Iranian Journal of Diabetes and Lipid Disorders; 2010; Vol 9, pp 1- 6

Effects of Education Based on Health Belief Model on Dietary Adherence in Diabetic Patients

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Abstract

Background: Diet adherence, as one of the cornerstones of diabetes self-management, is important to improve glycemic control and preventing diabetes complications. Health Belief Model (HBM) is one of the most helpful models used in health education programs. Aim of this study was to determine the effects of education based on HBM on diet obedience in type 2 diabetic patients.
Methods: In this quasi-experimental study, 128 diabetic patients referred to Fatemeh Zahra hospital of Najafabad, a city located in central region of Iran, were randomly allocated into 2 groups. The experiment group participated in four 40-minutes educational classes which were designed based on HBM. Data were gathered both before and 3 months after intervention and then were analyzed.
Results: After the intervention, significant differences were found between groups about perceived susceptibility ($P \leq 0.001$), perceived severity ($P \leq 0.001$), perceived barriers ($P=0.004$) and practice (diet obedience) ($P<0.001$).
Conclusion: The results showed that using HBM in diabetes education program is effective in diet obedience among type 2 diabetic patients.

Keywords: Education, Diet obedience, Type 2 diabetes, Health Belief Model

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Introduction

Diabetes is one of the most worldwide prevalent chronic diseases (1). The chronicity of diabetes and potential for serious complications often result in significant financial burden, decreased quality of life and major lifestyle changes for patients and their families (2). In Iran, according to the latest reports, approximately 4 million adult people with diabetes are diagnosed which would triple every 15 years (3).

As a result of obesity and sedentary lifestyle, it expects that the type 2 diabetes is much more prevalent than the type 1 (4). Diabetes and its complications are over costly disease (5). The chronic complications of diabetes have the potential to greatly impact health-related quality of life (6). On the other hand, diabetes management before 1921 without insulin discovery is preventing from early death and coma, while its management is not only encompasses keeping the blood sugar in the normal rang, but surrounding the other parameter of blood such as lipid and blood pressure levels (5).

In the type 1 and type 2 diabetes poor glycaemic control resulting in prolonged high blood glucose levels (measured by glycosylated hemoglobin**:** HbA1c) is strongly related to the development of diabetic complications, such as retinopathy, neuropathy and cardiovascular events. These complications are associated with high medical costs, disability and a reduction in quality of life (7); therefore, diabetes management is critical for prevention and delaying possible complications.

Studies showed a linear relationship between the risk of microvascular complications and hyperglycemia, so that, for every percentage point decrease in glycosylated hemoglobin (HbA_1c), there is a 35% reduction from risk of microvascular complications (8).

Accordingly lifestyle modification including nutrition status is an important factor for diabetes management (9). One recent study indicated that diet modification along with exercise enabled 30% of diabetic patients to control their disease (10); so, it is conclusively important to involve new diagnosed patients with diabetes in a diet modification program accompanying dietitian to structure a thorough diet plan (5).

Nevertheless, diabetic diet adherence is on of the most challenging concerns of diabetes self-management (10). Since daily adjustment of this diet plan is distressing for patients, intense education plan is essential component of diabetes management (11), a chore which is undertaken by diabetes educators (12).

In this context, health education using various theories and models aims to build-up awareness, attitudes regulation and catching suitable behaviors in diabetic patients (13).

According to Health Belief Model, individuals when compromised to danger than normal situation showed affective and suitable response to the prevention messages. Thus the training and other interventions are effective in this time (2). Health care professionals can play an important role in building up awareness, correcting the wrong imaging and beliefs, creating suitable attitude and promoting health behaviors in individuals especially diabetic patients to adhering their diet (5). This study was designed to determine the effects of education based on health belief model on diet adherence in diabetic patients.

