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The effect of training on the self-efficacy rate among patients with diabetes mellitus

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Original Article

Abstract

BACKGROUND: Self-efficacy is referred to as a person's belief in his/her ability to succeed in a particular situation. Training can be effective to enhance self-efficacy among the patients with diabetes mellitus (DM). Therefore, the present study was carried out with the aim to determine the effect of training on the self-efficacy rate among the patients with DM.

METHODS: The present study is a quasi-experimental study of interventional-control type. The data collection tool was a demographic questionnaire (demographic characteristics, educational needs assessment, and self-efficacy). 60 patients were selected by objective sampling method and were divided into the intervention and control groups (n = 30 in each group). Then, the replication-based study was performed on the subjects. Data were analyzed using independent t-test, chi-square, and Mann-Whitney tests in SPSS software.

RESULTS: The difference in mean of educational needs assessment in self-efficacy in the pre-test stage was not significant (P = 0.950), however, there was a significant difference between the two groups in the post-test stage in terms of the educational needs assessment (P = 0.030). From the viewpoint of self-efficacy level, there was a difference between the two groups in the post-test phase. However, this difference was not statistically significant (P = 519).

CONCLUSION: Considering the dependence of patients with DM on receiving care services, recognition of patient and self-care needs based on nursing theories and care planning will help the patient to adapt and increase self-efficacy.

KEYWORDS: Self-Efficacy, Diabetes Mellitus, Education

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Introduction

Diabetes mellitus (DM) is a crucial health problem in 21st century. DM is a chronic, metabolic, and progressive disease that is commonly defined by increased blood glucose due to impaired secretion of insulin or insulin function.[1]

DM is diagnosed when glucose is equal to or greater than 126 mg/dl in two separate sequences or the concentration of glucose two hours after meal is equal to or greater than 200 mg/dl.[2] DM is a critical chronic illnesses which affects young or middle-aged individuals. This disease may even be due to pregnancy.[3] According to the World Health Organization (WHO) in 2000, DM affected one per 300-500 individuals, in addition, the global incidence of this disease was reported to be 171 million individuals, reaching 438 million by the year 2030.[4] Most of this increase occurs in developing countries, and it is estimated that 75% of DM cases will be living in these

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countries by the year 2025.[5]

The highest incidence of DM is in the Middle East.[6] According to WHO, the incidence of this disease in Iran is more than 8%. Moreover, more than 20% of deaths in Iran occurs due to DM.[7]

Complications of the DM disease causing many deaths include short-term complications like hypoglycemia, hypocalcemia, and diabetic ketoacidosis (DKA), and long-term complications like cardiovascular, renal and ocular diseases; overall self-care and self-efficacy can be the causes of high mortality rates.[8]

Due to long-term treatment, the patients with DM need a change in their lifestyle in order to suitably manage their illness. The treatment of DM without the patient's self-contribution in some self-care activities cannot be sufficiently effective enough and the desired results will not be obtained.[9] Therefore, self-efficacy is one of the basic concepts among these patients. Self-efficacy is a concept with a wider scope of self-care among patients with DM. Self-efficacy means an individual's confidence and ability to perform self-care behaviors in a particular condition,[10] and emphasizes his/her ability to perform works properly and successfully.[11]

Individuals with a strong ability to work efficiently, believe that they can effectively manage their lives' events. This perception and belief give them a different view of one with poor self-efficacy since it has a direct effect on their behavior. Self-efficacy can be a critical factor in success and failure throughout life.[12] Individuals with higher levels of self-efficacy are better in controlling their disease.[13]

Self-care has a close link with the concept of self-efficacy, which is a process that requires the individual to progress independence and his ability to perform daily life activities as much as possible.[14]

Individuals with chronic illnesses, like DM, may not be able to take their own regimens according to the instructions, in addition, they may forget the appointment with their doctor and not be able to carry out daily activities of their lives.[15] However, patients with DM should understand their own self-care requirements.[16]

According to the important role of rehabilitation of patients who suffer from the physical and mental disabilities, nurses can help patients improve their ability in performing their daily activities and reduce their social, psychological and economic problems.[17]

Diseases are major factors increasing the need for self-care among individuals. Meanwhile, nurses play a compensatory role in meeting these requirements.[18] Orem's model of nursing is one of the most inclusive self-care theories which can be beneficial for care providers to help patients evaluate their self-care ability.[19] The purpose of this model is to encourage patients to take care of themselves, in addition, the model specifies the role of nurses in assessing the need for self-care and the presence or lack of self-care deficiency among patients with chronic diseases.[11]

