Original Article

The Effect of Peer Support on Foot Care in Patients with Type 2 Diabetes

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Abstract

Background: Diabetes mellitus is one of the prevalent diseases in the world with several complications including diabetic foot ulcers. The aim of this study was to investigate the effect of peer support on foot care in patients with type 2 diabetes. **Materials and Methods:** This clinical trial study was performed at selected centers of Isfahan University of Medical Sciences in 2017. Fifty patients with type 2 diabetes were randomly assigned into intervention and control groups. Five 30-min. supportive training sessions were held for the intervention group by the peers and during 35 days. Foot Care Confidence/Foot-Care Behavior Scale For Diabetes (FCCS-FCB) was completed by both groups before, immediately after and 1 month after the intervention. Collected data were analyzed using Chi-square, Mann–Whitney, repeated measures ANOVA and *t*-test. **Results:** Mean (SD) age of subjects was 56.46 (7.36) years old Mean (SD) score of self-efficacy ($F_{2, 26}$ = 54.71, $p < 0.001$), preventive behaviors ($F_{2, 26}$ = 28.46, $p < 0.001$), and potentially damaging ($F_{2, 26}$ = 27.89, $p < 0.001$) had significant differences between the two groups immediately and 1 month after the peer support. **Conclusions:** Peer support can enhance foot care behaviors in diabetic patients. Therefore, using people who are successful in the education and support of patients has a significant role, and nurses can use them as a support in the field of care and follow-up. However, health agencies are responsible for providing the patients with the best guidelines, and these results can be useful as an evidence for them.

Keywords: *Diabetes mellitus, type 2, diabetic foot, peer group, self efficacy*

Introduction

The prevalence of type 2 diabetes is increasing worldwide and the imposition of its related complications is a serious threat to global and individual health.[1] Lee *et al*., quoting the International Diabetes Federation, argue that in 2015, 415 million people, aged between 20 and 79 years, have been suffering from diabetes mellitus all around the world.[2] According to statistics released by the World Diabetes Federation, about 5 million people in Iran have diabetes.[3] People with diabetes are exposed to numerous and severe complications.

Diabetic foot is a potential disabling disorder and the most prevalent diabetes-related cause of hospitalization.[1] About 15–20% of diabetic patients develop this complication during their lifetime. The incidence of this complication is higher in people with type 2 diabetes.[4] If the diabetic foot ulcer completely heals, the probability of recurrence is about 30–40% in the first year and about 70% in the first 5 years.[5]

Risk factors for this disorder can be divided into two categories: external or controllable factors (including minor and thermal trauma, smoking and alcohol consumption, inadequate control of blood sugar, obesity and lack of patient cooperation) and internal or uncontrollable factors (including male gender, vasculopathy, age, duration of diabetes and history of previous foot ulcers).[6,7] Due to the controllability of external factors, this complication can be largely prevented.[7] The five main factors for preventing diabetic foot ulcers are identifying the high-risk foot, examining the high-risk foot regularly, educating the patient and family and caregivers, using the right shoes regularly, and treatment of symptoms observed before the onset of the main wound.[8]

Self-care education is the basis for treating diabetes and preventing its complications.[9] Self-care includes a set of spontaneous activities that enable patients to understand the conditions and factors affecting their health and

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they can make decisions to improve their health and implement these decisions.[10,11] One of the most important factors in boosting self-care in patients with diabetes is self-efficacy.[12] One's self-efficacy, belief, and expectation represent one's capacity to influence the desired outcome through individual efforts.[13] Khavasi *et al*., quoting Gao *et al*., maintain that self-efficacy is one of the most important factors for enhancing self-care in patients with diabetes.[12] Currently, self-efficacy of diabetic patients is not optimal and requires the promotion of self-care programs.[9]

Studies conducted by Yin *et al*. and Fisher *et al*. have shown that peer support is one of the methods used to improve adherence to treatment, self-efficacy, and patient awareness.[14,15] The World Health Organization (WHO) considers peer support as an economic and flexible intervention which can improve care and diabetes outcomes.[16] Research findings show the positive effects of peer support on self-care in patients with diabetes which can lead to better management of diabetes complications.[14,15,17] The results of a study conducted in 2013 by Sachmechi *et al*. showed that peer support reduced cholesterol, LDL, and HbA1c levels in diabetic patients.[18] Yin *et al*. found that peer support has improved self-care activities, including foot care and diet for patients with type 2 diabetes.[14] Similarly, Rashidi *et al*. found that peer support has improved the self-efficacy of diabetic patients.[10] However, there are limited results regarding the effectiveness of this method in patients with diabetes, especially those with type 2 diabetes.[19-21] For example, the results of a study by Smith *et al*. on patients with type 2 diabetes showed that peer support did not have a significant effect on HbA1c levels, cholesterol levels, systolic blood pressure, and patients' health scores.[19] Given these limitations, further studies are recommended.[17,20]

