



Using the Health Belief Model to Explain the Experience of Diabetic Patients About Referring to Rural Health Centers

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Abstract

Background: Diabetes is a chronic disease that leads to numerous complications. To prevent these complications, regular and timely visits of diabetic patients to receive health care services are necessary.

Objectives: This study aimed to understand the experience of diabetic patients visiting rural health in Ahvaz.

Methods: This qualitative study is a directed content analysis research that was conducted for six months in 2016 - 2017 in rural health centers in Ahvaz. A semi-structured verbal interview was conducted with 14 diabetic patients, 6 health care workers (behvarz), 3 physicians, and 3 family members of patients. The collected data was analyzed by MAXQDA 12 software with the content analysis method.

Results: Data analysis resulted in the extraction of 285 initial codes that were categorized into 5 categories of health belief models (perceived threats, perceived benefits, perceived barriers, guide to action, and self-efficacy).

Conclusions: Findings of this study provide in-depth understanding of factors affecting rural health centers appointments among patients with type 2 diabetes and also can use by decision-makers to choose the most suitable methods and strategies to change these factors and increase the number of regular visits by patients to the health centers to prevent probable complications.

Keywords: Diabetes Type 2, Visit Status, Rural, Qualitative, Content Analysis, HBM

1. Background

Diabetes is the most prevalent endocrine disease which is caused by the impairment in insulin secretion and/or its function and is characterized by a chronic increase in blood sugar or hyperglycemia (1, 2). At the moment, globally 43% of the disease burden is due to non-communicable diseases and it is estimated that by 2020, 60% of the total burden of diseases and 73% of death will be related to these diseases (3). Diabetes mellitus (DM) is a big public health problem that is associated with lifetime complications and huge expenses for the healthcare services system. According to the international diabetes federation (IDF), the number of people with diabetes has been 378 million people in 2014 and it is expected to reach 592 million people by 2035. According to IDF estimations, Iran will be one of the areas with a high prevalence of diabetes by 2030 and the prevalence of diabetes will reach 3.9% in it (4). Identifying the contributing factors to the status of visiting health centers by diabetic patients from the view-

point of those who have direct experience with it, may play a key role in planning interventional programs to increase regular visits by patients. Therefore this is one of the health priorities of society to conduct studies on situations and real needs of patients to improve their participation (5, 6). Qualitative methods are ideal to collect data to expand this understanding. Qualitative methods may help health educators to better understand health problems and their behavioral and environmental causes and contributors from the viewpoint of people who are involved with diabetes (7). Qualitative research is a systematic method to investigate issues that are not quantitatively explainable. The health belief model is one of the oldest and most used methods of behavior change. This model focuses on one's motivation and past experiences and it has been used in many interventions with diabetic patients (8, 9). To our best knowledge, no study has been conducted on the quantity and quality of visiting rural health centers by diabetic patients and all previous studies have been conducted in urban areas (5, 10).

2. Objectives

This study aimed to understand the experience of diabetic patients, their families, and providers about visiting rural health in Ahvaz using Health Belief Model.

3. Methods

This is a qualitative study conducted by directed content analysis method and by using the health belief model conducted in rural health houses under cover Ahvaz eastern health center. Health houses that are supervised by rural health centers play an important role in providing primary health care in rural settings. "Main village," selects for the establishment of a rural health house based on a set of criteria. Each health house provides health services for several "satellite" villages. Primary health care in the health house is provided by trained community health worker, behvarz (11).

