (13.5)	4 (7.7)	11 (21.2)			
High school	3 (5.8)	2 (3.8)	5 (9.6)			
Total	26 (100)	26 (100)	52 (100)			
Marital status						
Married	24 (51.1)	23 (48.9)	47 (90.4)		0.221	0.638
Single	2 (40.0)	3 (60.0)	5 (9.6)			
Total	26 (100)	26 (100)	52 (100)			
Occupation						
Officer	2 (3.8)	2 (3.8)	4 (7.7)		5.810	0.214
Worker	2 (3.8)	3 (5.8)	5 (9.6)			
Farmer	1 (1.9)	4 (7.7)	5 (9.6)			
Retired	16 (30.8)	8 (15.4)	24 (46.2)			
Housewife	5 (9.6)	9 (17.3)	14 (26.9)			
Total	26 (100)	26 (100)	52 (100)			
Age	*X*=60.7±5.77	*X*=61.0±7.08	*X*=60.88±6.40	-0.129		0.898
BMI	*X*=29.4±3.61	*X*=28.2±2.49	*X*=28.8±3.13	-1.387		0.172
Duration of DM (years)	*X*=8.84±4.90	*X*=9.76±4.90	*X*=9.30±4.88	-0.846		0.398
Drug usage period (years)	*X*=8.69±5.08	*X*=9.76±4.90	*X*=9.23±4.98	-0.901		0.368

p<0.05 Significance level, [a]Independent t test, [b]Chi-square analysis

found that foot self-massage did not affect the peripheral neuropathic pain level of the patients, but it significantly reduced the pain level of the patients in the massage group compared to the patients in the control group. Although no studies examining the effect of foot self-massage on peripheral neuropathic pain in individuals with diabetes could be found, Chatchawan et al. (2020) emphasized that both therapist-administered and self-administered Thai foot massage in individuals with type 2 diabetes can be a promising alternative treatment that improves foot skin blood flow and ankle patency (ROM) in patients with peripheral neuropathy and can be applied at home by patients (20). In the literature, it is recommended that foot massage has an effect on reducing diabetic peripheral neuropathy complaints and that patients should regularly perform foot massage independently in home care treatment (21,22). It is stated that foot reflexology is effective on peripheral neuropathy because it stimulates large nerve fibers, suppresses the perception of pain, and controls the stimulation of the sympathetic nervous system, and the process of massaging the reflex zones in the feet causes relaxation by keeping the feet in balance (23). However, surprisingly although there is no decrease in the patients' peripheral neuropathic pain levels, there is an improvement in their pain expression. Although there are limited studies on this subject in the literature, the current findings are considered important.

In this study, it was found that foot self-massage did not affect the peripheral skin temperature of the patients. Similarly, Silva et al. (2018) found that there was no significant difference between the groups on capillary blood glucose, foot tissue temperature and plantar pressure after foot reflexology in individuals

Table 2. Comparison of neuropathic pain levels, VAS and peripheral skin temperature in foot self-massage and control groups

Variables	Foot self-massage (n=26) X±SS	Control (n=26) X±SS	Test value	*p*
Pre-test neuropathic pain	3.92±2.77	3.80±2.36	-0.129[a]	0.897
Post-test neuropathic pain	3.15±1.80	3.73±1.82	-1.271[a]	0.204
Test value[b]	Z= -1.208 p= 0.227	Z= -0.260 p=0.795		
Pre-test VAS	4.54±2.19	4.92±2.03	-0.593[a]	0.553
Post-test VAS	4.38±1.60	5.42±1.41	-2.441[a]	**0.015**
Test value[b]	Z= -0.816 p=0.415	Z= -1.647 p=0.099		
Pre-test peripheral skin temperature	36.53±0.30	36.48±0.28	0.653[c]	0.517
Post-test peripheral skin temperature	36.46±0.24	36.51±0.31	-0.636[c]	0.528
Test value[d]	t=0.953 p=0.350	t= -0.608 p=0.549		

