Original Research

The Effect Of Training Based On Leventhal's Self-Regulatory Model On The Disease Perception Of Diabetic Adolescents

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Abstract:

Background: People who have a correct understanding of their illness at the time of illness will be more sensitive to the related risk factors and will have more self-efficacy and ability. Leventhal's self-regulatory model as a cognitive-behavioral model plays an important role in disease management by increasing patient's perception of the disease. Therefore, this study was conducted with the aim of investigating the effect of education based on Leventhal's self-regulatory model on the disease perception of diabetic adolescents.

Method: This classical experimental study was conducted on 50 people who had been selected by simple random method in two intervention and control groups. The data collection tool was the disease perception questionnaire. The collected data entered into SPSS-21 statistical software to be analyzed by descriptive statistics (table, mean and standard deviation) and inferential statistics (paired t-test, independent t-test, ANCOVA test).

Results: The covariance ANCOVA test by removing the effect of pre-test showed a significant difference between the intervention and control groups (P=0.006 and Eta=0.14), so that 14% of the post-test changes could be explained by the intervention.

Conclusion: Leventhal's self-regulatory model increased the disease perception of participants. Therefore, based on this low-cost but effective non-pharmacological model, managers and health care workers can increase the disease perception, self-efficacy and self-care of diabetic patients.

Keywords: Leventhal's Self-Regulatory Model, Disease perception, Adolescents, Diabetes

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Introduction

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Diabetes is a common chronic disease all over the world (1). The World Health Organization has named this disease a silent disease (2). Diabetes is recognized as a chronic disease, and also includes a series of metabolic diseases (3-4). Diabetes is a serious medical problem, the prevalence of which is increasing dramatically worldwide. According to the World Health Organization report, the prevalence of diabetes will reach to 380 million people by 2025 (5). The growth of this disease in today's world is about 24% per year, and the prevalence of diabetes in Iran is also on the rise (6). In Iran, 7.7% of the country's population are affected by diabetes (7-8). The World Health Organization has estimated that the number of diabetic patients in Iran will reach to 6 million by 2030 (9). According to the report of World Diabetes Federation, in the near future, Iran will become one of the most prevalent countries in the world in terms of diabetes (10). The growing statistics of diabetes in Iran is considered an important challenge for the health system (9). Patients impose a heavy burden on the healthcare system. The World Diabetes Organization has estimated total cost of diabetes in Iran at 3.7 billion dollars (11), and according to the latest statistics of Iran's Ministry of Health, more than 40 billion Rials are spent annually by the Ministry of Health to control diabetes (12). This issue shows the high cost of diabetes in Iran (13). Unfortunately, the prevalence of diabetes in teenagers has increased over last decade, and 1 out of every 400-500 adolescents is affected by diabetes (14). Diabetes in adolescence causes a decrease in independence and a sense of dependence on others due to age conditions and type of special care required. This issue threatens the physical and mental health of adolescents (15). Diabetes is one of the chronic diseases that, due to its chronic and complex nature, causes a decrease in the self-efficacy of adolescents (10). In the meantime, understanding of the disease can affect self-care practices, psychological anxiety and other health outcomes in people (16). People who have a correct understanding of their disease at the time of illness will be more sensitive to the related risk factors and will have more self-efficacy and ability (2). It is obvious that some of the effective factors in the prevention and control of diabetes include sufficient awareness of the diabetes, and factors affecting its occurrence, and prevention. However, unfortunately, the lack of awareness and knowledge of the disease and especially not following the recommended diet is one of the weaknesses of care in diabetic patients (17). Therefore, educational programs based on theory-centered approaches play an important role in changing behaviors of diabetic patients (18-19). Leventhal's self-regulatory model is proposed as an effective model in changing behavior (20). In the Leventhal's model, understanding of the disease plays an important role in self-care and management of the disease (21). Leventhal's model has an effective role in health care decision-makings by increasing recognition and control of the emotions (22). Leventhal's self-regulatory model provides a structure for understanding factors influencing how to perceive the disease threats and the relationship between perceptions and reported symptoms, because one's perceptions and beliefs will influence his decisions about self-care behaviors (17). Once a person has a correct understanding of the disease' complications and risk factors, he or she can better predict future situations and make decisions based on them (23). On the other hand, the use of nursing theory and models plays an important role in improving the quality of nursing care (24-26). Therefore, this study was conducted with the aim of investigating the effect of training based on Leventhal's self-regulatory model on the disease perception of diabetic adolescents.