The Ahvaz eastern health center includes 3 rural health centers, and 12 health houses which cover 48 satellite villages. Participants were 14 patients, 6 health care providers (behvarz), 3 family physicians, and 3 members of patients' families. The inclusion criteria included being a type 2 diabetic patient with a profile in the health center, being a diabetes patient's family member, being a provider of health services to a patient with type 2 diabetes, having the desire to participate in the interview, and being able to speak Persian. By using the list of patients with diabetes type 2 in the mentioned health centers, patients, health care personnel, and family members of patients were selected purposively and were invited by phone call to participate in this study. In case they were not able to come to the health center, the interviewers were going to their homes to do the interview. To comply with the ethics, written consent was taken from participants before the interview and they were assured about the confidentiality of their identity and details of the interview. The data was collected through semi-structured interviews. After getting the agreement of the participants, their interview was recorded, and also some notes were taken. The interviewer tried to record the non-verbal movements like facial expressions, voice tone, and so on. The questions were designed to be open and according to the objectives of the study. Besides, during the conversation, some quarry questions like "why", "would you explain more" and "please tell me an example" were asked of the participants to clarify their answers and we repeated that to reach data saturation (12). After doing 23 interviews, the answers to questions became similar and repetitive and no new data was collected. To be cautious, after reaching the saturation level, we interviewed 3 more people. After each interview, the collected data was typed

immediately and recited by the researcher several times to make sure about its accuracy. Analysis of the data was performed simultaneously with doing interviews. After the primary categorization of data by MAXQDA 12, keywords and phrases were extracted in form of primary codes and after that, these codes were used to make sub-themes. Finally, these themes were matched with the 5 structures of the health belief model. The validity of the findings and scientific accuracy was evaluated by Lincoln & Guba criteria (13). To increase the validity of the findings continues communication and review of the finding by participants were done. Peer review was used for the assessment of the reliability of the findings. Avoiding any presumptions in the process of the study was a technique for conformability ensuring. The study proposal was approved by the ethics committee of Ahvaz Jundishapur University of Medical Sciences with the reference code of IR. AJUMS. REC. 1395. 502.

4. Results

The demographic characteristics of interviewed participants are presented in Table 1. By data analysis, 285 initial codes, and 32 sub-themes that were matched to the 5 constructs of the health belief model were extracted (Table 2).

4.1. Description of Main Themes and Sub-themes

4.1.1. Perceived Threat

Due to understanding the complications of diabetes, diabetic patients felt feared more especially if they had seen such complications in people around them, they felt under threat of these complications. Therefore they had more regular visits and followed recommendations better.

4.1.1.1. High Knowledge of Patients

some of the patients knew about this disease, methods of controlling that, on-time consumption of medications, regular visits to the health center, and disease complications. One of the patients said: "I come to this center every month and every 6 months I visit an optometrist and cardiologist. I take my drugs regularly because I know complications of this disease are serious" (a female patient, married, 37 years old with primary school education level). A behvarz also said: "some of the patients read about it and have good knowledge about diabetes. They are scared of the complications so they come to check their blood sugar on time" (a male behvarz with 25 years of job experience).

4.1.1.2. History of Disease in the Family

Patients who had a history of diabetes in their family were more sensitive about this disease and were proceeding to diagnose their disease earlier. One of the patients

Table 1. Demographic Characteristics of Interviewed Participants^a

Variables	Patients (N = 14), Patient's Family (N = 3)	Physician (N = 3)	Behvarz (N = 6)
Age	46.35 ± 7.2	30.33 ± 1.52	43 ± 4.60
Gender			
Male	3 (17.6)	2 (66.7)	3 (50)
Female	14 (82.4)	1 (33.3)	3 (50)
Marital status			
Married	14 (81.5)	3 (100)	5 (83.6)
Divorce	1 (5.9)	-	-
Single	2 (11.8)	-	1 (16.7)
Number of family member	5 ± 2.73	NA	4.66 ± 0.51
Education level			
Illiterate	6 (35.3)	-	-
Primary	7 (41.2)	-	-
Intermediate	3 (17.6)	-	3 (50)
High School	1 (5.9)	-	3 (50)
University	-	3 (100)	-
Job			
Housewife	14 (82.4)	-	-
Driver	1 (5.9)	-	-
Retired	2 (11.8)	-	-
Behvarz	-	-	-
Physician	-	3 (100)	6 (100)

^a Values are expressed as mean ± SD or No. (%).

said:” my parents had high blood sugar. I have been always scared of getting high blood sugar. I think high blood sugar is hereditary. Two years ago I visited a doctor to check my blood sugar and I found out that I have diabetes. I take my drugs regularly” (a female patient, married, primary school education level).