Methods

As a quasi-experimental case control study, 128 type 2 diabetic patients who referred to Fatemeh Zahra Hospital of Najaf Abad, a city situated in center of Iran, recruited with simple sampling and randomly assigned in two equal groups. Inclusion criteria included: ability to read and write, aged less than 65 years old, being under treatment with anti-diabetic agents and for other comorbid conditions with proper medications and not having mental disorders. The exclusion criteria were: any recent changes in medication to control diabetes. The study protocol was confirmed by ethics committee of Isfahan University of Medical Sciences and all the participants were signed written informed consent. The study tools were two questionnaires which the first included demographic data as: age, gender, marital status, educational level and economic status, and the second included 21 questions related to the components of health belief model and practice of patients, questions about level of knowledge in terms of diet, 17 questions related to perceived severity, 12 questions about perceived benefits of glycemic control, 21 questions related to barriers of self-

management and 14 questions related to the style of nutrition before and after the intervention. The instrument used a 5-score scaling varied from completely disagree to completely agree. Total score were distributed between 25 and 50% as poor, 50 to 75% as moderate and 75% as good.

The performance which defined as type of diet has been ultimately used after training by patients was determined via questionnaire validated by Aghamolaie *et al.* (14). Content validity measure was used for determining the validity of the questionnaire; thus the questionnaire was sent to some internists for confirmation. Test-retest method with 2 weeks interval was undertaken to determine the related reliability of the questionnaire and the spearman coefficient of correlation between two measures was calculated 83%. Data were recorded in two phases before and after training. The intervention was undertaken in four 40 minutes weekly sessions while participants in both case and control groups were under standard treatment identical to pre-intervention phase. The module comprises educational needs and some materials congruent with health belief model which presented via lectures and pamphlets. Blood samples in both groups were collected to measuring glycosylated hemoglobin before and 3 months after intervention. Glycosylated hemoglobin was measured by using photometer method with Biochemical auto-analyzer device model BT3000.

Data analyzed by SPSS software version 11.5 and chi-square, Wilcoxon, Mann-Whitney u, paired t-test and simple t-test were used. P-values <0.05 were determined as statistically significant.

Results

In comparison between two groups, there were no significant difference in terms of general characteristics (Table 1); also, according to the Mann-Whitney test, no difference was seen in comparing components of health belief model including perceived susceptibility (P=0.1), perceived benefits (P=0.2) and perceived barriers to diet modification (P=0.4) within two groups at beginning of the study.

According to the Wilcoxon test, perceived susceptibility to diet in both two groups of case (P<0.001) and control (P=0.022) was revealed significant difference, but difference between mean scores of case group after intervention were more than controls group and this difference was significant (P= 0.001).

The results reveal that perceived severity before intervention had significant difference between two groups (P=0.005). In Wilcoxon test analysis, we observed significant difference in scores of perceived severity in both groups [cases (P<0.001) and controls (P<0.001)] before and after intervention. Mann-Whitney test showed that perceived intensity distribution after training in each groups had significant difference and the mean scores for perceived intensity in case group was more than controls (P<0.001).

Analyses by Wilcoxon test showed that there was significant difference between perceived benefits before and after intervention in case and control groups (P<0.001) and the mean scores of case group were significantly more than controls after intervention (P<0.001), as well as, Wilcoxon test showed that in both cases (P<0.001) and controls (P=0.004) between perceived barriers before and after intervention there was significant difference. Also case and control groups after the intervention showed significant differences in this area of health belief model (P=0.004); furthermore, results showed that according to the Chi-Square test, in both the case and control groups, the type of diet before intervention were the same (P=0.051) while the test results showed significant differences between two groups in terms of diet (P<0.001).

According to other findings, the amount of glycosylated hemoglobin in case group before the intervention was 8.9±1.4 % and after 7.4±1.1 %, while in the control group before and after the intervention this amount was 9±1.5 and 8.6±1.8, respectively and the difference between two groups was statistically significant according to t-test (P<0.001). Paired t-test also showed significant differences in case group before and after intervention (P<0.001), but in control group this difference was not significant (P=0.14).