[a]Mann-Whitney U Test z value, [b]Wilcoxon signed-rank test Z value, [c]Independent t test, [d]Paired samples t-test, p <0.05 Significance level

with diabetes (24). Another study evaluated the effects of a foot care training program using foot reflexology massage in diabetic patients. As a result, there was a significant increase in foot care knowledge and self-care behaviors between the experimental and control groups. There was no significant difference between the groups in terms of skin temperature and foot pulse, while the interaction was significant according to the groups or time (25). In contrast, it has been reported that foot reflexology for six weeks in patients with gynecological cancer undergoing chemotherapy caused significant reductions in peripheral neuropathy symptoms, interference with activities, anxiety and depression scores, and a significant increase in peripheral skin temperature (26). Another study found that foot reflexology improved some indicators of skin and hair deterioration hair growth, elasticity/turgor, hydration, sweating, skin texture and integrity/skin peeling in individuals with type 2 diabetes (27). Chatchawan et al. (2020) stated that in individuals with type 2 diabetes, foot skin temperature did not change in self-administered Thai foot massage (STFM), but it increased significantly in therapist-administered foot massage (TFM) (20). It is stated in the literature that foot reflexology improves peripheral blood circulation and therefore increases peripheral skin temperature (23). The findings of the study are similar to some studies and different from others, and this difference is thought to be due to the study sample and method differences.

This study, although the post- fasting and postprandial blood glucose levels of the patients in the massage group were significantly lower in intragroup measurements, it was found that foot self-massage did not affect the fasting blood glucose, postprandial blood glucose or HbA1c levels of the patients in the intergroup measurements. On the other hand, in a study conducted to determine the effect of Swedish massage on HbA1c in children with diabetes, it was emphasized that the HbA1c level was significantly lower in the intervention group than in the control group after the intervention, and that massage therapy could help reduce the patients' drug consumption in glucose control (28). Cicek et al. (2021), in a study to determine the effect of foot reflexology on ankle brachial index, diabetic peripheral neuropathy, and glycemic control in older adults with diabetes, stated that foot reflexology is effective in improving glycemic control and diabetic peripheral neuropathy in older adults with diabetes (29). In another study, it was determined that foot reflexology had a systemic effect on glycemic control and lowered serum glycemic level (30). In this study, unlike the literature, it is thought that the fact that foot massage did not affect the HbA1c levels of the patients, maybe due to the limited time between the first and last measurements (four weeks) and the method differences in the studies.

Table 3. Comparison of FBS, PPG ve HbA1c in foot self-massage and control groups

Variables	Foot self-massage (n=26) X±SS	Control (n=26) X±SS	*Test value*	*p*
Pre-test FBS	118.58±15.87	115.88±14.87	0.631[c]	0.531
Post-test FBS	113.26±12.64	115.76±12.05	-0.605[a]	0.545
Test value[b]	Z= -4.490	Z= -0.326		
	p=0.000	p=0.744		
Pre-test PPG	162.92±17.41	156.54±14.95	-1.338[a]	0.181
Post-test PPG	155.38±11.39	157.69±14.22	-0.646[a]	0.518
Test value[b]	Z= -2.342	Z= -0.619		
	p=0.019	p=0.536		
Pre-test HbA1c (%) (mmol/mol)	7.98±0.92	8.06±0.76	-0.671[a]	0.502
Post-test HbA1c (%) (mmol/mol)	7.88±0.76	8.00±0.77	-0.165[a]	0.869
Test value[b]	Z=-0.909	Z=-1.514		
	p=0.364	p=0.130		

[a]Mann–Whitney U Test z value, [b]Wilcoxon signed-rank test Z value, [c]Independent t test, p <0.05 Significance level

Table 4. Comparison of comfort levels in foot self-massage and control groups

Variables	Foot self-massage (n=26) X±SS	Control (n=26) X±SS	*Test value*	*p*
Pre-test refreshing	35.34±1.42	34.38±0.86	-0.165[a]	0.869
Post-test refreshing	34.11±1.02	33.42±0.91	-0.606[a]	0.544
Test value[b]	Z= -0.071	Z= -0.701		
	p= 0.943	p=0.484		
Pre-test relief	33.19±1.41	32.73±0.97	0.268[c]	0.789
Post-test relief	33.96±0.88	32.53±0.77	-1.286[a]	0.198
Test value[b]	Z= -0.744	Z= -0.212		
	p= 0.457	p=0.832		
Pre-test overcoming	37.96±1.50	37.42±1.16	0.283[c]	0.779
Post-test overcoming	37.38±1.13	35.42±0.93	1.339[c]	0.187
Test value[d]	t=0.392	t= 1.941		
	p=0.698	p=0.064		
Pre-test total comfort	106.50±3.97	104.53±2.69	-0.156[a]	0.876
Post-test total comfort	105.46±2.59	101.38±2.20	-1.301[a]	0.193
Test value[b]	Z= -0.781	Z= -0.674		
	p= 0.435	p=0.501		

aMann–Whitney U Test z value, bWilcoxon signed-rank test Z value, cIndependent t test, dPaired samples t-test, p <0.05 Significance level

