ORIGINAL ARTICLE

Foot Care in Diabetic Patients, Based on Health Belief Model in Yazd – Iran (2009)

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ABSTRACT

OBJECTIVE**:** Diabetes mellitus is one of the most common medical problems worldwide. Approximately 18% of persons over 65 years old are diabetic. WHO estimates that the prevalence rate of diabetes (4% in 1995) will increase to 5.6% in 2025.
Diabetic foot problems are potentially the most preventable long–term complication for diabetes. The purpose of this study was to test the utility of the Health Belief Model (HBM) in understanding and predicating the intention of diabetic patients in prevention of their foot lesions and amputations.

MATERIALS AND METHODS: This cross–sectional study was carried out on 100 diabetic patients in Yazd. The data were collected using a researcher-made questionnaire in four sections. All of data were collected by direct interview and in basis of constructs of Health Belief Model (HBM). The data were analyzed by SPSS.

RESULTS: There was no significant difference between mean grade scores of HBM and period of disease ($P > 0.05$). There was significant difference between perceived severity, perceived benefits and barriers and level of education of patients ($P < 0.000$). There was no significant difference between the foot care and period of disease ($P > 0.05$). The mean grade scores of knowledge, constructs of HBM and practice of participants about foot care was as follows: Mean grade score of knowledge 4.87 out of 12, perceived susceptibility 12.33 out of 20, perceived severity 14.56 out of 20, perceived threat 26.88 out of 40, perceived benefits 13.33 out of 20, perceived barriers 12.08 out of 20 and mean grade score of practice in foot care was 3.81 out of 10.

DISCUSSION: The findings of this study showed that higher mean grade scores of knowledge and constructs of HBM resulted in better foot care by the patients. So our results and results of many other studies carried out on HBM, revealed that HBM constructs may change and improve behavior in participants.

KEY WORDS: Diabetes, Foot care, Health belief model, Lesions

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INTRODUCTION

Diabetes mellitus is one of the most common medical problems worldwide with increasing prevalence (1). In Iran the prevalence and incidence of diabetes is varying (2). It is the fifth reason of death in the Europe and about 15% of financial cost to the public health services in USA is for diabetes (3).

Approximately 18% of persons over the age of 65 have diabetes mellitus. WHO estimates that the prevalence rate of diabetes (4% in 1995) will increase to 5.6% in 2025 (4).

Foot problem is a major determinant of the quality life of patients suffering from diabetes, and remains one of the most common reasons of hospital admission among diabetic patients, despite efforts to prevent and treat this long-term complication during the last decade (5-7). The financial cost to the public health services, and psychological cost to the patients and their families, are considerable (8).

Diabetic foot problems, however, are potentially the most preventable long-term complication of diabetes. There is clear evidence that lower extremity amputation rates can be dramatically reduced by programs that stress education of patients and their care givers, techniques of prevention and early identification and treatment of injuries (9-12). Furthermore, the prevalence rate of diabetic foot lesion is 15%, that about 20% of them have amputation (13,14).

It is very important to educate these patients to prevent their foot lesions and amputation.

The health belief model (HBM) is one of the most widely used models in public health theoretical framework. It can explain health behavior modification and can function as the foundation for health education intervention (15). Social psychologists developed the HBM during the 1950's to predict why individuals do not participate in preventive health behaviors such as immunization (16). The model assumes a value expectancy approach postulating that behavior depends upon the expected outcome of an action and the value of individuals places on those outcomes (15-17).

The evaluation of theory-based health education programs requires valid measuring instruments to assess a program's impact on the theoretical mediating variables. Failing to develop and use valid and reliable instruments can cause spurious findings (18-19).

The HBM has five constructs: 1- perceived susceptibility 2- perceived severity 3- perceived benefits 4- perceived barriers and 5- cues to action (15, 18-20). Researchers have successfully used the model's constructions in expanding a variety of preventable health behaviors, sick- role behaviors and clinic utilization behaviors (16,17 and 20).In this study we assessed the content and concurrent validity of construct of HBM scales to evaluate safer choices by diabetic patients to prevent their foot lesions and amputations.

