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Investigating the effect of educational intervention based on the Pender's health promotion model on lifestyle and self-efficacy of the patients with diabetic foot ulcer: A clinical trial

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Abstract:

BACKGROUND: This study aimed to investigate the effect of educational intervention based on the Pender's health promotion model (HPM) on lifestyle and self-efficacy of the patients with diabetic foot ulcer.

MATERIALS AND METHODS: In this clinical trial conducted in 2019, 74 patients based on inclusion criteria were selected through convenience sampling and allocated to two groups of intervention (n = 37) and control (n = 37) using the randomized permuted block method. In this study, Demographic characteristics and localized Diabetes Foot Care Self-Efficacy Scale and Health-Promoting Lifestyle Profile Questionnaire for diabetic foot care were completed by two groups. The obtained data were analyzed using SPSS 16 and through descriptive and comparative statistics, independent t-test, paired t-test, and ANCOVA.

RESULTS: After the intervention, the mean score of the intervention group significantly increased in all lifestyle dimensions ($P < 0.001$). Furthermore, the mean score of self-efficacy increased in the intervention group after the intervention ($P < 0.001$). Comparing the change in the mean scores of lifestyle and self-efficacy in both the groups 50 days after the intervention, an increase was observed in the mean scores of self-efficacy ($P < 0.001$) as well as those of lifestyle and its dimensions in the intervention group compared to those in the control group ($P < 0.001$).

CONCLUSION: Educational intervention based on the Pender's HPM can promote the self-efficacy, lifestyle, and its dimensions in the patients with diabetic foot ulcers. The results of this study can be used in educational interventions aiming at patients with diabetic foot ulcers to change their lifestyle and improve their self-efficacy.

Keywords:

Diabetic foot, health promotion, lifestyle, self-efficacy

Introduction

Diabetes is a chronic, complex, and destructive disease and requires constant medical and nursing care.[1] Diabetes is on the rise, with 108 million adults living with diabetes in 1980 and 422 million in 2014 (a nearly fourfold increase). It is estimated that the number of these patients would reach 529 million by 2035.[2] Complications of diabetes are very prevalent and diverse, including peripheral arterial diseases that lead to foot injury and ulcers and eventually amputation.[3] Diabetic foot ulcer and subsequent amputation of the extremities is one of the common, serious,

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and costly complications of this chronic disease and is one of the main causes of hospitalization of people living with diabetes.[4] In East Asian countries such as Taiwan, the prevention of diabetic foot ulcers has been enhanced about 1.1% and the number of amputations among hospitalized diabetic patients has increased from 29% to 61.3%. Most of the diabetic patients in Asian countries have peripheral neuropathy due to the lack of clinical foot care in these areas. Therefore, the prevention of diabetic foot ulcers, especially in diabetic people with peripheral neuropathy, is essential.[5] In Iran, the study of Mashaikhi *et al*. estimated the prevalence of diabetic foot ulcer as 30.6% and the rate of amputation was reported as 30%,[6] while 80% of diabetic foot ulcers can be prevented with basic management and care.[7] Education plays a major role in increasing the awareness of diabetic patients of how to deal with the disease and change their attitudes and behaviors toward it.[8] These educational interventions should be initiated in patients at low risk of diabetic foot ulcers as primary prevention will be more effective and successful.[4]

The Pender's health promotion model (HPM) is one of the oldest theories of health behavior that has been considered since 1996 as a framework for explaining health-promoting lifestyle behaviors. Pender identified the model constructs that were effective in explaining behavior in more than 50% of the studies, including

Table 1: Demographic characteristics of patients in control and intervention groups

