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Effects of a Self-Management Short Course Instruction on Glycemic Control in Adults with Diabetes Mellitus

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ABSTRACT

Background: Education is an integral part of the treatment in diabetes mellitus. Attendance at long courses might not be convenient for many patients.
Objectives: The current study was conducted to evaluate the effectiveness of self-management, short course instruction on glycemic control in adults with diabetes mellitus.
Patients and Methods: A total of 60 patients with diabetes mellitus were randomly allocated into intervention (n = 30) and control (n = 30) groups. Fasting blood sugar (FBS) and blood sugar (BS) (5pm) tests were conducted. The intervention group received instruction about self-management in diabetes mellitus for two hours, during two sessions. They were followed-up for three months with telephone calls. Patients asked any questions they had during these calls. After three months the patients' FBS and BS were recorded again. The same process took place in the control group without training. Independent sample t-test and chi-square tests were used to analyze data using SPSS version 16.0.
Results: The sample included 60 patients with a mean age of 46 ± 2.14 years. The FBS dropped from 151 mg/dL to 110 mg/dL in the intervention group ($P = 0.02$). While it increased from 146 mg/dL to 150 mg/dL in the control group. The BS also decreased from 231 mg/dL to 196 in the intervention group. ($P = 0.05$), but it increased from 240 to 247 in the control group ($P = 0.09$). There was a significant difference in FBS and BS tests in the two groups after three months. ($P = 0.002$, $P = 0.05$), respectively.
Conclusions: The results showed that a short course of instruction is effective in glycemic control. It is suggested that further research is conducted to evaluate the effectiveness of self-management long course instruction on glycemic control in adults with diabetes mellitus.

Implication for health policy/practice/research/medical education:
Health authorities are responsible for integrating self-management instruction and follow-up programs in the course of diabetes care.

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1. Background

Diabetes mellitus is a relatively common chronic disease with no cure at present (1). Type 1 diabetes usually develops in childhood and adolescence, whereas type 2 diabetes, is not common before the age of 40 years (2, 3). There is evidence that the incidence of diabetes mellitus is rising in the world (4, 5). The International Diabetes Federation estimates that in 2010, over 200 million

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people in the world were affected by diabetes (6). This encompasses approximately 6% of the world's population (7). People with diabetes have elevated risks for; retinopathy, renal failure, neuropathy, atherosclerosis, peripheral artery disease, coronary heart disease and cerebrovascular disease. It is expected that better diabetes control will postpone or even prevent some of these complications (8). Although diabetes cannot be cured, the disease can be managed by pharmacological and non-pharmacological strategies (9). Patients' understanding of diabetes mellitus and its treatment have been viewed as essential to the management of this complex, chronic illness. To this end, the American Diabetes Association and other national agencies have recommended diabetic patients' education as an integral part of their treatment (10, 11). Recent discussions about educational interventions for patients with diabetes have focused on the potential benefits of simultaneously improving patients' understanding of diabetes, providing support for healthy behavior changes, and empowering patients (12, 13). Formal diabetes education has often focused on lifestyle modifications such as; dietary change, exercise, and self-measurement of blood glucose. Educational interventions have been shown to increase patients' knowledge of diabetes and self-care activities (14), especially in the short-term, but the results of these interventions on important long-term health outcomes remain unclear (12-15). Improving patients' knowledge of diabetes through educational efforts could lead more patients to take an active role in obtaining the necessary preventive care (16). It is widely recommended that educational interventions should be an integral part of diabetes care (17, 18). Educational interventions primarily teach diabetes-related knowledge and skills required for self-management, including correctly testing blood-glucose levels and injecting insulin (5). A multidisciplinary educational program of at least six to 25 hours is recommended for diabetes education (19). However, many patients are not able to attend these programs and long courses might be exhausting or inconvenient for some patients. In two similar reports, 76-85% of diabetic patients had poor knowledge and 33.3% had poor performance on self-care, despite routine patient education programs that had been delivered in diabetes centers. Consequently, the need for improved patient education programs and identifying ways to empower patients in diabetic care has been emphasized (14).

2. Objectives

The aim of the current study was to evaluate the effects of self-management, short course instruction on glycemic control in adults with diabetes mellitus.

3. Patients and Methods

A randomized controlled pre- and post-test design was employed to verify the effect of self-management, short course instruction on glycemic control in patients with diabetes mellitus attending the outpatient clinic of the Shahid Beheshti Hospital, Kashan, Iran The inclusion criteria were; age between 20-65 years, good general health, history of diabetes and injecting insulin for at least one year. Patients who were pregnant or diagnosed with end-stage renal disease or any other severe condition were excluded from the study. Exclusion criteria were; failure to follow the education program. A sample of 60 patients participated in the study. The purpose of the study was explained and informed consent was obtained.Numbers for the 60 patients were listed and using a random number's table, the names were allocated into two equal groups. Initially, the two groups completed demographic questionnaires (age, sex, race, education, income, and marital status) and patient clinical characteristics (self-reported health status, number of co-morbidities and years with diabetes). Then, fasting blood sugar (FBS) and blood sugar (BS) (5 pm) tests were carried out in both of the two groups. In the intervention group, face-to-face instruction was given by a researcher. The content of the instruction were lifestyle modifications such as; dietary changes, exercise, self-measurement of blood glucose, and blood pressure control. The instructions were carried out in two sessions; the duration of each session was one hour, with a one-week interval. An educational booklet was also given to the intervention group. Patients were followed for three months by telephone, and they could also ask questions. After three months, FBS and BS tests were taken and recorded in terms of mg/dL. The same process took place in the control group which did not receive any training. The mean score of FBS-BS was then calculated for each participant. t-test and chi-square were used to analyze data using SPSS version 16.0. A *P* value less than 0.05 was considered to be significant. This study received a grant from the Institutional Review Board (IRB) and the study was approved by the Kashan University of Medical Sciences (KAUMS), ethics approval was received from the Ethics Committee of KAUMS.