Self-care programs facilitate adaptation to conditions of chronic complications like DM.[10] Many health organizations and health care providers have also considered promoting self-care as a way to reduce the high cost of medical services.[15] Nurses contribute to the implementation of a care plan through serving, guiding, providing physical and mental support, and training the patients.[14]

Patient education and support are needed to increase self-efficacy, improve outcomes and reduce hospitalization.[15] Improving self-efficacy among the patients with DM and planning based on this potential is of particular importance. Due to numerous concerns of patients with DM regarding how to care for themselves and doubts about the ability to perform their daily routine and normal life, the researcher decided to conduct a study to determine the effect of training on the rate of self-efficacy among these patients.

Materials and Methods

The present quasi-experimental study of control-intervention type was carried out with the aim of determining the effect of training on self-efficacy level among patients with DM in Tohid Hospital of Sanandaj, Iran, in 2017.

In this study, 60 patients were selected based on the inclusion criteria with non-randomized method; 30 of these samples were assigned to the control group (n = 30). 15 individuals were estimated for each group according to previous studies. In this study, taking into account the intervention and the possibility of operating time for each group, 30 samples were sufficient, which were selected from 60 samples.

A 3-part questionnaire was used to collect data. The first part included demographic information including age, sex, marital status, duration of DM, and history of DM among the family members. The second part contained 20 questions about educational needs; this part of the questionnaire included the researcher problems with patients with DM. In this part, the subjects were asked to answer "I have" or "I do not have" any of the problems in the questionnaire in case of the presence or lack of a problem with a patient, respectively. Then, in case of a problem, they were supposed to answer the next question. There was a difficult question regarding how much patients needed to be trained and supported to control the situation. The scoring was based on the Likert scale and the answers to questions included high, moderate, low, and at all choices, with scores ranging from 4 to 1, respectively.

The third part included 15 questions for assessing the level of self-efficacy of the subjects, including personal health, nutrition, diet control, fluid intake control, compliance with drug regimen, sleep and rest, adaptation to problems, anxiety and worries control, communication with medical and nursing staff, family communication and social activities. The questions in this section of the questionnaire were prepared by the researcher using the articles and scientific resources. The answer to each question was based on the Likert scale, with scores ranging from 4 to 1. On this basis, the self-efficacy levels were divided into 3 classes of self-efficacy, half affiliation, and independence with a score range of 15-30, 31-45, and 46-60, respectively.

In order to obtain scientific validity and reliability of this questionnaire, content validity method and Cronbach's alpha coefficient were used respectively. The informed consent were obtained from the subjects. In the next step, the researcher completed the questionnaires through in-person interview with the patients. Then, the patients' educational requirements in self-care and the related problems and their self-efficacy level were determined in the next step.

After the pre-test, a self-care program designed based on the Orem's nursing model, was performed for the intervention group in three stages, including evaluation of self-care needs among the study subjects, intervention in physical, psychological and social areas of self-care needs, and the post-test follow-up of patients during the 40 days after intervention. Data analysis was performed using descriptive and inferential statistics in SPSS software (version 16, SPSS Inc., Chicago, IL, USA).

Results

The 60 patients under study were equally divided into the intervention control groups (n = 30 in each group). The mean age of individuals in the intervention and control groups was 36.56 and 37.85, respectively. 15 (50.0%) of the subjects in both groups were women. In both intervention and control groups, 7 (23.3%) and 23 (76.7%) of the individuals were married and single, respectively. The mean duration of the illness among the intervention and control groups was 6.76 and 58.6 years, respectively. In both groups, the majority of individuals did not have a family history of DM.

Table 1. Distribution of absolute and relative frequencies of characteristics of individuals in the two intervention and control groups

Variable		Intervention group		Control group		Independent t-test results
		Mean	SD	Mean	SD	
Age		36.56	8.67	37.85	0.01	P = 0.514
Duration of DM		6.76	5.59	6.58	5.28	P = 0.700
Average monthly treatment cost		15.81	53.37	9.40	38.49	P = 0.581
Variable		**Rate**	**%**	**Rate**	**%**	**Chi-square test results**
Gender	Man	15	50.00	15	50.00	P > 0.999
	Woman	15	50.00	15	50.00	
Marital status	Married	7	23.33	7	23.33	P > 0.999
	Single	23	76.67	23	76.67	
Family history of kidney failure	Yes	8	26.67	6	20.00	P = 0.411
	No	22	73.33	24	80.00	
Education level	Illiterate	7	23.33	9	33.33	P = 0.880
	Elementary or diploma	15	50.00	15	50.00	
	Higher than diploma	8	26.67	6	20.00	

SD: Standard deviation; DM: Diabetes mellitus

Besides, most of the subjects among both the intervention and control groups had elementary education or diploma degrees (Table 1).