Demographic characteristics	Frequency (%)		Test result, *P*
	Intervention	Control	
Sex			
Men	19 (51/4)	17 (45/9)	0/642
Women	18 (48/6)	20 (54/1)	
Marital status			
Married	32 (86/5)	22 (59/5)	0/055
Single	1 (2/7)	6 (16/2)	
Divorced	1 (2/7)	2 (5/4)	
Widow	3 (8/1)	7 (18/9)	
Level of education			
Elementary	20 (54/1)	14 (37/8)	0/244
Cycle	3 (8/1)	5 (13/6)	
Diploma	10 (27)	8 (21/6)	
Academic	4 (10/8)	10 (27)	
Job			
Freelance job	14 (37/8)	10 (27)	0/282
Employee	4 (10/8)	10 (27)	
Homemaker	15 (40/6)	15 (40/6)	
Retired	4 (10/8)	2 (5/4)	
Type of diabetes			
One	11 (29/7)	11 (29/7)	-
Two	26 (70/3)	26 (70/3)	
Underlying diseases			
Hypertriglyceridemia	6 (16/2)	3 (8/1)	0/250
Hypertension	4 (10/8)	3 (8/1)	
Heart disease	6 (16/2)	3 (8/1)	
Cancer	4 (10/8)	1 (2/7)	
Hypothyroidism	1 (2/7)	4 (10/8)	
No disease	16 (43/3)	23 (62/2)	
Type of drug used			
Regular insulin	3 (8/1)	3 (8/1)	0/896
NPH insulin	1 (2/7)	1 (2/7)	
Pen insulin	22 (59/5)	18 (48/6)	
Metformin tablets	8 (21/6)	10 (27/1)	
Glibenclamide tablets	3 (8/1)	5 (13/5)	
Age			
SD±mean (maximum-minimum)	60/92±10/29 (32-84)	49±14/66 (28-82)	0/005
Duration of diabetes			
SD±mean (maximum-minimum)	11/46±8/72 (1-42)	9/76±7/81 (1-29)	0/527

SD=Standard deviation

individual characteristics and experiences, cognition, and specific emotions of behavior.[9,10] The constructs of HPM have been identified as important determinants of physical activity behavior and have been tested by health professionals.[11] The power of Pender's theory in defining health is in not limiting nurses and other members of health-care team to certain interventions to reduce the risk of disease.[12] This model gives nurses more opportunities to examine individuals, families, and communities to work toward improved health, functional ability, and quality of life. Furthermore, they promote health and quality of life by emphasizing health-promoting behaviors, recognizing individual behaviors and characteristics as well as increasing self-efficacy and understanding.[13] Lifestyle, as an important factor, has been always the focus of health education and promotion. Lifestyle dimensions such as physical activity and nutrition have been more successful in controlling diabetes than drug intervention.[14] Changes in lifestyle are associated with the control and prevention of chronic diseases such as diabetes.[15] Hence, it should be considered along with other therapies as an essential factor in reducing complications and improving symptoms.[16] Many studies have demonstrated the effectiveness of a HPM on quality of life, health, and lifestyle. The study by Safabakhsh and Moatary showed that educational programs based on the Pender's theory as three sessions on healthy lifestyle and 3 months of follow-up significantly increased patients' health-promoting lifestyle scores after coronary artery bypass surgeries in the intervention group.[12,17]

Self-efficacy is a unique and dynamic behavior through which the individual identifies his or her abilities in specific contexts.[18] Self-efficacy is one of the key components of Bandura's social cognitive theory. Patients' self-efficacy evaluation by nurses and its promotion can increase patients' motivation for care.

Table 2: self-efficacy, lifestyle and its dimentions in intervention and control group before and after intervention.

Self-efficacy, lifestyle, and its dimensions	Group (mean±SD)		Test result, *P*	
	Intervention	Control	Age effect	Group effect
Spiritual growth (9-36)				
Before	17/89±3/64	20/08±4/57	<0/001	0/553
After	23/86±2/66	18/72±3/27	0/056	<0/001
Paired *t*-test, *P*	<0/001	0/002		
Responsibility (15-60)				
Before	15/64±1/81	18/18±3/32	<0/001	0/042
After	20/35±2/16	16/86±2/35	0/812	<0/001
Paired *t*-test, *P*	0/001	<0/001		
Interpersonal relationships (8-32)				
Before	17/45±1/84	19/7±2/71	<0/001	0/024
After	22/62±2/37	18/64±1/84	0/056	<0/001
Paired *t*-test, *P*	0/03	<0/001		
Stress management (5-20)				
Before	14±2/04	16/16±3/28	<0/001	0/131
After	19/56±1/8	15/54±2/31	0/628	<0/001
Paired *t*-test, *P*	<0/001	0/084		
Exercise (7-28)				
Before	13/35±1/78	16/08±3/06	<0/001	0/007
After	17/97±1/83	15/56±2/32	0/977	<0/001
Paired t-test, *P*	<0/001	0/087		
Nutrition (8-32)				
Before	15/4±1/6	19/1±4/5	<0/001	0/007
After	22/32±2/05	18/35±3/15	0/79	<0/001
Paired *t*-test, *P*	<0/001	<0/001		
Lifestyle				
Before	93/75±8/6	109/32±20/04	<0/001	0/025
After	126/7±9/64	103/7±13/35	0/901	<0/001
Paired *t*-test, *P*	<0/001	0/002		
Self-efficacy				
Before	33±12/50	45/783±21/107	<0/001	0/620
After	60/70±9/50	46/162±15/912	0/005	<0/001
Paired *t*-test, *P*	<0/001	0/819		