Although peer support appears to be beneficial for some adults with diabetes, there is no sufficient evidence supporting this theory. On the other hand, studies in this field have focused on the effect of peer support on metabolic variables such as HbA1c level and there have been limited studies on its effect on foot care and related behaviors. Therefore, evaluation with a better design on the effectiveness of peer support is still needed.[17]

Materials and Methods

This parallel clinical trial was registered in Iranian Registry of Clinical Trials with ID of IRCT20171216037895N4 and was conducted on patients with type 2 diabetes referring to Kourosh Health and Diabetes Clinic of Isfahan, Iran, in 2017.

The confidence coefficient of the study, the test power, and the standard error were determined to be 95%, 80%, and 0.80 of standard deviation, respectively. Also, the effect size was 0.70. Accordingly, the number of the samples constituting each group was determined to be 25. The research was conducted in two stages of peer selection and education and intervention.

First step was sampling. Inclusion criteria consisted of willingness to participate in the research, literacy, fluency in speaking Farsi, having type 2 diabetes with more than 3 years of duration, being under diabetes treatment, no speech or hearing impairment, no active or improved diabetic foot ulcer, no medical and paramedical education and history of participation in similar research, no age-related illness that prevents learning (memory problem, Alzheimer's), and no use of drugs that affects the level of consciousness and learning. Exclusion criteria consisted of the patients with developed foot ulcer in the course of the study, and those who did not fully participate in the sessions.

In addition to having patient inclusion criteria, the subjects of the peer group must meet the following criteria: be interested in education and leadership of the group as well as participation in the research, the ability to educate and communicate, and, based on the evidence in the cases regarding the incidence of diabetes complications, having self-efficacy in foot care and diabetes management. These individuals were selected from patients who from the point of view of the center's endocrinologist and based on physical examinations found to be self-sufficient in foot care. They also had the highest score on the Foot Care Confidence/Foot-Care Behavior Scale For Diabetes FCCS-FCB questionnaire.[22]

In order to prepare the peer group, two 1 h training sessions[23] were initially organized as workshops. The first session was to review the experiences of peers. Information about foot care was received by the researcher for the purpose of preventing foot ulcers in people with diabetes. Using the question and answer method and the use of slides and brainstorming in the classes of the selected centers, the second session was held by the researcher in order to show the peers how to support the daily management of foot care for diabetic patients, provide social and emotional support, and facilitate communication and support for access to clinical care and ongoing support. The necessity of the practice, the intervention method, the research process and the curriculum were fully described and taught in this session. In order to make the education integrated, the peers were assessed in terms of their ability to learn the correct information through questioning and role playing. A training session was held for the subjects of the peer group to increase their skills in order to promote practical and information support and empower them in the field of support. Also, at the end of each training session, the information presented by the individuals was reviewed as a role play to ensure learning.

In order to achieve a scientific and comprehensive content for citing and correcting the information of the peer group

on cares, first the relevant sources were reviewed and a draft of the related contents on foot care behaviors[24] was collected. Then, two diabetes nurses were asked to express their opinions and, finally, the completed materials were approved by two of the faculty members of the university.

Data collection method was daily referring to the patients' files in the selected centers of Isfahan province and inviting them to participate in the study. Among the eligible patients, 50 subjects were selected using simple random sampling method and were divided into two groups of 25 subjects. As such, two same size cards with numbers one and two on them were placed in a packet. When patients came in person, they were asked to choose one of these cards. The subjects who chose the card with number one on it were allocated to the intervention group and those who chose the card with number two on it to the control group. After initial sampling, three patients were excluded because of having exclusion criteria while four other patients withdrew from the study. Therefore, seven other samples were re-added to the study by using the previously mentioned sampling method. The intervention group participated in peer support program and the control group in two training sessions held by the researcher. The provided educational content was the same for both groups. The intervention group was divided into four groups each of which was given a peer. Each peer supported his/her group for 35 days in the form of training-supportive sessions (Five 30-min. sessions) held weekly (in the research environment between 9 and 11 am) using group discussion, question and answer, and problem-solving. The peers gave their support in the form of four key functions including support for daily foot care management in the diabetic person, social and emotional support, facilitating communication, and assistance for access to ongoing care and support [Table 1].

