

Received: 01 November 2014 • Accepted: 10 December 2014



doi:10.15412/JBTW.xxxx

# Is the Health Belief Model as an Appropriate Predictor of the Self-Care Behaviors in Type II Diabetic Patients?

Tahereh Etesamifard<sup>1</sup>, Touraj Ahmadi Jouybari<sup>2</sup>, Fazel Zinat-Motlagh<sup>3</sup>, Mohammad Mahboubi<sup>4</sup>, Abbas Aghaei<sup>5</sup>, Mari Ataei<sup>2\*</sup>

<sup>1</sup> Department of Health Education and Promotion, Health Science Research Center, Faculty of Health, Hamadan University of Medical Sciences, Hamadan, Iran

<sup>2</sup> Clinical Research Development Center, Imam Khomeini Hospital, Kermanshah University of Medical Sciences, Kermanshah, Iran

<sup>3</sup> Social Determinants of Health Research Center, Yasuj University of Medical Sciences, Yasuj, Iran

<sup>4</sup> Abadan School of Medical Sciences, Abadan, Iran

<sup>5</sup> Department of Epidemiology, School of Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

\*correspondence should be addressed to Mari Ataei, Clinical Research Development Center, Imam Khomeini Hospital, Kermanshah University of Medical Sciences, Kermanshah, Iran; Tell: +988337272049; Fax: +98; Email: [mariataee@yahoo.com](mailto:mariataee@yahoo.com).

## ABSTRACT

Type 2 diabetes mellitus is a disease with long-term cardiovascular, renal, eye and neural complications. It is prevalent all around the world including Iran its prevalence is increasing. The aim of this study is to determine factors related to self-care behavior based on health belief model among sample of Iranian type 2 diabetes mellitus patients. This cross-sectional study was conducted among 301 type 2 diabetics patient in Gachsaran, Iran. Data collection was based on an interview and were analyzed by SPSS version 20 using ANOVA, t-tests, Pearson correlation, and linear regression statistical tests at 95% significant level. Linear regression analyses showed that the health belief model variables accounted for 29% of the variation in self-care behavior; and perceived severity and perceived self-efficacy, more influential predictor on self-care behavior.

**Key words:** Diabetic Patients, Self-Care, Health Belief Model

Copyright © 2014 Tahereh Etesamifard et al. This is an open access article distributed under the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/).

## 1. INTRODUCTION

The prevalence of type 2 diabetes mellitus (T2DM) has seen a fivefold increase worldwide over the last 20 years (1, 2). Estimates of global diabetes prevalence and most recent projections for the future indicate that diabetes now affects 246 million people worldwide and is expected to affect some 380 million by 2025 (3). In Iran, according to the latest reports, approximately 4 million adult people with diabetes are diagnosed which would triple every 15 years (4). This condition is now regarded as the most common metabolic disorder worldwide, and is increasing among adults (5). T2DM is a serious condition that can lead to complications such as heart disease, stroke, renal failure, amputation and blindness (6, 7). The greater incidence and prevalence of overt clinical complications in a vastly expanding diabetes population will impose an enormous burden on our healthcare system and on the quality of life of the T2DM patient (8, 9). Control of diabetes requires the normalization of carbohydrate, protein, and

fat metabolism; patient lifestyle and health behavior changes, and patient self-management in agreement with professional treatment guidance, are cornerstones of diabetes (10). According to the facts that stated above to explain and describe factors affecting in self-care behavior we can use of the models and theories that they are guidelines for activities in health education and health promotion and they can answered to planners questions about; why people lack intended favorable behavior, how should change behaviors and what factors should be considered in program evaluation; behavioral theory has increasingly been used to guide researcher to improve intervention efficacy (11). One such theoretical framework that has been applied is the health belief model (HBM); some researchers also mentioned the beneficiary of applying this model in different health education programs; the HBM was developed in the 1950s to explain health behavior associated with the failure of people to participate in programs that would reduce disease risk; the HBM implies that health behaviors are determined by health beliefs and readiness to take ac-

tion (12-15). For over 4 decades, HBM has been used both to explain change and maintenance of health behavior and as a guiding framework for health behavior interventions (11). The HBM has been used in studying behaviors such as attending screenings for high blood pressure, breast cancer, or hepatitis B, exercising, diabetes self-management, and etc (16-20). This model relates psychological theories of decision making to an individual's decision about health behaviors (21). According to the HBM, a subject is more likely to take the recommended action if he 1- perceives himself susceptible to the disease; 2- perceives the disease as serious; 3- perceives benefits of the health action; 4- perceives limited barrier to the action; 5- receives a cue to take the action (11). The aim of this study was to determine factors related to self-care behavior based on HBM among sample of Iranian diabetic patients.