SD=Standard deviation

Table 3: self-effecacy and life style changes in intervention and control groups

Self-efficacy and lifestyle changes	Group (mean±SD)		Independent sample *t*-test result, *P*
	Intervention	Control	
Self-efficacy	27/70±10/71	0/37±9/97	<0/001
Lifestyle	32/94±9/72	−5/62±10/11	<0/001
Spiritual growth	5/97±4/19	−1/35±2/48	<0/001
Responsibility	4/7±1/88	−1/32±2/13	<0/001
Interpersonal relationships	5/162/39	−1/051/99	<0/001
Stress management	5/56±1/55	−0/62±2/12	<0/001
Exercise	4/62±2/11	−0/51±1/77	<0/001
Nutrition	6/91±2/15	−0/75±2/1	<0/001

SD=Standard deviation

Furthermore, promoting self-efficacy enhances life expectancy and moderates health behaviors.[19] Patients' self-efficacy regarding their ability to perform their own activities is the significant predictor of their behaviors.[20] Nurses should be able to maintain and improve the health of the patients living with diabetes through disease management, evidence-based practices, and care training. Promoting self-efficacy is one of the important interventions of nurses that can improve patients' health and heal diabetic foot ulcers to a large extent.[7] Given the high prevalence of diabetes in Iran and the importance of focusing on empowering patients to prevent its complications, especially the most important complication that is diabetic foot, and that using health promotion theories such as Pender's theory can play an important role in promoting their self-efficacy and lifestyle, also given the consistent and inconsistent findings mentioned in the statement of problem, it seems that a research aimed to determine the effect of education based on Pender's HPM on lifestyle and self-efficacy of patients with diabetic foot ulcer through a quantitative approach is necessary.

Materials and Methods

Study design and setting

The present study was a clinical trial. The study population consisted of all the patients with diabetic foot ulcers referred to the hospitals a□liated to Iran University of Medical Sciences. To determine the sample size at 95% confidence level and 80% test power, at least 32 patients were estimated to be in each group and the final sample size was calculated to be 37 including sample loss.

Study participants and sampling

The participants were selected through convenience sampling and assigned to two groups of intervention and control using the randomized permuted block method. In the randomized permuted block method, the researcher designed a four-part package and put all the probabilities of the intervention and control groups into that package based on the sample size. The participants in both the groups were selected by a third person who was unaware of the study. By visiting the medical centers and random selecting and assigning the participants, they were assigned to the intervention and control groups.[21] Inclusion criteria were suffering from Type 1 or Type 2 diabetes with a medical diagnosis listed in the file, having diabetic foot ulcer, being literate, being over 18 years old, not working at health-care system or not being educated in medical fields of study, being able to communicate, and having no experience in taking care of a person with diabetic foot ulcer. Exclusion criteria included vascular disease.

Data collection tool and technique

The data were collected using three questionnaires: Demographic Characteristics, Health-Promoting Lifestyle Profile II (HPLP II), and Diabetes Foot Care Self-Efficacy Scale (DFCSES).

"Demographic Characteristics Questionnaire" – Given the high prevalence of diabetes in Iran, this researcher-made questionnaire has ten questions concerning age, sex, marital status, lifestyle, level of education, occupation, type of diabetes and duration of illness, body mass index, other underlying diseases, and medications. "HPLP II" – The questionnaire was developed by Walker and Hill-Polerecky and consists of 52 items measuring lifestyle on six dimensions: nutrition, exercise, responsibility for health, stress management, interpersonal support, and self-actualization. Cronbach's alpha coe□cient for the total score of this questionnaire was 0.94.[22] The items on this questionnaire were scored on a Likert scale, and the scores for each option or item were as for never: 1, sometimes: 2, often: 3, and always and usually: 4. In this questionnaire, scores above 196 indicated a positive health promotion style and scores below 49 indicated a negative health promotion style.[23] "DFCSES" – This questionnaire consists of nine questions about the feeling or behavior of a person regarding their foot care. The lowest score on this tool was 0 (I don't feel empowered at all) and the highest score was 10 (I feel totally empowered). Content validity of this tool has

been studied in the study of Biçer *et al*. Furthermore, the reliability of this tool in the mentioned study has been investigated using internal consistency method through Cronbach's alpha as 0.86.[1]

