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Effects of Predisposing, Reinforcing and Enabling Factors on the Self-care Behaviors of Patients with Diabetes Mellitus

Nazila Nejhaddadgar[1]*, Farbod Ebadifard Azar[2], Mahnaz Solhi[3], Firuoz Amani[4]

Abstract

Aim: Diabetes mellitus (DM) is a life time disease that requires change in patients' self-care and life style. The aim of this study was to determine the effects of predisposing, reinforcing and enabling factors on the self-care of patients with DM in Ardabil City, Iran in 2016.

Methods: This quasi-experimental study was conducted on 129 patients with DM referred to the diabetic centers of Ardabil. We used the components of PRECEDE model for planning the program. The educational program was executed on six information sessions. Changes in the predisposing, reinforcing, enabling factors and self-care behaviors one month after the intervention activities were assessed by using the same questionnaire. Data were analyzed through SPSS 16 software using descriptive and analytical tests.

Findings: The mean age of the patients was 56.82(±13.4) years, 69.8% of them were married and 20.2% were illiterate. According to the results, the mean scores for the knowledge, attitude, self-efficiency, self-care behavior, and reinforcement factors increased significantly after the educational intervention (p-value >0.001).

Conclusion: Educational intervention with PRECEDE-PROCEED model improved the diabetic patient's self-care.

Keywords: Diabetes mellitus, Enabling factors, Predisposing factors, Reinforcing factors, Self-care behaviors

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1. Ph.D. Candidate in Health Education and Health Promotion, Department of Health Care Services and Health Education, Faculty of Health, International Campus, Iran University of Medical Sciences, Tehran, Iran Email: naziladadgar60@gmail.com
2. Professor, Department of Health Care Services and Health Education, Faculty of Public Health, Iran University of Medical Sciences, Tehran, Iran Email: dr_febadi@yahoo.com
3. Associate Professor, Department of Health Care Services and Health Education, Faculty of Health, Iran University of Medical Sciences, Tehran, Iran Email: solhi.m@iums.ac.ir
4. Assistant Professor, Department of Epidemiology and Biostatistics, Faculty of Public Health, Ardebil University of Medical Sciences, Ardebil, Iran Email: f.amani@arums.ac.ir

Introduction

Diabetes mellitus (DM) is one life time diseases, and because of its growing trend, it is considered to be one of the most important public health problems in the world. The disease has led to 9% of all deaths worldwide, and is the fifth leading cause of death in Western societies, as well as the fourth reason for going to a doctor [1].

Currently, more than 230 million people worldwide are suffering from this disease, which will increase up to 380 million till 2025, as predicted by the World Health Organization (WHO). According to this report, in the developed countries, the number of patients will be 51-72 million that is 42% increase in the number as compared to 170% in the developing countries, that will be 84-228 million [2]. Generally, in Iran, the prevalence of diabetes is 2-3% of the country's population; it is about 3.7% in people over 30 years old and 13% in people with undiagnosed diabetes [3]. Studies have shown that despite normal living conditions, diabetics are affected by complications of diabetes such as neuropathy, nephropathy, stroke, etc. in the long run [4]. In other words, diabetes is the most important cause of blindness and chronic renal failure in adults. Moreover, diabetics are at risk of heart disease 2 to 4 times more than the non-diabetic patients [5]. Therefore, it is important to pay due attention to its direct and indirect financial burden on the health care system and its impact on the quality of life, as well. A survey by WHO indicates that 16% of hospital costs and 58% of all amputations are related to diabetics [6].

Health education is the foundation of chronic diseases' care and treatment. The main objective of educational interventions in terms of diabetes is to change the life style of patients and improve their self-care [7]. In health education field, certain models help us explain occurrence behavior and conduct health education programs in order to view their effect on behavior [8].

One of the frequently used models in health education and promotion is the PRECEDE Model. The most recent version of the model by Green and Kreuter prescribes eight phases in planning, implementing, and evaluating health promotion programs. In fact, one of the models used for diagnosing, implementing, and preventing the chronic diseases (as in the present study) is the **p**redisposing, **r**einforcing and **e**nabling **c**onstructs in **e**ducational **d**iagnosis and **e**valuation (PRECEDE) model [8]. Among the constructs in the PRECEDE model, predisposing, reinforcing and enabling factors could be mentioned as an educational diagnosis phase. Therefore, this study was carried out to determine the effects of predisposing, reinforcing and enabling factors on the self-care of patients with DM in Ardabil

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City, Iran in 2016.