The questionnaire of demographic characteristics including age, sex, marital status, educational level, occupation, and duration of diabetes was completed at the beginning of the study by the patients in the intervention and control group using interview method. Foot Care Confidence Scale/Foot-Care Behavior (FCCS-FCB)[25] was used to measure foot care in three stages of before, immediately, after and 1 month after the intervention for the two groups. The severity of self-confidence (self-efficacy) of patients is measured by the first part of this questionnaire (12 questions) whose scores range from 12 to 60, and the highest score in this section indicates the highest level of self-efficacy in the patient. The second part evaluates foot care behavior and includes the areas of preventive behaviors (six questions) and potentially damaging behaviors (11 questions). The scores of the questions in the field of preventive behaviors range from 6 to 36, and a high score means the non-observance of preventive behaviors in foot care. The score for the potentially damaging behaviors questions ranges from 11 to 44, and the higher this score, the more harmful will be the behaviors in foot care. The validity and reliability of this questionnaire was confirmed by Perin *et al*. in 2009.[25] The validity of this questionnaire was also revised in 2015.[26] This questionnaire was validated for the first time in Iran in this study. After translating it into Persian and then translating back into English, it was examined by 10 professors of Isfahan University of Medical Sciences and its validity was confirmed. Reliability of the questionnaire was confirmed by calculating a higher than 0.87 Cronbach's alpha coefficient. Data analysis was performed in the Statistical Package for the Social Sciences (SPSS) software (version 16.0, SPSS Inc., Chicago, IL, USA) and through using Chi-square for the qualitative and independent *t*-test and repeated measures ANOVA for the quantitative data.

Table 1: Training sessions in intervention and control group

Session	Content	Time (min)
	Intervention group	
1	Introducing members to each other and stating the purpose of group formation, definition of diabetic foot ulcers, etiology and complications, symptoms of foot infection, diabetic neuropathy, vascular disorder, vision disorders associated with diabetes and its effect on foot ulcers.	30
2	Express the importance of foot care in the prevention of foot ulcers, theoretical and practical training of daily foot care behaviors, high-risk and potentially traumatic foot injuries and provide prevention strategies, support in gaining foot care skills by sharing peer experiences and encourage independent day care	30
3	Training on foot care behaviors, high-risk and potentially harmful to the feet and providing preventive measures, supportive program to select appropriate clothing in the store, share peer-to-peer experiences in the field of preventive behaviors and foot care	30
4	Scientific and practical support by sharing information and peer experiences in the field of foot care such as washing and drying the foot, strengthening the learned skills, emotional support by strengthening the autonomy and independence in foot care	30
5	Evaluate group members, review the contents of previous sessions, correct bugs, fix bugs and problems related to previous sessions	30
	Control group	
1	Provide general information about diabetes and control the effects of diabetes	30
2	Express general information about the complication of diabetic foot ulcers and foot care	30

Ethical considerations

This research was ethically approved by the Ethics Committee of the Isfahan University of Medical Sciences under registration ID IR.MUI.REC.1396.3.211 on September 24, 2017. Thus, this study is also ethically validated. Moreover, informed consent was obtained from the patients.

Results

The mean (SD) age of the subjects was 56.46 (7.63) in the intervention group and 55.24 (6.70) in the control group. There was no significant difference in the mean age and history of diabetes between the two groups [Table 2]. Before the intervention, there was no significant difference between the two groups in terms of the mean (SD) score of Foot Care Confidence (self-efficacy), preventive behaviors and potentially damaging behaviors ($p > 0.05$). But, immediately ($t_{52} = 3.35$, $p = 0.002$) and 1 month after the peer support ($t_{52} = 4.62$, $p < 0.001$), the mean (SD) score of self-efficacy in the intervention group was significantly more than that of the control group. The mean (SD) score of potentially damaging behaviors immediately ($t_{52} = 5.13$, $p < 0.001$) and 1 month after the peer support ($t_{52} = 6.02$, $p < 0.001$), and the preventive behaviors immediately ($t_{52} = 3.62$, $p = 0.001$) and 1 month after the peer support ($t_{52} = 3.86$, $p < 0.001$) in the intervention group was significantly lower than the control group [Table 3]. The mean (SD) score of self-efficacy, preventive behaviors, and potentially damaging behaviors of the control group did not differ significantly within the three time periods. The mean (SD) score of potentially damaging behaviors in the intervention group immediately and 1 month after the intervention ($t_{52} = 27.89$, $p < 0.001$) was significantly lower than before the intervention. Moreover, the mean (SD) score of self-efficacy immediately and 1 month after the intervention ($t_{52} = 54.71$, $p < 0.001$) and the mean (SD) score of preventive behaviors immediately and 1 month after the intervention ($t_{52} = 28.46$, $p < 0.001$) were in the intervention group significantly greater than before the intervention. However, no significant difference was observed between immediately and 1 month after the peer support in the control group [Table 4].