4. Results

The study included 60 patients with a mean age of 46 ± 2.14 years. Other characteristics of the participants are shown in *Table 1*. The intervention and control groups showed no significant differences in age, sex, duration of diabetes, and marital status (*Table 1*). Following the intervention, the mean score of FBS dropped from 151 mg/dL to 110 mg/dL in the intervention group ($P = 0.02$), while the mean score of the FBS increased from 146 mg/dL to 150 mg/dL in the control group. The mean score of the BS also decreased from 231 mg/dL to 196 in the intervention group, and it showed an increase from 240 to 247 in the control group (*Table 2*).There was a significant difference in FBS and BS tests in the groups three months after the education sessions. ($P = 0.002$, $P = 0.05$) (*Table 3*).

Table 1. Demographic Characteristics of Patients

	Intervention Group, No. (%)	Control Group, No. (%)	X^2	*P* value
Age, y			1.34	0.2
20 - 30	2 (6.6)	4 (13.3)		
30 - 40	8 (26.6)	9 (30)		
40 - 50	15 (50)	12 (40)		
50 - 60	5 (16.6)	5 (16.6)		
Gender			2.01	0.32
Female	18 (60)	21 (70)		
Male	12 (40)	9 (30)		
Marital Status			1.74	0.1
Single	7 (23.3)	1 (3.3)		
Married	20 (66.6)	24 (80)		
Widow	3 (10)	5 (16.6)		
Duration with diabetes, y			2.13	0.84
1 - 5	17 (56.6)	15 (50)		
5 - 10	8 (26.6)	9 (30)		
Up to 10	5 (16.6)	6 (20)		
Insulin use in day			1.76	0.15
Once	18 (60)	15 (50)		
Twice	12 (40)	15 (50)		

Table 2. Fasting Blood Sugar and Blood Sugar Level Before and After Instruction in the Two Groups

	Intervention Group			
	Before, Mean ± SD	**After, Mean ± SD**	***P* value**	***t*-Test**
FBS	151 ± 2.4	110 ± 2.1	0.02	3.45
BS (5 pm)	231 ±2.5	196 ± 2.8	0.05	3.01
	Control Group			
FBS	146± 1.3	150± 2.2	0.14	1.78
BS (5 pm)	240 ± 2.8	247 ± 3.2	0.09	2.65

Abbreviations: FBS, fasting blood sugar; BS, blood sugar

Table 3. Comparison of FBS and BS Tests After Instruction in the Two Groups

	Intervention Group, Mean ± SD	Control Group, Mean ± SD	*P* value	*t*-Test
FBS	110 ± 2.1	150 ± 2.2	0.002	4.65
BS (5 pm)	196 ± 2.8	247 ± 3.2	0.05	3.98

Abbreviations: FBS, fasting blood sugar; BS, blood sugar

5. Discussion

In the present study, the effect of a short-course instruction on self-management in diabetes mellitus was examined. The results indicated that a short course on self-management instruction had a significant effect on glycemic control in diabetes mellitus. Education of diabetic patients often focuses on self-management activities, including; diet, exercise, self-measurement of blood glucose, problem-solving skills, and methods for coping with diabetes (20-22). Norris *et al.* showed that patients who received diabetes education from a clinician or a more knowledgeable person, were more likely to perform self-management activities (23). The current study supported the results of studies conducted by Norris *et al.* (23) and Persell *et al.* (24) which showed that changes in blood-glucose levels before and after instruction were significant. Gage *et al.* also showed that educational and psychosocial programs are effective in diabetes control

(4). In a study performed by Keers et al. (2004), it was pointed out that there was a meaningful difference in FBS and BS levels before and after giving instruction (25). Malone et al. randomized patients presenting with severe diabetic complications into those receiving care education and those with no education. After two years of follow-up, diabetic complication rates were three times lower in the intervention than in the control group (26). However, Jeffcoate et al. conducted a similar study design, and failed to verify these findings (27). In another study, there were no significant differences shown between intervention and control groups after a short-course of instruction on self-management in diabetes mellitus (28). The World Health Organization (WHO), in two separate reports declared that diabetes is increasing in developing countries, and invited members to investigate the importance of diabetes in their individual countries and requested them to apply appropriate preventive interventions to eliminate the complications of diabetes (29). The present results show that short-course teaching programs using self–management methods, which are accompanied by follow-up, enable patients to increase control of their blood sugar. A short-course of instruction is easier to attend, and it can provide a normal life for diabetic patients, not to mention the time and money that can also be saved. However, these types of interventions require professional trainers. The long-term effects of short-term instructions on glycemic control, quality of life and self-efficacy need to be further evaluated and the identification of patients who might benefit from this method of instruction also need to be determined.

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Authors' Contribution

Mohammad Afshar was responsible for study conception and design, data collection and participated in preparing the first draft. Neda Mirbagher Ajorpaz prepared the first draft of the manuscript, performed the data analysis, and made revisions to the paper.

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