Table 1- Frequency distribution of patients according to demographic characteristics

demographic characteristics		Case group		Control group	
		N	%	N	%
Age	50than less	31	48/4	30	46/9
	50 above than	33	51/6	34	53/1
Gender	Female	24	37/5	22	34/4
	male	40	62/5	42	65/6
Marital status	single	6	9/4	7	10/9
	married	58	90/6	57	89/1
Educational level	elementary	30	46/9	32	50
	high school	28	43/7	28	43/7
	university	6	9/4	4	6/3
Economic status	high	8	12/5	8	12/5
	intermediate	42	65/6	41	64/1
	low	14	21/9	15	23/4

Tablet 2- Mean scores and standard deviation before and after intervention regarding to health belief model components

Group / components health belief model		Control case	
		SD ±mean	SD ±mean
susceptibility	before intervention	6/09 ± 48/9	7/08 ± 46/87
	after intervention	6/08 ± 57/56	6/19 ± 47/53
intensity	before intervention	5/75± 40/51	7/1 ± 37/84
	after intervention	6/87 ± 52/96	6/58 ± 39/79
benefits	before intervention	3/99 ± 35/1	5/1 ± 34/25
	after intervention	4/67 ± 39/2	4/28 ± 35/17
barriers	before intervention	8/4 ± 48/25	12/05 ± 49/63
	after intervention	8/6 ± 53/04	10/34 ± 47/48

Discussion

Our results emphasize that there is a significant difference between perceived susceptibility and intensity to diet in both case and control groups. However in the case group increase in scores before and after training compared to controls groups showed significant difference. Probably this difference in the control group could be influenced by perceived knowledge from other sources such as media, friends and acquaintances. In this study, educational intervention based on health belief model, have effect on perceived severity and susceptibility to type of diet consumed. As well as, finding showed that according to this model, benefits and barriers of perception to diet have significant difference between cases and controls.

Aghamolaie et al. in their experimental study showed that there was significant correlation between perceived susceptibility, perceived benefits and behavior after training, also they found significant diminution in perceived barriers in comparing case group and controls (14).

Sharifi-Rad et al. in another experimental showed significant difference between cases and controls on components of health belief model except in barriers after training (15).

Studies show that perceived barriers are the most component in health belief model that affect behaviors of patients about diet (2). Researchers in another study showed that inappropriate diet was related to perceived barriers (16).

A group of researchers also studied self-care behaviors of 309 diabetic patients and found that perceived barriers in the health belief model were related to diet adjustment. They also found that self-conception has important role in health belief concept (17). Findings of this study showed that training based on health belief model had effects on performance of Type 2 diabetics.

Borzu et al. also indicated that diabetic patients before intervention had inappropriate performance regarding to diet (18). Heidari et al. in their study as same as Sharifi-Rad et al. showed that case individuals reached to 60% of good performance after training (15, 19).

A group of researchers investigated the role of training interventions on diabetic diet and results revealed improving in behaviors of patients regarding to diabetic diet and effective

blood sugar control (20). By the same root study researchers investigated the effectiveness of training programs on proper use of diets and said that HbA1c in patients reached to appropriate level after intervention (21).

Rezaie et al. in their study on 30 diabetic patients found reduction in HbA1c levels in cases compared to controls after intervention (22). Another study also examined the role of training interventions on adherence to diabetic diet and showed that patients more carefully monitored their blood sugar after the intervention (23). Despite educational interventions, misperceptions about the disease and its control are common (24).

Overall, in this study we observed significant improvement in health care behaviors after the intervention which emphasizes the important original philosophy of chronic disease control: strengthening of performance to managing the disease (25).

In diabetes management programs, health care professionals plan the process but only the patients are who should perform this complex medical regimen (26), so appropriate educational programs toward patients and theirs families are necessary (10).

Patients' education may result in increasing in satisfaction, improving quality of life, ensure continue of care, relieve anxiety, increase in treatment participation, independence in daily activities and reduce disease complications and costs (27).

Acknowledgements

This study was financially supported by Isfahan University of Medical Sciences. We thank all diabetic patients for their participation in this study.

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