Methods

This classic experimental study was conducted on 50 diabetic teenagers allocated in two intervention and control groups in Gorgan city in 2019. The conditions for entering this study included; being a teenager with diabetes, having a medical record with a diagnosis of type 1 diabetes, not having any chronic mental illness and having minimal literacy. The age range of the participants was between 10 and 18 years. Exclusion criteria in this study also included not willing to participate or continue the study. The sample size of this study was calculated to be 50 people, using G*power statistical software and based on

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Cheraghi et al. (2014) study with an effect size of 1.06, a test power of 95% and a confidence level of 95% (27). The significant level of 0.05 was considered for all tests. The setting of this study was the Diabetes Clinic of Taleghani Children's Hospital in the city of Gorgan, which was affiliated to Golestan University of Medical Sciences. Simple random allocation was used for sampling in this study. For this purpose, first, the researcher selected a list of adolescents who met the inclusion criteria. Then, 50 of them were selected by simple random method. Next, the selected samples were allocated in two intervention and control groups by coin tossing method. The data collection tools included a demographic information questionnaire (age, gender, education, age of diabetes onset) and the disease perception questionnaire (Broadbent). The disease perception questionnaire was designed and validated by Broadbent E, Petrie KJ (2006). This questionnaire includes 9 questions, which are in the order of outcomes, duration of disease, personal control, treatment control, nature, concern, disease perception, emotional response and cause of the disease. The score range in this questionnaire for the first 8 questions is from 0 to 10. Also, question 9 is open-ended and investigates three main causes of disease in the order of importance. A higher score indicates a higher disease perception (28).

The reliability of this questionnaire in Iran has been confirmed by Karimi-Ghasemabad (2021), using a test retest method with a correlation coefficient of 0.70, and Amiri et al. (2016) calculated a Cronbach's alpha coefficient of 0.80 for this tool (29, 30). The reliability of this questionnaire in the current study was confirmed by the retest method and the correlation coefficient of 0.88 was calculated for it.

The validity of this questionnaire in this study was confirmed by 10 faculty members. In the implementation of this study, the researcher introduced himself to the participants after approving the project in the University's research council and obtaining code of ethics from the Chalus Islamic Azad University's biological ethics committee with the number: IR.IAU.CHALUS.REC number 1398.046. The required permission was also obtained from the officials of diabetes clinic. While explaining the study objectives to the adolescent participants and their parents, they were assured about the safety of the study and principles of confidentiality and anonymity. The participants were also informed that they can withdraw from the study at any time with any reason. The routine monitoring and supportive care provided by the clinic were provided to samples in the control group, while in the intervention group, in addition to routine care similar to the control group, the samples received a total of 6 training sessions (2 sessions per week and each session lasting for 30-45 minutes) in 3 weeks, as well as 6 telephone follow-up sessions (one session per week for 6 weeks). The follow-up of care process was done by patients themselves. The first meeting was held with the purpose of getting to know each other, stating the study objectives and completing the pre-test. The second session was conducted with the aim of examining the preconceptions of patients about the disease. The third session aimed at sensitizing patients about disease complications and fourth session was related to risk factors such as lack of compliance with treatment, stress, inactivity, improper diet, smoking and psychosocial problems. The fifth session included the self-efficacy training and review of the previous sessions and the sixth session aimed at evaluating the training's effectiveness. The importance of medical care and self-care was emphasized in the follow-up sessions via SMS and telephone counseling. The collected data, before and after the intervention, was entered into SPSS-21 statistical software to be analyzed by descriptive statistics (table, mean, standard deviation) and inferential statistics (paired t-test, independent t-test and ANCOVA test) at a significance level of 0.05.

Results

In comparing demographic information between the two intervention and control groups, independent t-test showed no significant difference between the two groups in terms of age (P=0.24) and body mass index (P=0.21). Also, Chi-square test showed no significant difference between the two groups in terms

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of gender (P=0.36), history of diabetes in relatives (P=0.39) and history of diabetes (P=0.24). Fisher's test did not show a significant difference between the two groups in terms of treatment method (P=0.67).