A behvarz said: “some of the patients who have had a diabetic patient around themselves, have some information about it and that’s why they are scared of it. So they come earlier for tests and follow recommendations” (a female behvarz with 16 years job experience).

4.1.1.3. Accepting the Disease

Some patients had completely accepted the disease, and they were following the recommendation. On this issue, one of the physicians said: “patients who have accepted their disease, listen to us better and pay more attention to their treatment. Thus they come for visiting on time” (a male physician with 2 years of job experience). One of the diabetic patients said: “Diabetes is just like cancer. So we have to cope with it. I know that it has no treat-

ment but I do exercise and take my medicines on time and also listen to what behvarz tells me” (51 years old, male, 25 years occupational experience).

4.1.1.4. Fear of Complications

By observing other patients’ complications or seeing patients’ photos, most of the patients will be scared of the probable complications and visit their doctor and also take their medicines timely. One of the patients said:” Sometimes my kidneys get painful. My kidneys and legs have problems. My eyes get blurred and I am scared that if my blood sugar goes up I will die so I take my medicines on time”. On this issue, a behvarz said: “since many of the patients think that high blood sugar won’t make any problem, we remind them of the probable complications to push them to take their medicines on time and visit the doctor regularly”.

4.1.2. Perceived Benefits

Most of the patients understood the contributing factors of regular visiting and on-time medical care (af-

Table 2. Main Themes and Sub-themes of Experience of Diabetic Patients About Visiting Rural Health Centers Using HBM

Main Themes	Sub-themes
Perceived threat	Patient's knowledge
	Family history
	Patient's acceptance of the disease
	Fear of diabetes complications
Perceived benefits	Fair cost of treatment
	Family cooperation
	Accessibility
	Patient reverence
	Satisfaction from personnel
Perceived barriers	Patient's poor knowledge
	Denial of the disease
	Lack of patient cooperation
	Too busy and time-limited
	Physical inability
	No employment and poverty
	Medical costs
	Local traditions
	Low family support
	Transportation difficulties
	Unfavorable weather
	Referral system barriers
	Inadequate equipment
	Low provider motivation
	Disrespectful Behavior in Health centers
	Personnel's absenteeism
	Lack of regular follow-up by patients
Weakness of communication between physician and patient	
Guide to action	Symptoms
	Guide by personnel
	Disease in family and relatives
Self-efficacy	Following diet and advice on medicine consumption
	Self-care

fordable cost of treatment, family cooperation, health insurance, availability, transportation, patient reverence, patient follow-up, satisfaction, and personnel's low turnover).

4.1.2.1. The Affordable Cost of Treatment

Most diabetic patients do not have a good income. Considering the low cost of visiting doctors and cheap

medicines, patients are less worried at the first level of health care. On this issue, one behvarz said: "in the main village there is a pharmacy. Besides, on two days of the week laboratory comes here and they take samples. Since it is free of charge, patients in this village are happy" (a female behvarz with 23 years occupational experience). One of the patients said: "When I go to Sina hospital with my sealed insurance note, it is very good because I can meet my doctor and my medicines will be cheap as well" (a female patient, 35 years old, married with primary school education level).

4.1.2.2. Family Cooperation

The family's financial and spiritual support is very important to have regular visits and control of the disease. A patient's wife said: "my husband's health is very important to me. So I always try to cook suitable food for him and every evening we go out hiking" (patient's wife, 27 years old). A patient said: "my wife takes care of me a lot and tries to make suitable and healthy foods for me" (a male patient, 61 years old with a primary school education level).

4.1.2.3. Accessibility

A health center must be located on the main road from which many villagers have traffic. A physician said: "since small villages are scattered, we have the plan to visit them regularly every month. We go to the health house once a week as well. Therefore patients can even walk to come and see the doctor" (a male physician with 2 years job experience). A patient said: "health house is near here so whenever the doctor comes I can walk there and there is no problem" (a female patient, married, 41 years old, and uneducated).