Materials and Methods

This quasi-experimental study was conducted during 2016 on DM patients referred to the diabetic centers of Ardabil. The sample size considered for the statistical formula of this literature review was determined as 129 individuals. Patients who were selected had type 2 diabetes for at least one year, and all the patients were informed about the purpose of the study. For ethical issues, none of the patients were forced to take part in this study.

In the first step, the PRECEDE model constructs were analyzed, and the educational parameters were determined. In the second step, the educational program was compiled and presented on 6 educational sessions. To present the educational content, certain tools were used, which included a data projector and different lecturing methods including Questions and Answers, group discussion and different educational materials such as pamphlets, brochures and CDs. After one month, the efficiency of the content of the educational program was determined by using the same questionnaire.

Demographic and PRECEDE model variables were measured using questionnaire. Content validity test was used for validation of the questionnaire by a panel session with 15 experts, and the questions were changed based on the results. Also face validity was done based on the experts' comments. Content validity index acquired from all the questions in this section was higher than 0.71, and content validity ratio achieved from all of the questions in this section was higher than 0.66, which is appropriate in accordance with Lawshe table (for ten). Reliability of the researcher-made questionnaire was obtained by Cronbach's alpha test. The obtained correlation coefficients for Cronbach's alpha test for all questions was higher than 0.81.

The first part of the scale included questions related to the participants' demographic characteristics included age, gender, job, level of education, marital status, number of children, income, and BMI. The second part of the scale was self-care behavior with 15 questions by Summary of Diabetes Self Care Activities (SDSCA) questionnaire developed by Toobert whose validity in Iran has been proven to be 71% using Cronbach's α by Vosoughii 2010 [9]. The questionnaire included the following dimensions: diet (5 items), exercise (2 items), blood glucose testing (2 items), foot care (5 items), and regular drug use (1 item). Responses in each subscale were based on 7 days, ranging from 0 to 7; the higher number was indicative of days reflecting better self-care operation. Scoring the questions for SDSCA included 1 for *daily self-care* and zero for *not doing it*. The

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maximum score in this tool was 105, which was indicative of the highest quality of self-care. Based on the score categories guideline, the scores were classified into three levels: good (76-100 and higher), average (75-51), and poor (>50). The third part of the scale included predisposing factors (knowledge, attitude, and self-efficacy), enabling and reinforcing factors.

The knowledge of patients was measured using 8 questions with the *yes* and *no* responses: *Yes*=1 and *No=0*. The attitude of patients was measured using 14 questions, and the items were measured on the Likert-type scale, ranging from "*Strongly disagree*=0" to "*Strongly agree*=5". The self-efficacy of patients was measured using 4 questions, and the items were measured on the Likert-type scale, ranging from "Strongly disagree=0" to "Strongly agree=5".

The enabling factors' scale consisted of 9 questions (available resource, and educational programs); the reinforcing factors scale consisted of 3 items, and the scores were given in the following way: *Yes*=1 and *No=0*.

In order to calculate the reliability of the questionnaires, the method of test-retest was used during two-week time span for 30 patients (r=0/83).

Finally, the impact of educational program on the promotion of patients' self-care was measured 4 weeks after the first intervention.

Statistical analysis

IBM SPSS Statistics 16 for Mac (SPSS Inc., Chicago, Ill) was used for all the analyses. Continuous variables were presented as mean (SD), and categorical data as number and percentage. Data were analyzed through the SPSS 16 software using descriptive and analytical tests.

Results

The mean age of the participants was 58.82 (SD: 1.34) years. Table 1 presents the baseline characteristics of the participants.

Table 1: Baseline characteristics of the participants

	Number	Percent
Gender		
Male	64	49.6
Female	65	50.4
Total	129	100

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	Number	Percent
Educational level		
Illiterate	26	20.2
Primary school	22	17.1
High school	21	16.3
Diploma	25	19.4
University level	16	12.4
Total	129	100
Marital status		
Single	14	10.9
Married	90	69.8
Divorced	6	4.7
Spouse is dead	19	14.7
Total	129	100
BMI		
<18.5	0	0
18.5-24.9	27	20.9
25-29.9	46	35.7
30-34.9	56	43.4
Total	129	100
Income		
Low	68	52.7
Middle	46	35.7
High	15	11.6
Total	129	100
Period of having disease (year)		
2>	10	7.8
3-5	39	30.2
6-8	21	16.3
9<	59	45.7
Total	129	100

The mean scores of self-care in male participants (63.09±6.2) were statistically higher than in female participants (60.76±6.1) ($p<0.05$).