To ensure content validity, based on the WHO protocol, the instruments were translated and then retranslated into English and validity was assessed by three faculty members' comments. The reliability was measured using Cronbach's alpha and test–retest methods. First, they were given to twenty patients out of the sample population referred to hospitals a□liated to Iran University of Medical Sciences, and after 7–10 days, the instruments were completed again by the participants. Finally, Cronbach's alpha for the DFCSES scale was 0/93 and the correlation coefficient was 0/892, also Cronbach's alpha for the HPLP II scale was 0/91, and the correlation coefficient was 0/784. In addition, the participants who participated for investigating the reliability of the instruments were not included in the study.

The researcher selected the patients with diabetic foot ulcer and eligible for inclusion in the study as the study sample. Initially, all the participants were fully explained about the purpose of the research, and if they wish to participate in the study, they completed an informed consent form. The participants were assigned to two groups of intervention and control using the randomized permuted block method. In the intervention group, education was performed through lectures, individual and group discussion, question and answer, and an educational booklet containing the Pender's model dimensions as follows: (1) nutrition, (2) exercise, (3) responsibility for health, (4) stress management, (5) interpersonal support, and (6) self-actualization. In the lecture method, the intervention group received the education related to the Pender's HPM using audiovisual tools and educational aids (for four sessions in 2 weeks, each session lasting 2 h) in the hospital educational classroom, and at the end of the program, an educational booklet was provided to each participant.Educational content collected by the researcher, including 1:investigating the feelings and beliefs of patients with diabetic foot ulcers related to disease, 2:asking clients to determine their information about foot ulcers, 3: explain to diabetes mellitus and its complications, 4: risk factors for foot ulcers, 5: screening, and diagnostic criteria, 5: diet management, 6: healthy lifestyle behaviors, 7:stress management, 8: physical activity, 9: evaluation of training, knowledge management, and then evaluated based on forms related to diabetic foot ulcers after training. This content is based on Pender's HPM (understanding the obstacles, benefits, obstacles benefits, feelings about diabetic foot ulcers, interpersonal interactions, exchanging emotions between samples, taking responsibility, and designing a care plan). An average of 8–10 people attended each session. The first session lasted for 1 h in individual training and the next one in group discussion. In the first session, HPLP II and DFCSES were completed by the intervention group before the intervention. In the education sessions, the education was provided as simple and comprehensible as possible and without the use of specialized medical terms. After completing four sessions, the researcher asked the participants some questions about the educational content every 15 days on the phone (within 50 days after the intervention, the researcher made three phone calls to each individual patient). While answering the questions, the education and care process was also evaluated, which led to the application of the educational content. Nursing telephone follow-up can be an effective way to ensure continuity of care and an appropriate way to monitor the progress of these patients after discharge.[24] After 50 days,[25] the participants revisited the medical centers at the dates coordinated by the researcher and the abovementioned instruments were again completed by this group. After completing the mentioned forms, the control group received the usual education by the clinic staff before discharge, and after 50 days, the group returned to the hospital at the due dates and completed the tools. Finally, the group received an educational booklet as well to ensure the rules of ethics. The data were analyzed by SPSS software version 16 in descriptive and inferential statistics. Furthermore, numerical indices of quantitative variables were calculated separately for both the groups. Regarding the inferential statistics, Chi-square and Fisher's exact tests were used to evaluate the homogeneity of the qualitative variables and independent *t*-test was used to compare the quantitative variables. Independent *t*-test and paired *t*-test were used to answer the questions concerning the research objectives. Furthermore, ANCOVA was used in this study to control for age variable.

Ethical consideration

The study obtained the ethics code under no: IR.IUMS.REC.1397.339 from Iran University of Medical Sciences. Furthermore, the following ethical consideration was taken in the process of study. These considerations are signing an informed consent form by each participant before participating in the study, explaining the purpose of the study to the study participants before they participate in the study, and ensuring participants about confidentiality and privacy.