4.1.2.4. Patient Reverence

Most patients like to visit the doctor without delay and they like a physician or behvarz's sympathy. A behvarz said: "I always talk to the patients affably so that they come again on time. I put those who are older in priority to check their blood pressure and blood sugar" (a female behvarz with 16 years job experience). Another behvarz said: "patients like to be visited respectfully and without delay. We always respect them to motivate them to come again" (a male behvarz with 18 years of occupational experience).

4.1.2.5. Satisfaction from Personnel

Most of the patients were satisfied with the services that behvarzs was offering them at the first level. They also had relative satisfaction from physicians. One of the patients said: "I am happy of behvarzs. Whenever I go to the health house they help me and check blood pressure and blood sugar." (A female patient, 35 years old, married with

primary school education level). Another patient said: “the doctor is good-tempered. Whenever I go to the health center he prescribes laboratory tests and medicines. He also checks my blood pressure.” (A female patient, 39 years old, married. Guidance school education level).

4.1.3. Perceived Barriers

Based on the view of patients and health care personnel barriers to the ordered visit to the health centers are poor knowledge of patients, disease denial, patient’s poor cooperation, too busy and time-limited, physical inability, no employment and poverty, Medical costs, local traditions, low family support, transportation difficulties, Unfavorable weather, referral system barriers, inadequate equipment, low provider’s motivation, turnover of physicians, disrespectful behavior in health centers, lack of regular follow-up by patients, weakness of communication between physician and patient (18).

4.1.4. Guide to Action

Some external events such as having a diabetic patient in relatives, physician and other health care workers’ advice, and some internal events including pain and fear from complications will affect patients’ behavior in terms of coming to the health centers.

4.1.4.1. Clinical Symptoms

Physical signs like pain, blurred vision, vertigo, and so on stimulating patients to meet a doctor. A patient said: “whenever my mouth gets dried or I have a headache or blurred vision, I go to the health house so that behvarz checks my blood sugar and blood pressure.” (a female patient, 37 years old, married, primary school education level).

4.1.4.2. Personnel Guidance

It includes information that one may get from media or health care personnel. On this issue, a patient’s daughter said: “it’s been a long time since my mother has diabetes and it’s about 10 years that she is taking pills. behvarz comes to our house and checks my mother’s blood sugar and advises her to take her medicine on time.” (a female patient’s daughter, 40 years old, single, housewife, primary school education level).

4.1.4.3. A Disease in Family and Relatives

Patients who had a history of diabetes in the family or relatives, were more sensitive about this disease and came earlier for a checkup. A patient said: “my parents had diabetes too. I was always afraid that I will get diabetes. I think diabetes is hereditary. Two years ago, I went to a doctor and found out that I have diabetes. Now I consume my

medicines regularly.” (A female patient, 39 years old, married, primary school education level).

4.1.5. Self-efficacy

A diabetic patient’s belief in the ability to follow the advice in various situations including on-time consumption of medicines, following the diet, and self-care, affects his behavior of coming for follow-up.

4.1.5.1. Diet and Medicine Consumption

Patients have the most important role in controlling blood sugar. A patient said: “my father had diabetes too. It’s about 10 years that I have had diabetes and I’m scared of the complications. So I take my medicine on time and follow the diet.” (A female patient, 37 years old, primary school education level).

4.1.5.2. Self-care

In controlling diabetes, the patient’s role is more important than the health care personnel’s role. On this issue a patient said: “I check my blood sugar every morning and my daughter injects Insulin for me. I take my pills on time and do exercise. I eat a lot of fruit and vegetables and less rice and potato.” (a female patient, 39 years old, guidance school education level).

5. Discussion

Regular medical appointments engage patients in diabetes care, and can prevent severe complications of the disease. About 12 - 36% of patients with type 2 diabetes missed regular appointments. Understanding the distributing factors of regular appointments can improve diabetes care in patients with diabetes (14, 15).