Discussion

This study was designed to determine the impact of peer support on foot care in people with type 2 diabetes. The results of the study showed that limited studies have been conducted on the effect of peer support on preventive and potentially damaging behaviors in foot care.

Using peer group experiences for providing an educational program to other peers who have problems and have not yet been adequately skilled to care and control the symptoms associated with the disease can be useful in managing illness and better control of the disease. In peer education, the peer and the patient are in a same group that, reinforcing the sense of empathy and social identity, leads to the increase of knowledge.[27] The results of this study showed that the mean scores of self-efficacy, preventive

Table 2: comparison of demographic variables between study and control groups

Variable	Study group *n* (%)	Control group *n* (%)	Chi-square		
			χ^2	df	*p*
Gender					
Female	11 (42)	12 (43)	0.004	1	0.651
Male	15 (58)	16 (57)			
Life status					
Couple With Children	17 (60.70)	17 (65.40)	0.13	1	0.644
Only Couple	11 (39.30)	9 (34.60)			
Job					
Employed	20 (71.40)	15 (57.70)	1.49	3	0.860
Unemployed	8 (38.60)	11 (42.30)			
Variable	**Mean (SD)**	**Mean (SD)**	**Mann-whitney**		
			Z	df	*p*
Duration of disease					
Years	2.29 (0.71)	2.22 (0.60)	0.38	-	0.718
Education					
Illiterate	2.00 (7.70)	3.00 (11.50)	-	-	0.610
Primary To Diploma	21.00 (75)	17.00 (65.40)			
College	5.00 (17.30)	6.00 (23.10)			
Variable	**Mean (SD)**	**Mean (SD)**	**Independent *t*-test**		
			t	df	*p*
Age					
Years	56.46 (7.63)	55.24 (6.70)	-	52	0.553

Table 3: Comparison of score of foot care self-efficacy, preventive and potentially damaging behaviors between the two groups

Score	Time period	Mean (SD)		Independent *t*-test		
		Intervention group	Control group	*t*	df	*p*
Self-efficacy	Before the intervention	38.42 (26.63)	40.79 (22.79)	0.35	52	0.731
	immediately after peer support	66.41 (18.95)	45.83 (25.46)	3.35	52	0.002
	One month after peer support	74.06 (15.13)	44.40 (29.30)	4.62	52	<0.001
Preventive behaviors	Before the intervention	29.12 (20.25)	30.77 (17.59)	0.31	52	0.758
	immediately after peer support	53.79 (17.37)	33.76 (22.27)	3.62	52	0.001
	One month after peer support	58.93 (16.35)	37.85 (22.97)	3.86	52	<0.001
Potentially damaging behaviors	Before the intervention	37.51 (14.08)	39.59 (13.44)	0.54	52	0.590
	immediately after peer support	17.60 (8.00)	36.99 (17.31)	5.13	52	<0.001
	One month after peer support	15.17 (7.57)	35.87 (15.94)	6.02	52	<0.001

Table 4: Comparison of score of foot care self-efficacy, preventive and potentially damaging behaviors in each group

