Effect of educational intervention based on locus of control structure of attribution theory on self-care behavior of patients with type II diabetes

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Abstract

Background: Different factors, such as personality and psychological characteristics, are effective in the self-care and control of diabetes. This study aimed at determining the effect of educational intervention based on locus of control structure of attribution theory on the self-care behavior of patients with type II diabetes.

Methods: This was a quasi-experimental controlled study performed on 180 patients in Babol Diabetes Association. The sampling method was simple random sampling. Data collection tool was form C of standard questionnaire in multidimensional health locus of control (MHLC) and summary of diabetes self-care activities (SDSCA). Based on the results obtained from the initial completion of the questionnaires, educational intervention was designed as three 60-minute educational sessions using short lectures, question and answer, group discussions, and consultation methods, as well as educational materials, such as films, posters, and pamphlets. Intervention was only performed for the test group. The questionnaires were filled out again 2 and 3 months after the intervention.

Results: Before the intervention, there was no significant difference in the mean scores of self-care, internal, chance, and external locus of control between the 2 groups. However, 2 to 3 months after the intervention, the mean scores of self-care ($p<0.001$) and locus of control ($p<0.001$) increased in the test group. Moreover, the mean score of chance ($p<0.001$) and external ($p<0.001$) locus of control decreased significantly.

Conclusion: Educational intervention decreases the mean scores of chance and external locus of control and increases the mean score of internal locus of control; as a result, it improves self-care in patients with diabetes.

Keywords: Educational intervention, Self-care, Health locus of control, Type II diabetes

Introduction

Diabetes has increasingly received more attention due to its dangerous complications. Diabetes has involved millions of people worldwide (1). Diabetes, especially Type 2, has become one of the main threats to human health in the 21st century. This disease has become one of the global health problems and the main cause of death and disability; its vascular complications during lifetime lead to the huge increase of heart attacks and strokes, kidney failure, blindness, and amputation (2). Many studies have demonstrated that patients with diabetes, despite having relatively normal life for a long time, suffer from diabetic complications, such as neuropathy, nephropathy, and heart attack (3). Mortality rate of people with diabetes is 2 to 3 times higher than that of healthy individuals (4). Every year, more than 7 million people around the world suffer from diabetes and more than 3.8 million deaths occur due to diabetes, ie, 1 death occurs in patients with diabetes every 10 seconds. According to previous studies, the number of patients with diabetes in Iran was equal to 2 872 000 in 2010, which is predicted to be increased to 5 981 000 people in 2030, ie, 155 000 patients with diabetes per year (5). In 2008, Yazdan Panah et al. reported the

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↑What is "already known" in this topic:
Identifying diabetic patients with internal, external and chance attribution styles can be effective in identifying their behaviors to better control the disease.

→What this article adds:
Education based on locus of control structure of attribution theory has a positive effect on self-care in patients with diabetes through decreasing external and chance locus of control and increasing internal locus of control.

prevalence of diabetes to be 17% among the population aged 30 to 65 years in the west of Yasouj (6). Due to the growing trend of diabetes in the world, World Health Organization has considered it a hidden epidemic, and has called all the countries to cope with this epidemic since 2014 (7). One of the reasons for the lack of success and achievement of favorable treatment outcomes in patients with diabetes is the low participation of patients in treatment because they and their families need to learn and practice new lifestyle skills, such as monitoring blood glucose, selecting proper diet, and being more active. These skills are important for preventing and controlling diabetes, and delaying its complications (8). The increased knowledge of patients about diabetes' different problems including principles of self-care, continuous blood glucose control, and maintain it at the normal level could prevent early and late complications, ensure long lifetime for patients, and decrease treatment costs. Undoubtedly, achieving these objectives requires public participation, as well as dynamic and continuous education; without educating the patients and their participation in the self-care process, performing health care will be costly and quality of life of patients will decrease (9). Self-care, which is a strategy to comply with events and stresses of life and can improve health and independence, includes special activities to reduce the symptoms (10). Knowledge and type of attitude towards the disease, which could help control it, is highly important for patients with diabetes (11). Some studies have been performed on self-care education (12-14). In some of these studies, the role of educational interventions in diabetes has been evaluated, and it has been found that the interventions with the aim of behavioral changes are effective in improving self-care abilities, controlling diabetes, and enhancing quality of life of patients with diabetes (15). Results of a study indicated that health education improves quality of life of patients with diabetes and increases the mean scores of quality of life by 18.4±0.6 (16). Numerous studies in different parts of the world have also indicated that educating patients with diabetes could improve the hemoglobin profile (HbA1C) in fasting glucose and the metabolic status of diabetic patients (17-19). Tendency of people to attribute the behavior to external causes and factors is called attribution style (20). According to the studies on attribution styles, people attribute their diseases to personal or environmental factors; hence, there are 2 locuses of control, internal and external, in the attribution theory (21). Those who search the reasons for the behaviors in themselves would refine and modify their behaviors, without expecting help from others, waiting for others to help, relying on others' encouragement to take a step, and justifying their behaviors instead of self-analysis and judging themselves. Therefore, they would achieve success and can fulfill most of their dreams. In contrast, those who often attribute the reasons for their behaviors to something outside themselves, would blame others for their failure, wait for others to help, and usually do not correct their viewpoints (22). Hence, identifying diabetic patients with internal, external, and chance attribution styles can help identify their behaviors to better control the disease. Therefore, considering the importance of locus of control and self-care education in patients with diabetes, this study aimed at evaluating the effect of educational intervention based on locus of control structure of attribution theory on the self-care behavior of patients with type II diabetes in Babol Diabetes Association. The results can be applied to design improvement programs for patients based on locus of control structure in health centers, health houses, hospitals, diabetes centers, as well as diabetes associations, and other organizations.