Before the intervention, the majority of diabetic patients had a poor score of self-care. The lowest scores were related to consumption of drugs 3.3±1.38, blood glucose testing 6±1.9,

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and physical activity 6.1±2.2. Self-care behaviors of the DM patients before and after the educational intervention are presented in Table 2.

Table 2: Average self-care score and its subscales before and 4 weeks after the educational program

Independent variables	Before intervention mean(±SD)	4 weeks after intervention mean(±SD)	P- value
Total self- care	44.24±7.32	61.92±6.28	>0.001
Diet	14.12±3.2	18.20±3.2	>0.001
Doing blood sugar test	6±1.9	8.9±1.7	>0.001
Regular drug use	3.3±1.38	4.1±1.4	>0.001
Physical activity	6.1±2.2	7.9±1.7	>0.001
Foot care	14.60±3.7	20.85±3	>0.001

The mean scores for knowledge, attitude, self efficiency, and reinforcement factors increased significantly after the educational intervention (P<0.001) (Table 3).

Table 3: Predisposing, enabling and **reinforcing** factors affecting the self-care behavior of participants before and after the intervention

Independent variables	Before intervention mean(±SD)	4 weeks after intervention mean(±SD)	P- value
Knowledge	3.17±1.3	5.7±1.3	>0.001
Attitude	45.91±9.9	53.34±5.6	>0.001
Self-efficiency	11.38±2.1	14.1±3	>0.001
Reinforcement	1.5±0.9	2.2±0.7	>0.001

Discussion

The findings in this study showed a significant change in the mean scores of patients' self - care behavior after the educational intervention (p<0.001). Education is fundamental in promoting the knowledge, attitude, self efficiency and self-care behavior of the patients with DM [10]; this finding is similar to the finding of Borhani [11].

In the present study, only 15.5% of the participants were taking medications for more than 5 days a week regularly before the intervention; however, after the study, this figure increased to 34.9%. Aghamollaee [12] and Borhani [11] found a significant increase in the self-care score of the intervention group but there was no significant difference observed in the control group.

The results of this study revealed that the mean scores for the predisposing factors (knowledge, attitude and self efficiency) increased one month after the educational intervention, which is similar to the findings of Asghar [13], Borhani [11] and Dehdari [14].

In the present study, there was a significant increase in the score of reinforcement factors

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after the intervention, and also a significant difference for the enabling factor of deciding to go on a diet by the patient's families. Overall, most specialists pass on the responsibility of monitoring DM onto the patients and their families. They believe that patients must take the responsibility of controlling their disease in a manner that is most suitable for their living background and culture [15]. Like all non-diabetic healthy individuals, the patient must play a role in the working place, family, and society [16].

In this study, there was an increase in the scores of reinforcement factors after the educational intervention. Similar to other studies, receiving education on complications of diabetes and self-care from the health workers, members of family and peer groups had a significant effect in their self-care behavior [17]. Our findings further showed that taking advice from the family and receiving their encouragement to self-care behaviors are important in controlling the disease. DM is a lifetime disease that affects the patients' quality of life, so for the therapeutic treatments, change in the life style of patients is necessary. The relatives of the patients, especially the family members and peer groups [18,19] have the most important role. As a result, because of the significant role of the family, the healthcare staff in the treatment process and educational classes should involve the family [20].

Conclusion

This study showed that after education intervention based on PRECEDE model, the intervention group got higher scores in self-management, knowledge, belief, self-efficiency, and self-care as reinforcing factors. So we can conclude that PRECEDE model provides an applicable framework for educational programs in diabetic patients.

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Authors' contribution

FAA, MS and NND participated in the study design and data acquisition. FA participated in statistical analysis and interpretation of the results. MS and NND participated in statistical analysis and drafting of the manuscript. All authors read and approved the final manuscript

Limitation of study

In this study, we do not have control group so we could not compare the results of the intervention group with the control group.

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