Score	Time period	Repeated measures ANOVA							
		Intervention group				Control group			
		Mean (SD)	*F*	df	*p*	Mean (SD)	*F*	df	*p*
Self-efficacy	Before the intervention	38.42 (26.63)	54.71	52	<0.001	40.79 (22.79)	0.88	52	0.431
	Immediately after peer support	66.41 (18.95)				45.83 (25.46)			
	One month after peer support	74.06 (15.13)				44.40 (29.30)			
Preventive behaviors	Before the intervention	29.12 (20.25)	28.46	52	<0.001	30.77 (17.59)	2.31	52	0.120
	Immediately after peer support	53.79 (17.37)				33.76 (22.27)			
	One month after peer support	58.93 (16.35)				37.85 (22.97)			
Potentially damaging behaviors	Before the intervention	37.50 (14.08)	27.89	52	<0.001	39.59 (13.44)	1.24	52	0.241
	Immediately after peer support	17.60 (8.00)				36.99 (17.31)			
	One month after peer support	15.17 (7.57)				35.87 (15.94)			

behaviors, and potentially damaging behaviors before the intervention were not significantly different between the two groups of control and intervention. However, the mean score of self-efficacy immediately and 1 month after peer support in the intervention group was significantly higher than the control group.

The result of the current study is consistent with the results of some other studies. A study conducted by Rashidi *et al*. in 2015 on patients with type 2 diabetes showed that peer support improved patients' self-efficacy.[10] The study of Yin *et al*. in 2015 found that peer support enhanced and improved self-care activities, including foot care and diet for patients with type 2 diabetes. This intervention also led to better blood sugar control in the study's samples.[14] Investigating a self-management support program for type 2 diabetes in patients who have recently been diagnosed with diabetes, Scully *et al*. found that peer support is effective in the patients' self-care, particularly, in exercise and nutritional behaviors.[28] Assessing the effect of nutrition education by peers and health personnel on knowledge, attitude, and nutritional indices of diabetic women, Morovati *et al*. showed that, compared with health personnel, peers are more influential on the nutritional indices and attitudes of their peers.[29] Sari and Yamin's study showed that community-based foot care programs are effective in the care of diabetes mellitus patients.[30]

Indeed, some studies have reported that peer support has been weak and ineffective. For example, in a study conducted by Dale *et al*., although social support for some adults with diabetes was beneficial, the evidence for a strongly convincing recommendation was very weak.[17] Smith *et al*. in 2011 found out that peer support intervention is not effective for all patients with type 2 diabetes. The results of this study showed that peer support had no significant effect on HbA1c levels, blood cholesterol levels, systolic blood pressure and patients' health score compared to the control group.[19] Another study by Sachmechi *et al*. in 2013 compared the effects of two training methods and training with peer support on HbA1c levels, body mass index, systolic blood pressure, and blood lipid index. The results of this study also showed that the effect of peer support on the mentioned variables was not significantly different from the normal education of patients.[18] The variables studied in Smith and Sachmechi's study were metabolic and physiological. However, in the present study, behavioral factors for foot care were investigated, which could be the reason for the differences in the results of these studies.

The mean score of potentially damaging behaviors and preventive behaviors in the intervention group was significantly lower than the control group in the two time periods. But no study was found in this regard.

The results of this study generally point to the positive dimensions of peer support. Peer support is formed on the basis of understanding another person's position empathically through common feelings and experiences. When patients find out that others are close to them, they feel a similarity between themselves and others and, hence, caregivers-patients traditional educational relationship disappears. It can be said that the main reason for these effects is perhaps the same level of horizon of thought in peers and patients, creation of a sense of empathy, correct education, and the full readiness of the peer group in this type of intervention. It seems that in the present study, the most important and influential factor has been the formed relationship between the peer supporter and the patient accompanied with a feeling of empathy and role similarity.

The present study's main limitation was the short follow-up period after the intervention. In order to generalize the findings, it is suggested that a long-term study be conducted to assess the effect of peer support on behavioral change and clinical outcomes. Additionally, some more studies are required to show how educated peers and peer support can be more effective than conventional clinical services. Finally, it is recommended that researchers conduct some research on the cost of effectiveness and achievement of psychosocial and clinical benefits of peer support for diabetic patients.

Conclusion

This study aimed at investigating the effect of peer support on foot care in patients with type 2 diabetes. The results showed that the level of self-efficacy and foot-care behaviors of the patients in the intervention group who enjoyed the support and experiences of peer group was higher than that of the control group. Given that peer support for improving foot care in people with diabetes is a universal program, it is recommended that mechanisms be developed for the preparation and use of peer groups for the primary and empathic education of caregivers in health centers in order to mitigate the vast workload of nurses using the ability of peer groups. For this purpose, it is necessary to identify successful patients in foot care and train them to use peer support and training programs that requires the cooperation of health agencies and academic centers.

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Conflicts of interest

Nothing to declare.

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