Methods

This was a semi-experimental controlled research performed on 180 patients in Babol Diabetes Association. This study aimed at determining the effect of educational intervention based on locus of control structure of attribution theory on self-care behavior. The sampling method was simple random sampling. First, among 7200 members of Babol Diabetes Association, using the formula for comparing the means of the 2 independent groups, a total of 82 participants was determined as the sample size. Considering almost 10% extra sample size for the loss in the second step, the total number of samples was estimated to be 90 in each group. Then, the participants were randomly divided into 2 groups of test and control. The inclusion criteria were membership in Babol Diabetes Association and having type II diabetes. Based on Social research ethics protocol, the participants in the 2 groups should not have had any relationship with each other.

One of the data collection tools was a C-form standard questionnaire in multidimensional health locus of control (MHLC), with a 6-point Likert scale. In this form, 6 items measured beliefs of people in the internal control of health, and 12 remaining items measured the effect of factors such as chance, powerful others, doctors, and people on personal health, representing external locus of control for health. Scores 1 to 6 were considered for the options from strongly agree to strongly disagree; therefore, the score could vary from 6 to 36 for each subtest, which is not summed and estimated independently. Multidimensional health locus of control (MHLC) questionnaire was designed by Walston and Devlis; and its validity and reliability have been formerly estimated by Kohara et al. (23) as 0.62 and 0.76, by Nikogoftar (24) as 0.70, by Moshki et al. (25) as 0.70, 0.75, and 0.69 for each of the components of internal, external, and chance locus of control, and by Hatamloye Sadabadi et al. (26) as 0.94, 0.65, and 0.90 for each of the components of internal locus of control, external locus of control, powerful others, and chance, respectively.

Another data collection tool was summary of diabetes self-care activities (SDSCA), which includes 11 questions to measure 5 aspects: diet, physical activity, blood glucose testing, foot care, and smoking. The respondents reported the frequency of performed activities during 7 previous days on a 0 to 7 scale. In total, the mean scores of 11 items showed the self-care level of the person in doing the assignments related to diabetes. Except in Question 4, the higher the score of the questions, the higher the total score, ie, self-care is done in a better way. Question 11 is a yes/no question, in which a no response indicates better

self-care. This questionnaire has been evaluated by Skinner and Hamsun, and its internal consistency coefficient was obtained as 0.82 in the English edition by the producer, 0.85 in the Spanish edition (27), and 0.65 in the Persian edition by Nikogoftar, as well as 0.82 by Hatamloye Sadabadi et al. (24, 26, 27).

In the pretest step, the questionnaires were completed by all participants in the 2 groups. According to the analysis of the pretest results, the self-care educational course in diabetes was designed and was then performed and modified according to the experts' opinions. The educational intervention included 3 educational sessions based on locus of control structure of attribution theory (internal, external, and chance) and self-care in diabetes. Each session contained a 60- minute education by short lectures, question and answer, group discussions, and consultation methods using educational materials, such as films, posters, and pamphlets. Then, the designed educational intervention was only performed for the test group. The questionnaires were completed again in both groups 2 to 3 months after the intervention in the posttest. The data obtained in SPSS20 software were analyzed using descriptive (number, percentage, mean, and standard deviation) and analytical (Pearson's correlation coefficient, regression analysis, paired t test, and chi square) tests.

Ethical considerations were observed based on the social research ethics protocol and informed consent was obtained from participants in the study.

Results

Minimum age in the test and control groups was 35 and 36 years, respectively, and maximum age was 80 years in both groups. Mean±SD age in the test and control groups was 57.33±9.6 and 58.74±9.5 years, respectively. Independent t test did not reveal a significant difference between the 2 groups in age (p= 0.325). The result of chi square test (root mean square) showed no significant difference between the control and test groups in sex, education, and employment (Table 1).