## 2. MATERIALS AND METHODS

### 2.1. Participants

The study was a part of a project conducted among sample of type 2 diabetic's patient in Gachsaran, Iran, with the goal of providing knowledge for the promotion self-care among type 2 diabetic's patient. To enroll the participants and collect data the following stages were done. First, different areas of the city were classified based on the division of the geographical region, next for each social class two health centers were randomly selected (a total of four health centers were selected). Then, subjects referred to the health centers for taking health care, were enrolled into this study voluntarily. Finally, the volunteers were given the self-questionnaire. The subjects ranged in age from 35 to 65 with the mean of the 54.4 years.

### 2.2. Measures

Questionnaire included three sections that comprised of 58 questions: Five questions for demographic features; 36 questions for HBM variable; 15 questions about self-care behavior .

#### 2.2.1. Demographics

Background item was designed to gather information related to age (years), gender (men, women), duration of diabetes (years), educational status (elementary, guidance, diploma) and marital status (single, married, widow).

#### 2.2.2. Theoretical Framework

The items which assessed components of the HBM with use of two standard questionnaires (12-15) and 36 items were composed of four major constructs, (1) perceived susceptibility; (2) perceived severity; (3) perceived benefit; (4) perceived barrier; (5) perceived self-efficacy. Four

items were designed to measure perceived susceptibility (e.g., "I do not get diabetes complications"). Ten items were designed to measure perceived severity (e.g., "I think that diabetes is a serious disease"). Six items were designed to perceive benefit of self-efficacy to self-management (e.g., "Proper diabetic diet is effective for control blood sugar"). Ten items were designed to evaluate perceived barrier to self-management (e.g., "Diet for diabetics is annoying me"). Six items were designed to perceived self-efficacy to self-management (e.g., "How you sure the ability to diabetic diet?"). In order to facilitate respondents' responses to the items, all items were standardized to a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). For self-efficacy scale, ranging from 1 (very little) to 5 (very much). Estimated reliability coefficients for each HBM constructs questionnaires were as follows: Severity ( $\alpha = 0.69$ ); susceptibility ( $\alpha = 0.71$ ); barrier ( $\alpha = 0.62$ ); benefit ( $\alpha = 0.75$ ); and self-efficacy ( $\alpha = 0.76$ ). These results demonstrated that questionnaires were internally consistent.

#### 2.2.3. Self-Care Behavior Scale

In this study self-care behavior measured by a standard questionnaire (10). This scale have a 15 item (including: Smoke use, physical activity, foot care, measurement of blood glucose, dietary intake, weight regular monitoring, and using medical advice).

#### 2.2.4. Statistical Analysis

ANOVA and T-tests were used to examine the association between self-care behavior and level of education and positive family history, and gender. Pearson correlation coefficient was used to examine the relation between self-care behavior with age and duration of diabetes. Stepwise multiple linear regression analysis was performed to explain the variation in the self-care on the basis of HBM variables. The data analysis was performed at 95% significant level using statistical program SPSS version 20.

## 3. RESULTS AND DISCUSSION

The mean age of respondents was 54.4 years [95% CI: 51.4, 53.3], ranged from 35 to 65 years. Regarding the educational status: 46.5% (140/301) had in illiterate, 17.9% (54/301) primary school, 30.2% (91/301) secondary school, and 5.3% (16/301) were diploma. Furthermore, 28.2% (85/301) of the participant were reported positive family history of diabetes. We found the significant correlation between level of education and self-care behavior among the participants, but not significant between positive family history of diabetes and self-care behavior (Table 1).