The average monthly income among the intervention and control groups was 9'950'000 and 9'200'000 IRR, respectively, with no significant difference between the two groups in terms of the abovementioned variables.

Findings on the educational requirements of patients with DM before intervention in the two groups are demonstrated in table 2. As it can be seen, the two groups are identical in terms of educational needs before intervention (P = 0.880).

Results on the educational needs of patients with DM after intervention in the two groups are shown in table 3.

The findings regarding the level of self-efficacy among patients with DM before and after intervention and their difference in the two groups are shown in table 4. The results presented in this table indicate that the two groups were statistically the same in terms of

Table 2. Distribution of absolute and relative abnormalities of the study subjects on educational needs in the two intervention and control groups before intervention

Group	Intervention group		Control group	
Training needs assessment before intervention	Rate	%	Rate	%
Independent	24	0.75	26	74.30
Semi-dependent	9	0.03	8	26.60
Overall	30	100	30	100

Table 3. Distribution of absolute and relative abnormalities of the study subjects on educational needs in the two intervention and control groups after intervention

Group	Intervention group		Control group	
Training needs assessment after intervention	Rate	%	Rate	%
Independent	27	90.30	23	74.00
Semi-dependent	1	3.30	6	0.02
Overall	27	100	27	100

the self-efficacy score before the intervention (P = 0.734). There was a difference between the two groups after the intervention in the self-efficacy score, however, this difference was not statistically significant (P = 519).

Discussion

Today, chronic illnesses are the greatest challenge to the public health, which are cause of more than 75% of deaths.[1] DM is one of these chronic diseases. Due to multiple and complex drug treatments, various problems and essential changes in life of patterns of patients with DM have an impact on their social and psychological functioning. Since DM is a chronic complication, patients suffering from this illness are required to use a set of instructions to better cope with and manage this illness. The treatment of the patients with DM does not involve any self-care activities to be effective enough and the desired results to be obtained.[15] Taking into account the critical role in improving the self-efficacy among patients who suffer from the physical and mental disabilities, nurses can help patients improve their ability to carry out daily activities and reduce their social, psychological and economic problems.

The present study was accomplished aiming to determine the effect of training on the self-efficacy rate among patients with DM. In this study, 75.0% and 74.3% of the subjects respectively in the intervention and control groups were independent in terms of self-care before the intervention. After intervention, this rate was obtained as 90.3% and 74% were for the intervention and control groups, respectively.

In a study by Jaser et al. on the self-care ability and self-efficacy of patients with DM, the mean self-care score of subjects was obtained as 89.76 ± 14.20. Moreover, the mean self-efficacy score was 34.66 ± 5.65 in this study. Furthermore, the difference between the self-care and self-efficacy scores of patients with DM was statistically significant.[9]

In the present study, the self-efficacy score of patients in both groups was similar before intervention (P = 0.950). In a study by Kough on determining the effect of training and support on self-care ability of patients with chronic diseases, the results indicated the lack of a significant difference in the self-care ability of patients at the onset of the study (P = 0.300).[10]

In an investigation by Kilcup on the self-care assessment and determination of the factors affecting self-care among patients with DM, the mean self-care score of patients was obtained as 114.33 ± 16.25 and there was no statistically significant difference between the study groups.[12]

Table 4. Mean and standard deviation (SD) of self-efficacy scores of the study subjects before and after intervention in the two intervention and control groups

Group	Intervention group		Control group		P
Self-efficacy	Mean	SD	Mean	SD	Mann-Whitney test results
Self-efficacy before intervention	50.73	7.80	52.80	4.10	0.590
Self-efficacy after intervention	53.70	4.70	53.30	3.30	0.519
Self-efficacy difference	3.00	8.10	0.46	3.60	0.460

SD: Standard deviation

In the present study, the results of Mann-Whitney test indicated a significant difference between self-care scores of individuals after training (P = 0.030). This difference in post-intervention scores can be the implementation of Orem's self-care model for patients with DM. Therefore, it can be concluded that self-care model improves the self-care status of patients, in addition, the training level is also effective among patients. In a study by Marcdante et al., after intervention, patients in both intervention and control groups had a higher degree of self-care behaviors compared with the beginning of the study (P < 0.020).[14]

Training is a suitable tool for increasing the level of awareness of patients. Studies have shown that the lack or insufficiency of knowledge on self-care in the areas of proper diet, fluid intake, and care cause various problems among the patients with DM and eventually lead to various complications and increased mortality rate.[19] There are different models for training the patients. According to the problems among these patients, training can inform patients regarding the active and informed participation to take care of themselves, hence face-to-face education and family education can bring patients into independence; which this is closely linked to their ability to take continuous care of themselves.