A significant difference was found between the mean scores of self-care, internal, external, and chance locus of control before and 2 months after the intervention (p<0.001) (Table 2). However, no significant difference was observed between the 2 groups in the mean score of internal locus of control before educational intervention. However, as it has been demonstrated in Table 2, internal locus of control mean score increased in the test group 2 months after the intervention, and a significant difference was observed (p<0.001).

Self-care mean score increased after the educational intervention in the test group, indicating a statistically significant difference (p<0.001). The control group also demonstrated a significant difference in the opposite direction so that the mean score of self-care decreased in the control group by 0.78 two months after the educational intervention and became significant in the opposite direction (Table 2). It decreased in the control group by 1.10 during the 3 months after the educational intervention and became significant in the opposite direction (Table 3).

Table 1. Demographic variables of the participants

Studied variable	Category	Test		Control		χ^2 test P-value
		Number	Percentage	Number	Percentage	
Sex	Male	39	43.3	36	40.0	p=0.650
	Female	51	56.7	54	60.0	
Education	Illiterate	29	32.2	24	26.7	p=0.482
	Elementary to high school diploma	47	52.2	55	61.1	
	Academic	14	15.6	11	12.2	
Employment	Housewife	40	44.4	35	38.9	p=0.379
	Retired	18	20.0	14	15.6	
	Employed	32	35.6	41	45.6	

Table 2. Comparing the mean and standard deviation of the studied variables before and 2 months after the educational intervention in the test and control groups

Studied variables	Intervention time	Test		Mean differences	Paired t. test P value	Control		Mean differences	Paired t. test P value
		Mean	Standard deviation			Mean	Standard deviation		
Self-care	Before educational intervention	24.98	13.3	4.03	0.001	21.12	10.4	-0.78	0.001
	2 months after educational intervention	29.01	13.1			20.34	10.5		
Internal locus of control	Before educational intervention	21.56	5.3	3.97	0.001	21.95	4.2	-0.15	0.109
	2 months after educational intervention	25.53	5.5			21.80	4.2		
Chance locus of control	Before educational intervention	25.02	7.1	-2.27	0.001	27.34	6.8	0.02	0.765
	2 months after educational intervention	22.75	7.0			27.36	6.7		
External locus of control	Before educational intervention	26.88	4.2	-2.56	0.001	27.44	3.9	-0.15	0.207

Table 3. Comparing the mean and standard deviation of the studied variables before and 3 months after the educational intervention in the test and control groups

Studied variables	Intervention time	Test		Mean differences	Paired t. test P value	Control		Mean differences	Paired t. test P value
		Mean	Standard deviation			Mean	Standard deviation		
Self-care	Before educational intervention	24.98	13.3	3.84	0.001	21.12	10.4	-1.10	0.001
	3 months after educational intervention	28.82	13.0			20.02	10.5		
Internal locus of control	Before educational intervention	21.56	5.3	3.94	0.001	21.95	4.2	-0.19	0.147
	3 months after educational intervention	25.50	5.3			21.76	4.3		
Chance locus of control	Before educational intervention	25.02	7.1	-2.29	0.001	27.34	6.8	0.12	0.403
	3 months after educational intervention	22.73	6.8			27.46	6.5		
External locus of control	Before educational intervention	26.88	4.2	-2.54	0.001	27.44	3.9	-0.18	0.238
	3 months after educational intervention	24.34	4.3			27.26	3.7		

The result of paired t test indicated that the mean scores of chance and external locus of control in the test group decreased after the intervention, and the difference was statistically significant (p<0.001). However, no significant difference was observed in the control group.

Comparison before and 3 months after the intervention was also repeated, similar to the 2 months after the intervention, and it was found that the mean differences in the self-care and internal locus of control increased in the test group, showing a statistically significant difference (p<0.001). Nonetheless, no significant difference was observed in the internal locus of control in the control group,

and self-care became significant in the negative direction (Table 3). Regarding the external and chance locus of control before and 3 months after the intervention, like the previous step, the mean differences decreased and became statistically significant (p<0.001), while no significant difference was observed in the control group (Table 3).