**Table 1. Correlation between level of education, positive family history of diabetes, gender and self-care behavior**

Variable	self-care	Mean (SD)	f/t	P
Education status	Illiterate	6.42 (1.59)	3.222	0.023
	Primary school	6.59 (1.64)		
	Secondary school	6.81 (1.52)		
	Diploma	7.62 (1.82)		
Positive family history of diabetes	No	6.55 (1.66)	-1.493	0.137
	Yes	6.85 (1.45)		
Gender	Female	7.33 (1.43)	9.961	0.001
	Male	5.71 (1.35)		

In addition, bivariate correlation analyses showed the significant correlation between increasing age and improve self-care behavior ( $r = 0.180$ ). Table 2 shows the Zero-order correlations. Significance levels at the 0.01 and 0.05 were the criteria for the analysis. The bivariate assessment of variables revealed that there were signs of multicollinearity among HBM variables. The findings indicate that for the sample, susceptibility was significantly related to severity ( $r = 0.287$ ), benefit ( $r = 0.131$ ), self-efficacy ( $r =$

$0.258$ ), self-care ( $r=0.256$ ); and barrier ( $r=-0.125$ ). Severity was significantly related to benefit ( $r = 0.637$ ), barrier ( $r = - 0.462$ ), self-efficacy ( $r = 0.456$ ), and self-care ( $r=0.447$ ). Benefit was significantly related to barrier ( $r = - 0.286$ ), self-efficacy ( $r = 0.351$ ), and self-care ( $r=0.340$ ). Barrier was significantly related to self-care ( $r = -0.118$ ), but not significant with self-efficacy ( $r = -0.095$ ). In addition self-efficacy was significantly related to self-care ( $r = 0.471$ ).

**Table 2. Correlation between different components of health belief model**

Variables	X1	X2	X3	X4	X5
X1. Susceptibility	1				
X2. Severity	0.287*	1			
X3. Benefit	0.131*	0.637**	1		
X4. Barrier	-0.125*	-0.462**	-0.286**	1	
X5. Self-efficacy	0.258**	0.456**	0.351**	-0.095	1
X6. Self-care	0.256**	0.447**	0.340**	-0.118*	0.471**

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

A hierarchical multiple regression analysis was performed to explain the variation in self-care behavior, using the HBM variables. As can be seen in Table 3, are were statistically significant predictors of the outcome measure. Collectively, they were accounted for 29% of the variation in self-care behavior; and finally on 3<sup>rd</sup> step the procedure

stopped and the best model was selected, among the HBM variables: perceived susceptibility, perceived severity and perceived self-efficacy, more influential predictor on self-care behavior.

**Table 3. Predictors of the health belief model variables in self-care behavior**

Variable	B	SE B	Beta	T	P value
<i>Step 1</i>					
Susceptibility	0.055	0.028	0.100	1.939	0.053
Severity	0.073	0.020	0.264	3.570	0.001
Benefit	0.020	0.018	0.070	1.106	0.269

Barrier	0.014	0.012	0.065	1.182	0.238
Self-efficacy	0.103	0.019	0.306	5.465	0.001
<hr/>					
<i>Step 2</i>					
Susceptibility	0.053	0.028	0.095	1.852	0.065
Severity	0.084	0.017	0.307	4.890	0.001
Barrier	0.014	0.012	0.065	1.179	0.239
Self-efficacy	0.105	0.019	0.313	5.667	0.001
<hr/>					
<i>Step 3</i>					
Susceptibility	0.052	0.028	0.094	1.835	0.068
Severity	0.075	0.015	0.273	4.897	0.001
Self-efficacy	0.108	0.018	0.322	5.832	0.001

Final model: Step 3, Adjusted R squared=0.29 and P <0.001

The study findings suggest that the self-care behavior among a sample of Iranian diabetic patients is relatively average. According to the results, the perceived susceptibility, severity, and self-efficacy are three main predictive factors to self-care behavior. In addition our result indicated women gender, level of education, and increasing age were associated with self-care behavior. In this regard many studies have underlined the predictive potential of age and level of education to self-care behavior. The perceived severity of a threat is an important fear arousal factor in predicting or explaining the behavior while people believe that they are susceptible to get a disease or engage in an unhealthy behavior (22). Our findings showed that perceived susceptibility, with the severity were two important factors to self-care behavior. In this regards, Prochownik *et al* (23) in their research reported people perceive the seriousness of the symptoms were moderate. Previous studies show that understanding the symptoms' severity and susceptibility to these effects can lead to adopt a higher level of self-care among diabetic patients (24-26). Weinstein (27) stated that understanding complications severity without understanding susceptibility will lead them to adopt behaviors. Therefore, it seems, that increasing susceptibility may be usefulness of the results in order to self-care promotion. Several studies indicated for designing effectiveness healthy intervention need to prediction factors related behavior (14, 28-32). In this regard, self-efficacy is the extent or strength of one's belief in one's own ability to complete tasks and reach aims (11). Self-efficacy was another cognitive factor that had a protective role in refraining from self-care behavior. Bivariate correlation analysis showed that self-efficacy was inversely related to the self-care behavior. In this context, Bernal