Results

Demographic findings in both the intervention and control groups showed that the mean age of the patients was 60.92 years in the intervention group and 49 years in the control one. The results of independent *t*-test showed that

there was a statistically significant difference between the two groups in terms of age. Therefore, this variable was controlled for as a confounding variable in the results. However, the results of the Chi-square test showed that the two groups were not significantly different in terms of sex distribution and were homogeneous. Except for age, there was no significant difference between the two groups in the intervention and control groups and they were homogeneous [Table 1].

Since there was a statistically significant difference in age between the intervention and control groups before the intervention and there was also a significant relationship between age and lifestyle variables, this variable was considered as a confounding one in the analysis of covariance. The results of covariance analysis showed that, by controlling for age variable in both the groups, there was a statistically significant difference between the groups in terms of responsibility before the intervention, but overall scores of lifestyle and its dimensions (spiritual growth, interpersonal relationships, stress management, exercise, and nutrition) were not significantly different and they were homogeneous. Furthermore, the results of covariance analysis showed that by controlling for age variable (controlled confounding variable) in both the groups, mean scores of lifestyle and its dimensions were significantly different between the two groups after the intervention and the mean score in the intervention group was significantly higher than that in the control group. Regarding the scores of self-efficacy in the patients with diabetic foot ulcer in the control and intervention groups before and after the intervention, the results showed that the mean scores of both the groups were not statistically significant different before the intervention. However, after the intervention, the mean score of the intervention group was significantly higher than that in the control group. The paired t-test results in the intervention group, the mean score of lifestyle and its dimensions before and 50 days after the intervention had a significant difference [Table 2].

The mean score after the intervention was significantly higher. These results showed the effect of educational intervention based on the Pender's HPM on lifestyle and self-efficacy of the patients with diabetic foot ulcer. Furthermore, the mean score of self-efficacy in the intervention group significantly increased compared to that before the intervention. However, in the control group, the mean scores before and 50 days after the intervention were not significantly different.

Comparing the changes in self-efficacy, lifestyle, and its dimensions in patients with diabetic foot ulcer in the intervention and control groups, the results showed that the mean score of self-efficacy in the intervention group was significantly higher than that in the control group. Furthermore, changes in lifestyle and its dimensions were positive in the intervention group but negative in the control group. This means that in the intervention group, the mean scores of lifestyle and its dimensions increased 50 days after the intervention but decreased in the control group. This difference was statistically significant [Table 3].

Discussion

These results showed the effect of educational intervention based on the Pender's HPM on lifestyle and self-efficacy of the patients with diabetic foot ulcer. Still, the mean score of lifestyle and its dimensions in the control group before and after 50 days had a significant difference so that the average score reduced in the next 50 days. Perhaps, the reason for this decline was the long-term hospitalization of many control group specimens during this study. The results of the study by Carreno *et al*. showed that the mean scores of lifestyle and its dimensions in the intervention and control groups before and after the intervention had a significant difference, which was observed in all six dimensions.[26] In line with this, the study of Shin *et al*. showed that using the model caused statistically significant changes in all dimensions of lifestyle in the participants.[27] While the results of the study by Ho *et al*. showed that the model enhanced the health of the patients with chronic diseases. Strengthening interpersonal relationships, enhancing motivation and spiritual growth, influencing one's personality, attracting participation, and increasing self-efficacy were positive effects of implementing this theory.[28] The results of the study by Mohammadipour *et al*. showed that the mean scores of lifestyle and its dimensions significantly increased in the intervention group.[29] The study by Khodaveisi *et al*. showed that HPM-based educational intervention and some model structures improved nutrition in overweight obese women.[30]

The studies on using the Pender's HPM to increase the scores of lifestyle and its dimensions have shown a statistically significant difference between these scores in the intervention and control groups before and after the intervention. In this respect, the present study is similar to the literature, but given the fact that lifestyle is influenced by the culture of a country, the cultural contexts in the present study are different from those in the studies mentioned. On the other hand, observing the positive effects of the Pender's model on promoting lifestyle and its dimensions in patients with diabetic foot ulcer can add to the value of the results obtained in this study.