RMA (repeated measure ANOVA) analysis also revealed a significant difference among the mean scores of self-care, internal, external, and chance locus of control before and 2 to 3 months after the intervention (Diagram 1).
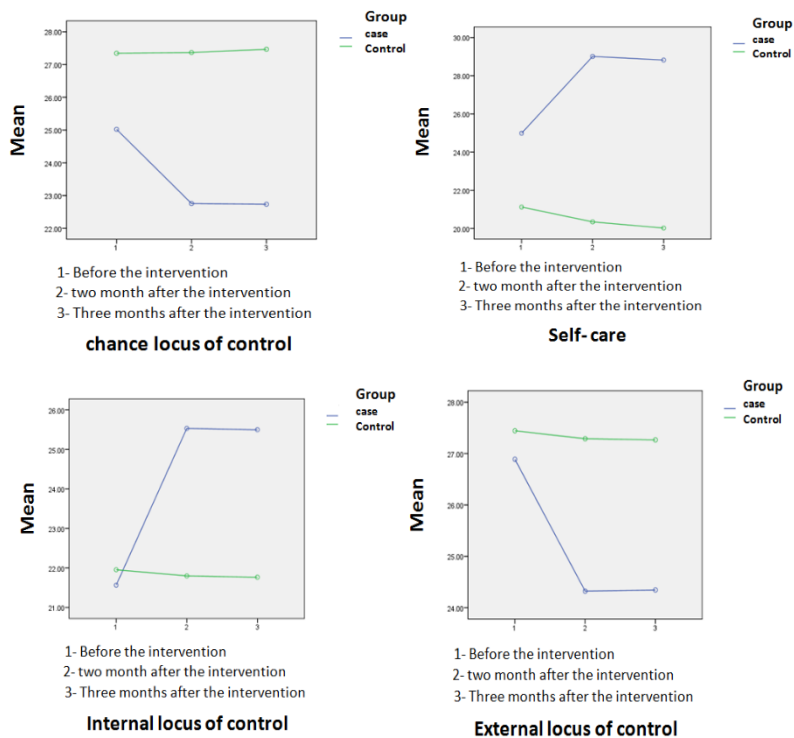

Diagram 1. Comparing the mean scores of self-care, internal, external, and chance locus of control before and to 3 months after the intervention

Discussion

In diabetes, different psychological factors, such as health locus of control, are important, which could create sense of responsibility in controlling the disease and self-care. In this study, the mean score of self-care increased significantly 2 to 3 months after the educational intervention in the test group. Solhi et al. confirmed the effect of educational program on self-care in patients with type II diabetes (28). Many studies have shown the increased level of self-care because of educational intervention (29 to 34). According to Jacobson et al., the necessity for diabetes control is the self-management of patients, which is a lifelong attempt to maintain quality of life (35). Therefore, the designed intervention is effective for self-care improvement.

In the present study, the mean score of internal locus of control in the test group significantly increased 2 to 3 months after the intervention. The health locus of control is the belief of the person that his/her health is controlled by the external or internal factors. Those with the internal health locus of control have a greater control over their blood glucose levels, ie, those who believe that the main reason of their health is in themselves pay more attention to the treatment regimens and are less involved in the complications of the disease. Thus, the internal health locus of control increases the person's ability in self-care behaviors and induces better control over diabetes. Also, those who believe their health is related to their personal behavior are more responsible for their health than those with a higher tendency towards the external locus of control. Brown and Fist showed that the individuals with internal control had better quality of life and health than the control group (36). Results of other studies have demonstrated that educational interventions increase self-efficacy (37), self-management (38-39), and health assessment (40). Therefore, the designed intervention is effective to increase the internal locus of control score. In this study, the mean score of the internal and chance locus of control in the test group significantly decreased 2 to 3 months after the educational intervention. Moaieni et al. indicated that educational intervention in the regular physical activity in the intervention group increased significantly compared with the control group (p<0.05) (41). Agha Molaie et al. found that educational intervention significantly (p<0.05) changed the behavior of the patients with diabetes (29). Hazavehi et al. demonstrated the effect of the educational program in caring for diabetic foot, and they found a significant difference in before and after the educational intervention in the test group (32). Baghiani Moghdam et al. showed the effect of the educational intervention on the quality of life among the patients with diabetes, so that in the components associated with quality of life a significant difference was observed before and after the educational intervention in the test group (p=0.017); however, there was no significant difference in the items in the control group (42). Diabetes self-care behaviors is required during life, and its acute and chronic complications can be prevented by constant pursuing, and its onset can be delayed (43). Health locus of control is the belief that health is controlled by internal or external factors. The result of a study conducted by Ebadi Fard Azar et al. showed patients with higher score of self-care had higher score in inner locus of control as well. Also, they found that patients with higher score in self-care had lower score in chance locus of control (44).

Self-reporting was one of the limitations in this study, and it is recommended that other studies be conducted using interview methods.

Conclusion

Results revealed that education based on locus of control structure of attribution theory on self-care in patients with diabetes had a positive effect in disease control and that the mean scores of external and chance locus of control decreased and that of the internal locus of control increased. Therefore, self-care was improved in the patients. Hence, to improve the self-care behaviors and increase the health of patients with type II diabetes, improved educational interventions based on locus of control structure of attribution theory should be performed by diabetes associations and health centers. In these interventions, the improved internal locus of control and decreased external and chance locus of control are considered. Considering the importance of locus of control in participants and their beliefs about the effective factors, more studies should be conducted in this field.

Conflict of Interests

The authors declare that they have no competing interests.

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