(33) reported presence in the diabetes education class is associated with perception of self-efficacy. In addition, Jalilian *et al* (10) carried out a research on women diabetic patients in Hamadan, the west of Iran and reported high level of self-efficacy can predict higher level of self-manengment among them. Therefore, self-efficacy must be reinforced in these patients and in this regard medical doctors and nurses have important role for improving quality of life among diabetic patients; forthermore, several study reported self-efficacy could be predicted by providing training, particularly through doctors.

#### 4. CONCLUSION

Our findings showed that perceived seriousness, susceptibility and self-efficacy were mediators for promoting effectiveness of the self-care promotion programs.

#### ACKNOWLEDGMENT

We would like to thank health centres in Gachsaran for collaborating with the research team and also thanks patient's participant in the study.

#### AUTHORS CONTRIBUTION

This work was carried out in collaboration among all authors.

#### CONFLICT OF INTEREST

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

## REFERENCES

1. Zimmet P, Alberti K, Shaw J. Global and societal implications of the diabetes epidemic. *Nature*. 2001;414(6865):782-7.
2. Clark M, Hampson SE, Avery L, Simpson R. Effects of a tailored lifestyle self-management intervention in patients with Type 2 diabetes. *British journal of health psychology*. 2004;9(3):365-79.
3. Praet SF, van Loon LJ. Optimizing the therapeutic benefits of exercise in type 2 diabetes. *Journal of applied physiology*. 2007;103(4):1113-20.
4. Esteghamati A, Etemad K, Koohpayehzadeh J, Abbasi M, Meysamie A, Noshad S, et al. Trends in the prevalence of diabetes and impaired fasting glucose in association with obesity in Iran: 2005–2011. *Diabetes research and clinical practice*. 2014;103(2):319-27.
5. Association AD. Diagnosis and classification of diabetes mellitus. *Diabetes care*. 2008;31(Supplement 1):S55-S60.
6. Bagust A, Hopkinson P, Maslove L, Currie C. The projected health care burden of Type 2 diabetes in the UK from 2000 to 2060. *Diabetic Medicine*. 2002;19(s4):1-5.
7. Lawton J, Ahmad N, Hanna L, Douglas M, Hallowell N. 'I can't do any serious exercise': barriers to physical activity amongst people of Pakistani and Indian origin with Type 2 diabetes. *Health Education Research*. 2006;21(1):43-54.
8. Alberti G, Zimmet P, Shaw J, Bloomgarden Z, Kaufman F, Silink M. Type 2 Diabetes in the Young: The Evolving Epidemic The International Diabetes Federation Consensus Workshop. *Diabetes care*. 2004;27(7):1798-811.
9. Booth FW, Chakravarthy MV, Gordon SE, Spangenburg EE. Waging war on physical inactivity: using modern molecular ammunition against an ancient enemy. *Journal of applied physiology*. 2002;93(1):3-30.
10. Jalilian F, Motlagh FZ, Solhi M, Gharibnavaz H. Effectiveness of self-management promotion educational program among diabetic patients based on health belief model. *Journal of education and health promotion*. 2014;3.
11. Glanz K, Patterson RE, Kristal AR, DiClemente CC, Heimendinger J, Linnan L, et al. Stages of change in adopting healthy diets: fat, fiber, and correlates of nutrient intake. *Health Education & Behavior*. 1994;21(4):499-519.
12. Gherman A, Schnur J, Montgomery G, Sassu R, Veresiu I, David D. How are adherent people more likely to think? A meta-analysis of health beliefs and diabetes self-care. *The Diabetes Educator*. 2011;37(3):392-408.
13. Kartal A, Özsoy SA. Validity and reliability study of the Turkish version of Health Belief Model Scale in diabetic patients. *International journal of nursing studies*. 2007;44(8):1447-58.
14. Jalilian F, Hazavehei SMM, Vahidinia AA, Jalilian M, Moghimbeigi A. Prevalence and Related Factors for Choosing Self-Medication among Pharmacies Visitors Based on Health Belief Model in Hamadan Province, West of Iran. *Journal of research in health sciences*. 2013;13(1):81-5.