Although many studies have shown the positive effects of the Pender's model on enhancement of lifestyle and

all its dimensions, the results of the study by Radmehr *et al*. showed that there was a statistically significant difference between the mean scores of health-promoting lifestyle before and after the intervention through the following dimensions: physical activities, nutrition, interpersonal relationships, and stress management. However, this difference was not significant in spiritual growth and responsibility dimensions.[12] Dislike these results, the study by Hosseini *et al*. showed that their health-promoting lifestyle was not fully desirable and was considered as moderate. In their study, interpersonal relationships and spiritual growth dimensions had the highest score, the lowest score belonged to the students' physical activity and nutrition, and responsibility and stress management were at a middle position.[31] These two studies are unlike the previous studies and are considered inconsistent, implying that the Pender's HPM has not had a positive effect on individual responsibility. Perhaps, this is due to the nature of the concept of responsibility that requires time, long-term planning, and a comprehensive research effort to be promoted. In the present study, the researcher was able to enhance all dimensions of lifestyle in the intervention group.

Regarding the scores of self-efficacy in the patients with diabetic foot ulcer in the control and intervention groups before and 50 days after the intervention, the results showed that the mean scores of both the groups were not statistically significant different before the intervention and they were homogeneous. However, 50 days after the intervention, the mean score of the intervention group was significantly higher than that in the control group. The results of the paired *t*-test also showed that the mean score in the intervention group significantly increased compared to that before the intervention. However, in the control group, the mean scores before and 50 days after the intervention were not significantly different.

The study by Mohseni Poya *et al*. showed that the perceived self-efficacy changed significantly over time. The mean score of self-efficacy in the intervention group was higher than that in the control group 3 and 6 months after the intervention.[32] The study by Mohamadian *et al*. showed that self-efficacy is the most important predictor of students' health-related quality of life. On the other hand, the interventions aimed at improving self-efficacy can lead to increased health-related quality of life and enhanced lifestyle among adolescent girls in developing countries, such as Iran.[33] The results of the study by Bicer *et al*. showed that the mean score of self-efficacy was significantly increased in the intervention group who received education, but the mean score of self-efficacy in the control group did not change. The results of this study showed that educational intervention based on the Pender's and Bandura's model is a powerful tool for promoting self-efficacy and increasing the awareness of the patients with diabetes mellitus.[1] The results of the study by Mohammadi Zeidi *et al*. showed that the Pender's model increased students' self-efficacy due to their awareness of barriers and strategies, which led to increased motivation and understanding of social support.[34] The results of these studies are consistent with the present study as the education in both studies effectively has led to improved self-efficacy in diabetic patients. However, in the present study, the participants were only the patients with diabetic foot ulcers who have different needs and lifestyle from all diabetic patients. However, contrary to the abovementioned results, the study by Sirin *et al*. showed that the mean score of health-promoting lifestyle was significantly increased in the intervention group, but the mean scores of self-efficacy in both the intervention and control groups were not significantly different.[25] The study by Homko *et al*. found that educational intervention for blood sugar self-controlling had no effect on self-efficacy and pregnancy outcomes in women with a controlled gestational diabetes diet and did not lead to an increase in mean scores of self-efficacy in the study groups.[35] "Self-efficacy can provide the patients with an active role to take care of themselves."[1] Given this statement and the contradictory findings in the studies reviewed, the participants' age conditions and self-care abilities may be the main reason for the inconsistency in the results. The mean age of most participants in this study was 49–61 years, and education was able to increase their understanding of self-care and thereby enhance their self-efficacy. In inconsistent studies, the participants in the target group could not improve their self-efficacy by the mentioned educational method.[25]

Limitation and suggestion

The most important limitations of this study were the cooperation of clients to attend training sessions, which was reduced with proper planning and communication. It is suggested that further research should investigate the effect of the Pender's HPM on self-efficacy and lifestyle of patients with other complications of diabetes such as nephropathy and retinopathy.

Conclusion

One of the most important duties of nurses is education in the field of prevention and promotion of patients' health, so due to the fact that patients with diabetic foot ulcers need basic training in the prevention of exacerbation of complications, educational intervention based on the Pender's HPM can promote the self-efficacy, lifestyle, and its dimensions in the patients with diabetic foot ulcers. Pender's model has been used in the field of health and disease prevention for many years, so the use of this model in the prevention of diabetic foot ulcer complications can also play an important role in promoting self-efficacy and lifestyle.

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Conflicts of interest

There are no conflicts of interest.

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