The independent t-test did not show any significant difference between the two groups before the intervention (P=0.94). But this test showed a significant difference between the two groups after the intervention (P=0.02).

Also, the paired t-test did not show a significant difference in the control group before and after the intervention (P=0.36), but it showed a significant difference between the intervention and control groups after the intervention (P=0.001). (Table 1)

The covariance test showed a significant difference between the intervention and control groups by removing the effect of pre-test (P=0.006 and Eta=0.14), so that 14% of the post-test changes could be explained by the intervention (Table 2).

Discussion

The results of present study showed that training based on Leventhal's self-regulatory model increases the disease perception of diabetic adolescents. The results of this study are consistent with other studies. Saed Tabarian (2019) also showed the effectiveness of Leventhal's self-regulatory model on the disease perception of diabetic patients (21). Postolica (2018) stated that Leventhal's model plays an important role in increasing the disease perception and improving the psychological behaviors of cancer patients' caregivers, as this model leads to a better understanding of disease by increasing cognition (22). Achstetter (2019) believed that Leventhal's model plays an effective role in improving the mental health of patients with asthma by creating sensitivity and helping to recognize threats caused by the disease (23). Jayne (2001) argued that Leventhal's model is effective as a cognitive model in the control and self-management of diabetes (20). Saranjam (2023) believed that Leventhal's model helps to control the symptoms of hypertension in chronic hypertension patients by increasing their understanding of hypertension (31). Wang (2023) stated that Leventhal's self-regulatory model is effective in improving oral cancer treatment process in cancer patients (32). Khodaparast (2019) showed that using Leventhal's self-regulatory model can be effective in increasing the disease perception of women with gestational diabetes. He also recommended this intervention to be used among women with gestational diabetes (16). Rakhshan M, Hassani (2013) investigated the nature of disease perception in patients with pacemaker, using a self-regulation approach, and showed that after the implementation of intervention, the participants became more sensitive to the consequences of disease and non-compliance with the treatment, concluding that this model improves the treatment process (33). Misunderstanding of patients about the disease can lead to behavioral and emotional problems, and same of these problems can prevent patients from adopting a healthy lifestyle (16). Correct understanding of negative beliefs, control of emotions and knowledge of existing conditions increase self-management of the disease (32). Disease perception affects people's behavior, their adaptation to the disease and their control of the disease. Health interventions that based on disease perception can be useful in improving patient's health and recovery (34). Therefore, the use of educational programs based on cognitive awareness leads to improper health behaviors, which improve lifestyle (31). Knowing and understanding the causes of disease and predisposing factors are very important in disease prevention and treatment follow-up (35-36). Increasing knowledge and understanding the realities of the disease play an important role in increasing self-efficacy and self-care, and also reducing the anxiety of patients, which ultimately increase the quality of care (37-39). Therefore, empowering patients and caregivers improves the quality of healthcare services (34, 40-43). One of the limitations of this study is its small sample size. It is suggested to carry out similar studies on larger samples.

Conclusion

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The results of this study showed that education based on Leventhal's self-regulatory model increases the disease perception of diabetic adolescents. Therefore, the design and implementation of an educational program based on this model plays an important role in improving the disease perception of diabetic people. This theory effectively changes people's behavior and helps them to preserve it. The disease perception has an effect on people's behavior, their adaptation to the disease, their control of the disease, and the overall outcome of the disease.

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Conflict of interest

This research has no conflict of interest.

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Table & Figure:

Table 1: Comparison of disease perception between the intervention and control groups before and after the intervention

Group / Time	Control	Intervention	P-value
Pre-intervention	5.56 ± 9.91	51.6 ± 9.4	P=0.91 Mean=0.04
Post-intervention	52.88 ± 9.61	59.64 ± 6.83	P=0.02 M=5.88
P-value	0.36	0.001	

Table 2: The effect of Leventhal's self-regulatory model on the disease perception of diabetic adolescents

	Sum of squares	Degree of freedom	Mean of squares	f-value	Level of significance	Eta
Modified model	22.01	2	11	4.16	P=0.02	0.21
Post-test separator	55.37	1	55.37	50.96	P<0.01	0.52
Group	21.45	1	21.45	8.12	P=0.006	0.14
Error	124.16	47	2.64			
Sum	1615	50				
Total	146	49				

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