15. James D, Pobee JW, Brown L, Joshi G. Using the health belief model to develop culturally appropriate weight-management materials for African-American women. *Journal of the Academy of Nutrition and Dietetics*. 2012;112(5):664-70.
16. Buglar ME, White KM, Robinson NG. The role of self-efficacy in dental patients' brushing and flossing: testing an extended Health Belief Model. *Patient education and counseling*. 2010;78(2):269-72.
17. Carpenter CJ. A meta-analysis of the effectiveness of health belief model variables in predicting behavior. *Health communication*. 2010;25(8):661-9.
18. Moodi M, Mood MB, Sharifirad GR, Shahnazi H, Sharifzadeh G. Evaluation of breast self-examination program using Health Belief Model in female students. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences*. 2011;16(3):316.
19. Bendik MK, Mayo RM, Parker VG. Knowledge, perceptions, and motivations related to HPV vaccination among college women. *Journal of Cancer Education*. 2011;26(3):459-64.
20. Wdowik MJ, Kendall PA, Harris MA, Auld G. Expanded health belief model predicts diabetes self-management in college students. *Journal of Nutrition Education*. 2001;33(1):17-23.
21. Pinto SL, Lively BT, Siganga W, Holiday-Goodman M, Kamm G. Using the Health Belief Model to test factors affecting patient retention in diabetes-related pharmaceutical care services. *Research in Social and Administrative Pharmacy*. 2006;2(1):38-58.
22. Allahverdipour H, Jalilian F, Shaghghi A. Vulnerability and the intention to anabolic steroids use among Iranian gym users: An application of the theory of planned behavior. *Substance use & misuse*. 2012;47(3):309-17.
23. Charron-Prochownik D, Sereika SM, Becker D, Jacober S, Mansfield J, White NH, et al. Reproductive health beliefs and behaviors in teens with diabetes: application of the Expanded Health Belief Model. *Pediatric Diabetes*. 2001;2(1):30-9.
24. Jaber LA, Pinelli NR, Brown MB, Funnell MM, Anderson R, Hammad A, et al. Feasibility of group lifestyle intervention for diabetes prevention in Arab Americans. *Diabetes research and clinical practice*. 2011;91(3):307-15.
25. Daniel M, Messer LC. Perceptions of disease severity and barriers to self-care predict glycemic control in Aboriginal persons with type 2 diabetes mellitus. *Chronic diseases in Canada*. 2001;23(4):130-8.
26. Tan MY. The relationship of health beliefs and complication prevention behaviors of Chinese individuals with Type 2 Diabetes Mellitus. *Diabetes research and clinical practice*. 2004;66(1):71-7.
27. Weinstein ND. Perceived probability, perceived severity, and health-protective behavior. *Health Psychology*. 2000;19(1):65.
28. Zinatmotlagh F, Ataee M, Jalilian F, Mirzaeialavijeh M, Aghaei A, Karimzadeh Shirazi K. Predicting Aggression among Male Adolescents: an Application of the Theory of Planned Behavior. *Health promotion perspectives*. 2013;3(2):269-75. PubMed PMID: 24688977. Pubmed Central PMCID: 3963670. Epub 2013/01/01. eng.
29. Matin BK, Jalilian F, Alavijeh MM, Ashtarian H, Mahboubi M, Afsar A. Using the PRECEDE Model in Understanding Determinants of Quality of Life Among Iranian Male Addicts. *Global journal of health science*. 2014;6(6):p19.
30. Mirzaei Alavijeh M KMB, Jalilian F, Rakhshani F, Mahboubi M, Emdadi SH. Pap smear test Promotion among Women: An Educational Intervention Based on Theory of Planned Behavior. *Journal of Biology and today's world*. 2014;3(4):79-82.
31. Jalilian F, Emdadi S. Factors related to regular undergoing Pap-smear test: application of theory of planned behavior. *Journal of research in health sciences*. 2011;11(2):103-8.
32. Eslami AA, Jalilian F, Ataee M, Alavijeh MM, Mahboubi M, Afsar A, et al. Intention and Willingness in Understanding Ritalin Misuse Among Iranian Medical College Students: A Cross-Sectional Study. *Global journal of health science*. 2014;6(6):p43.
33. Bernal H, Woolley S, Schensul JJ, Dickinson JK. Correlates of self-efficacy in diabetes self-care among Hispanic adults with diabetes. *The Diabetes Educator*. 2000;26(4):673-80.