In this study, it was found that foot self-massage did not affect the comfort level of the patients. No studies examining the effect of foot self-massage on the comfort level of individuals with diabetes could be found in the literature. In another study conducted to evaluate the effect of foot reflexology massage on the comfort level of open heart surgery patients, it was determined that there was no significant difference in the average total comfort score of the intervention group and that it did not affect the comfort level of the patients (31). Although studies in this area are limited, incorporating touch massage interventions applied to patients into care planning may be beneficial in supporting patients suffering from chronic pain, as well as increasing the feeling that patients' pain is taken seriously, providing physical and psychological support, feelings of comfort and well-being, and thus life expectancy. It is emphasized that such practices can also improve the caregiver-patient relationship (32). However, Song et al. (2015) found that studies evaluating self-administered foot reflexology in patients with type 2 diabetes, hypertension, or urinary incontinence had insufficient evidence to determine the effect of the treatment, so to validate the effect of self-administered foot reflexology for chronic conditions, a well-designed, large-scale. and a randomized controlled trial is needed (33). At the same time, it is thought that it is important that self-administered foot massage should not be limited by time and place, that it should be easy to apply, practical and economical, that it should be learned by patients, and that the application should be supported by health professionals.

Limitations and Strengths

In order to evaluate this study correctly, it is important to consider some limitations. First, it should be known that there will be individual differences in individuals' own practices. At the same time, since the foot massage application was performed by the patients themselves, the follow-up of the effects of the intervention is limited. In addition, the need for longer-term applications (three months and above) in order to evaluate the longer-term effects of such massage applications can be considered as another limitation of this study. However, the limited number of studies examining patients' self-foot massage in the literature can provide data for the literature and future studies.

In addition, it is recommended that future studies use different research designs to explain the effects of individual contact, touch and other placebo effects.

Conclusions

In this study, it was determined that self-administered foot massage did not affect peripheral neuropathic pain, peripheral skin temperature or patient comfort, but it was an effective approach in improving the pain levels of patients in the foot massage group. However, it is important to closely monitor the complications of diabetes, which require long-term treatment and monitoring. It is necessary to regularly evaluate and raise awareness of groups that are particularly at risk. Studies based on the above-mentioned results and controversies examining the effectiveness of self-administered foot massage in individuals with diabetes are limited. Therefore, new studies should be conducted to evaluate the effects of the application in different sample groups and durations. At the same time, it is recommended that it be supported by health professionals because self-administered foot massage does not have time and place restrictions, and it is easy and economical to apply.

Resumen

Objetivo: El objetivo de este estudio fue evaluar el efecto del automasaje de pies sobre el dolor neuropático periférico, la temperatura de la piel periférica y la comodidad del paciente en personas con diabetes. Métodos: La muestra del estudio estuvo compuesta por 52 personas con diabetes tipo 2 (26 del grupo de automasaje de pies y 26 del grupo de control) entre agosto de 2021 y julio de 2022. Los individuos del grupo de automasaje de pies realizaron un masaje de pies durante 30 minutos (15 minutos para cada pie) tres veces por semana durante cuatro semanas después del entrenamiento. Los datos se recopilaron mediante un formulario de descripción individual, una escala visual analógica (EVA), el cuestionario de dolor DN4 y la escala de confort general, forma corta, y se midió la temperatura periférica de la piel. Los datos se evaluaron mediante la prueba t de muestras independientes, la prueba t de muestras pareadas, la prueba U de Mann-Whitney y la prueba de Wilcoxon. Se utilizaron pruebas de corrección de continuidad y de Pearson-$\chi 2$ (chi-cuadrado) para comparar variables categóricas. Resultados: En este estudio, se encontró que el automasaje de pies no afectó el nivel de dolor neuropático periférico de los pacientes, pero las puntuaciones medias de dolor (EVA) de los pacientes del grupo de masaje de pies disminuyeron significativamente en comparación con los pacientes del grupo de masaje de pies. grupos de control. Además, se descubrió que el automasaje de pies no afectaba la temperatura periférica de la piel ni la comodidad del paciente. Conclusión: Se recomienda que el masaje de pies, que puede aplicarse por sí solo sin restricciones de tiempo y lugar, sea aprendido por los pacientes y apoyado por los profesionales de la salud porque es de fácil aplicación, práctico y económico.

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