The purpose of this study was to test the utility of the HBM in understanding and predicting the intention of diabetic patients in prevention of lesions and amputations.

MATERIALS AND METHODS

This was a cross- sectional study to test the utility of HBM as a common theory in understanding and predicting the intention of type 2 diabetics in caring their feet.

In total, 100 diabetic patients were randomly selected from the patients who were referred to Yazd Diabetes Research Center. Exclusion criteria included the patients who had complication in feet or their feet were cut and those aged above 65. HBM was used to explain health behaviors. Data were collected using a researcher-made questionnaire, all of which was completed through interview.

HBM constructs were measured using a four-point Likert scale (strongly agree = 4 through disagree = 1) including perceived susceptibility, perceived severity, perceived benefits and barriers (range: 5–20) for everyone. The perceived threat (range: 10–40) was measured by summing participants' responses to 10 statements that were the questions of perceived susceptibility and perceived severity, with a high score reflecting higher threat for prevention of their feet. Cues to action were measured by summing participants' responses to 2 statements (range: 2-8).

We divided the level of education into 4 categories. The first group included people under 5 years of education (primary school), the second group people between 5th and 8th years of education (guidance school), the third group people graduated between 8th and 12th years of education (high school graduates), and the fourth group were those who had academic degrees (university graduates) then level of education was compared with constructs of HBM.

The knowledge and practice of caring their feet was measured (range: 0-12, 0-10), respectively. To ensure the reliability of the questionnaire, pilot testing of the questionnaire was performed using the coherence and consistency upon 10 diabetic patients who were not included in the survey. Then content-validity was established by five experts from the academic staff. To determine the internal reliability, a Cronbach's alpha was calculated for each scale (a = 0.76 for knowledge scale, a = 0.78 for constructs of HBM and a = 0.81 for caring of feet). All data were transferred directly into SPSS software. The data were analyzed and the level of confidence interval was 0.95. In addition the participants were assured that their responses were confidential. Figure 1 shows the details of the HBM for better understanding the relevance of the items of HBM and aim of the study.

RESULTS

We interviewed 100 diabetic patients in 2009. 35% of them (n = 35) were men. About 60% of the participants were illiterate and or on primary school. 48% of the subjects were aged 30 – 50 years, and 46% between 50-65 years.

The results showed that the mean grade scores of knowledge of participants were very low (4.87 out of 12) and the mean grade scores of constructs of HBM and practice of foot care were middle. Mean grade score of foot care was 3.79 out of 10. (Table 1).

There was no significant difference between mean grade scores of constructs of HBM, foot care and period of diabetes ($P > 0.05$). The results showed that by increasing the period of diabetes in patients, the mean grade scores of knowledge, some constructs of HBM and practice of participants in foot care increased, although these changes were not significant in statistical analysis, but mean grade score of foot care decreased. The mean grade score of knowledge of patients with period of diabetes less than 5 years, was 5 out of 12 but mean grade score of those with period of diabetes more than 10 years, was 5.55 out of 12 (Table 2).

The results of Table 3 revealed that there is significant difference between the mean grade scores of some constructs of HBM and the education of participants. The practice of foot care in university graduates is much better

Table 1- Distribution of mean grade scores of knowledge, constructs of HBM and foot care of participants.

Variables	Mean	S.D	N
Knowledge	4.87	4	100
Perceived susceptibility	12.33	2.35	100
Perceived severity	14.56	2.64	100
Perceived benefits	13.33	2.53	100
Perceived barriers	12.08	2.76	100
Cues to action	3.97	1.73	100
Foot care	3.81	2.28	100