The finding in the study by Rezasefat et al. on the correlation between self-care and self-efficacy in the adolescents with type 1 diabetes using Orem's nursing model on patients' recovery indicated a significant difference between the self-care ability among patients in the intervention group compared to the control group after the intervention (P < 0.001). In addition, the recovery of patients in the intervention group was better in comparison to the control group (P < 0.001).[13]

In the present study, after self-care program training, the mean self-efficacy level increased, however, this increase was not statistically significant (P = 519). Hence, a multi-faceted educational program is required for a higher effect, since increasing self-efficacy is more effective when combined with general changes in lifestyle, physical activity and social support.[16] It is suggested that the patient be supervised by a team of nurses, psychologists, social workers, and nutritionists since the entry of the patient into the department.

Moreover, in this study, other variables directly and indirectly affecting the level of self-efficacy of patients with DM were not evaluated. Fasting blood glucose (FBS) and non-fasting blood glucose tests are of these variables which are important indices to observe the principles of self-care among patients due to factors affecting the level of self-efficacy.

The findings obtained in this study indicated a significant difference between the self-efficacy scores of the subjects after training, however, this difference was not statistically significant.

The results obtained from the study by Vora et al.[16] on determining the relationship between self-efficacy and self-care of patients with DM showed that the mean score of self-efficacy and self-care among patients with DM was 4.124 and 23.240, respectively; there was a positive correlation between self-efficacy and self-care (P < 0.001).

In the present study, according to the independent t-test and chi-square test, there was no statistically significant difference between the intervention and control groups in terms of age, gender, education, and self-care education. In other words, the group was homogeneous. The scores of age, gender, and the education level require self-care education. In terms of gender, different social status, decision-making role in the family, and leadership can affect the self-care education scores. Self-care capacity decreases with age. By increasing the education level, the individuals obtain information in an easy way

and their interest in maintaining and improving their health is enhanced.

The results of the study by LEO on determining the level of knowledge, attitude and practice of patients with DM regarding self-care showed that there was a significant correlation between knowledge and attitude of subjects towards self-care ($P < 0.001$). In addition, the results indicated a significant relationship between age, number of children, educational level and monthly income of patients with their knowledge on self-care and there was a statistically significant relationship between the degree of education of patients and their performance about self-care.[17,18]

Unfortunately, no similar study on the examination of the effect of the self-care program on the self-efficacy rate among patients with DM was found, however, there was a study on the impact of self-care training on the quality of life (QOL) among these patients.

The results of a study by King and DeCicco to determine the impact of self-care education on the QOL and physical problems of patients with DM indicated a significant decrease ($P = 0.030$) in problems like overweight, hypertension, edema, itching skin, vascular problems, and increased QOL.[20]

The study by Zohar and Marshal on determining the effect of self-care training on the QOL of patients with DM indicated that self-care training significantly improved at general levels ($P = 0.300$), physical function ($P < 0.001$), and mental health ($P = 0.001$).[19]

The findings of a study by Cheraghi et al. on the assessment of the effect of self-efficacy training on adherence to fluid regimens among the patients with DM, indicated that 33-50% of patients did not follow the fluid limitation diet. After intervention and training, increasing self-efficacy was associated with increasing treatment compliance, improved health behaviors and reduced psychological and physical symptoms.[5]

The personal and physiological responses of individuals to the questionnaire and reduced accuracy of answering questions due to the high number of questions in the questionnaire were of the uncontrollable limits of the present study.

Based on the results of this study, it is suggested the self-care programs to be designed for other chronic diseases including dialysis, cardiovascular and respiratory failure, and their impact on self-efficacy.

Conclusion

Understanding the need for self-efficacy among patients with DM and the implementation of educational programs, due to the dependence of these patients on treatment to preserve life until the end of life, helps the patients to adapt with the conditions and increase self-care activities.

Conflict of Interests

Authors have no conflict of interests.

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