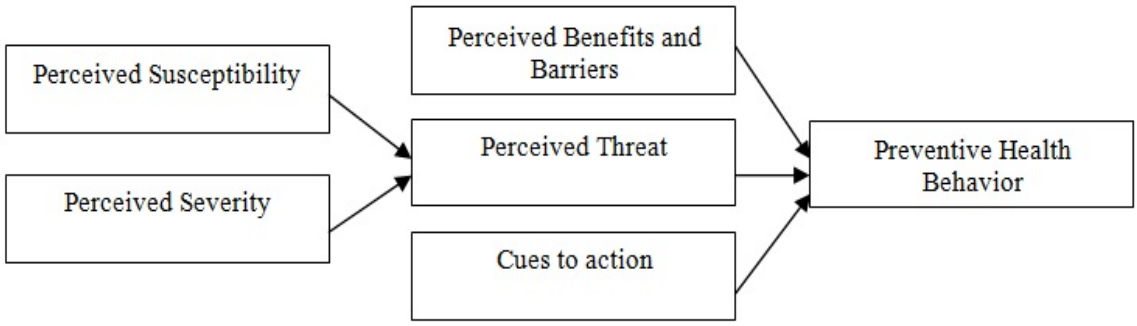

Figure 1-Health Belief Model

Table 2- Distribution of mean grade scores of knowledge, constructs of HBM and foot care in participants and their period of disease.

Period of disease	<5			5 – 10			>10			
Variables	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D	P-Value
Knowledge	7	5	1.41	39	4.33	2.92	54	5.55	2.18	0.56
Perceived susceptibility	7	12.14	1.57	39	12.35	2.27	54	12.33	2.51	0.67
Perceived severity	7	15.14	2.41	39	14.56	2.34	54	14.48	2.89	0.82
Perceived benefits	7	12.42	1.61	39	13.46	2.41	54	13.35	2.72	0.61
Perceived barriers	7	12.71	1.79	39	11.94	2.7	54	12.9	2.93	0.79
Cues to action	7	4.57	1.9	39	3.76	1.49	54	4.03	1.87	0.48
Foot care	7	4.14	1.41	39	3.79	2.15	54	3.77	2.38	0.62

Table 3- Distribution of mean grade scores of knowledge, constructs of HBM and foot care in participants and their education.

Education	Illiterate and Primary			Guidance			Diploma			University Graduate			
Variable	N	mean	S.D	N	mean	S.D	N	mean	S.D	N	mean	S.D	P-Value
Knowledge	60	4.6	2.71	14	5.07	2.65	4	2.75	2.87	22	5.86	2.27	0.43
Perceived susceptibility	60	12.48	2.22	14	10.92	3.07	4	11.5	4.43	22	12.95	1.25	0.06
Perceived severity	60	12.16	2.14	14	12.5	3.22	4	11.25	4.5	22	14.81	2.15	0.000
Perceived benefits	60	13.46	1.96	14	12.21	2.93	4	10.5	3.87	22	14.78	2.26	0.000
Perceived barriers	60	11.95	2.54	14	9.71	2.52	4	9.75	3.59	22	14.36	1.35	0.07
Cues to action	60	3.91	2.43	14	3.64	1.59	4	2.25	1.25	22	3.68	1.75	0.32
Foot care	60	5.6	1.9	14	3	2.35	4	2.75	1.25	22	4.22	1.84	0.000

Table 4- Distribution of mean grade scores of knowledge, constructs of HBM and foot care in participants and their sex

Sex	Men			Female			
variables	N	Mean	SD	N	Mean	SD	*P* Value
Knowledge	35	5.8	5.61	65	4.36	2.7	0.08
Perceived susceptibility	35	12.31	2.33	65	12.33	2.38	0.96
Perceived severity	35	14.62	2.98	65	14.52	2.46	0.85
Perceived benefits	35	13.25	2.7	65	13.36	2.45	0.83
Perceived barriers	35	12.37	2.81	65	11.92	2.74	0.44
Cues to action	35	3.57	1.46	65	4.18	1.83	0.09
Foot care	35	3.8	2.01	65	3.81	2.43	0.01

than high school graduates (4.22 out of 10), and in the illiterate persons was 5.6 out of 10.

As shown in Table 4, there was no significant difference between mean grade scores of constructs of HBM, foot care, and sex of participants ($P > 0.05$).

In total, only 22% of patients examined their foot skin daily. About 90% of whom that washed their foot daily did not dry them carefully, particularly between the third, fourth and fifth toes. About 64% of patients did not have any cues to action for caring their foot.

DISCUSSION

This study establishes preliminary confirmation of the feasibility of applying the HBM to predict and understand the intention to permanently follow practical activities by diabetic patients in prevention of their foot lesions and amputations.

The results of this study identified several basic educational needs in participants which increase their knowledge and change their practice for prevention of their foot lesions and amputations. It was shown that the awareness of patients about their foot lesions and amputations was low, and awareness of them about their foot lesions complications was 4.87 out of 12, that they need to learn about caring their foot.

The findings of this study are not consistent with the observation of Afkhami and some other studies concluding that the knowledge of diabetic patients about their foot lesions was middle (21-24).

The mean grade scores of perceived susceptibility, as one of the constructs of HBM in participants was middle, and they thought they are not high risk in lesions and amputations. If patients thought that they are not high risk, they would not care their foot, so their perceived susceptibility increased. The results of this study are consistent with the finding of Beranth C (25), Tan M.Y. (26), they found that perceived susceptibility of diabetic patients was middle. Results of a study in USA revealed that low perceived susceptibility is the reason of not caring themselves (27). The results of our study showed that cues to action of patients are low that is the same as Beranth results (25). Also in our study the mean grade score of perceived severity of patients about complication of foot lesions in all groups with different levels of education was middle, unless in university graduates that was 14/81 out of 20. These results showed that participants did not accept that they are high risk in foot lesions and amputations. These results are consistent with the findings of Rith Najarian et al., who found the mean grade score of perceived severity of diabetic patients was middle and they did not examine their foot skin (28).

It was shown that the perceived threat, as one of else constructs of HBM, could be used to prevent and control disease, so the results of a study revealed that increase of perceived threat could prevent and control the brucellosis (29). The results of a research carried out by Vickie et al., showed that amputation of those diabetic patients with low perceived threat, was more than others (30).

In practice, perceived barriers and benefits had an important role in control and prevention of disease in patients who had the first myocardial infarction (31). A study on nurses with less than two years of professional experience showed that those who followed the recommendation of not recapping needle, had less barriers and more benefits (32). Our findings showed that both perceived barriers and benefits constructs were significantly related to the patients' education and period of disease ($P < 0.000$).

A study by Susan Robinson revealed that the perceived benefits in the diabetic patients was not good and there was significant difference between foot care and perceived benefits (33). Our results about the perceived barriers and benefits are consistent with the results of many other studies (34-36).

In addition, there is no significant difference between the foot care by participants and period of their disease (Table 2), that are concordant with the results of previous studies, which demonstrated that practice in prevention and control of diseases in different groups with different demographic characteristic are not the same (37-39).

In total, the results of this study showed that mean grade scores of knowledge, constructs of HBM in participants was middle and practice of foot care was low. The knowledge of men was more than women; that the reason could be about their education level. The mean grade score of men and women is the same (men = 3.80 and women = 3.81 out of 10), that is very low and it is needed to educate them about caring their feet.

Our data also showed that illiterates and those with primary school education had better foot care, cues to action and perceived susceptibility compared with guidance school, high school and university graduates. This discrepancy in high school graduates is not reliable because the sample size in this group is very low. Further research with different questionnaires should be done to investigate

the reason for the high scores of illiterate people and their intention for better foot care. However, possibly their sense of need for gaining more information due to their lack of knowledge, can be the reason, whereas others may not have this need, among the university graduates the attitude of need for education is shaped then their scores are increased partly.

CONCLUSION

Our results and the results of many other studies revealed that HBM has potential for providing the foundation for educational programs at individuals and communities. It is, therefore, recommended that the application of this model may prevent different diseases and complication of diseases, including diabetic foot lesions and amputations.

LIMITATIONS

The limitations of this study were as follows:

1. At the beginning of the study, 37 patients did not contribute to the study and were excluded.
2. Because we could not see practice of foot care of patients, our data about foot care is based on patient self-reports.

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