In the present study, findings were extracted in 285 initial codes and were matched with 5 structures of the health belief model (perceived threats, perceived benefits, perceived barriers, guide to action, and self-efficacy). Sun et al. in a systematic review evaluated associated risk factors with missed appointments by patients with type 2 diabetes. Results of this review showed that a variety of multi-level factors is associated with an irregular appointment in this population with inconsistency in findings. They found that most of the published reports examined patients’ features and ignored the role of interpersonal factors (14). Davoodi et al. in a Qualitative Study explored barriers and incentive factors for patients with type 2 diabetes to refer urban health center of Ahvaz. Two main categories were extracted including individual and systemic factors. Individual barriers included two sub-categories of economic and occupational factors. The 4 sub-categories of systemic

barriers were lack of information resources, lack of specialized equipment and services, limited access, and long waiting lines. Individual incentives for referring to health center was patients' awareness and systematic incentives included the financial ability and appropriate public relations (16).

5.1. Perceived Benefits Theme

Perceived benefits mean belief in the efficacy of the recommended action to reduce the risk of disease. There is a relationship between the perceived benefits of behavior and the amount of following that (17). Results of the current study showed that patients who had regular visits, had a high understanding of benefits, were on time coming to the health center and following the recommended diet, and taking medicine. In Zare-Farashbandi's study, patients who had a better relationship with their physician had a better understanding of his advice (18). Similarly, Dehi et al. showed that visiting a diabetic patient at home and having a good relationship with the patient was more effective in controlling the disease (reducing glycosylated hemoglobin) than following up by phone (19).

In the current study also, the role of some factors, like active follow-up at a patient's house by behvarz, on the behavior of visiting health centers was mentioned. Bigdeli et al. showed that the relationship between physician and patient could predict self-care behaviors in patients with diabetes type 2. The positive effect of easy access to health centers on an increase in patient visits was also mentioned (20).

5.2. Perceived Barriers Theme

In the present study, the perceived barriers category was considered as the most important category affecting the behavior of visiting rural health centers by participants. Patients felt some barriers to adopting the behavior of regular visits and getting on-time care which confirms the findings of previous studies (16, 21, 22).

Patients who felt that complications of their disease or their situation is threatening (an increase in blood sugar, losing eyesight, foot amputation, renal problem, and cardiac stroke) and considered themselves at risk of those complications, paid more attention to the personnel and family doctor's recommendations including following the diet, consumption of medicines, monitoring blood sugar and doing the needed tests. Their visits to the health center were regular as well. Also, the findings of this study showed that the threat was more felt in diabetic patients who had seen complications of this disease in people around them.

Perceived barriers were reported as the most powerful predictor of preventive health behavior (23). In line with

our findings, Sabzmakan et al. showed that patients who felt that disease complications or their situation is threatening and found themselves at risk of those complications were following the recommended diet better. It was also observed that the feeling of threat was more in diabetic patients who had seen the complications in other patients around them (21).

5.3. Guide for Action Theme

Some internal and external factors may activate a person's readiness for action (24). External factors like a television program, diabetes poster, seeing a patient around, guide of health care personnel, and internal factors such as pain, and fear of complications affect the behavior of patients to come to the health centers. In present study many patients were visiting doctors based on the symptoms like pain, vertigo, visual problem, or renal problem. Besides patients who had seen some diabetes complications like foot sore or renal or cardiovascular problems in patients around them had more regular visits to test their blood sugar and get the services.

5.4. Self-efficacy Theme

In this study, some of the patients were sure about their ability to come regularly to the health center and do self-care. This is an indicator of action self-efficacy which means someone's assurance about his ability to start a new or tough behavior. Several researchers have shown the role of self-efficacy in the initiation of and keeping health-related behaviors (25, 26). In the present study, findings were extracted into HBM constructs. Melkamu et al. showed perceptions (Health Belief Model constructs) are relatively good predictor for self-care and can describe about 48% of the variance of self-care practice in patients with diabetes mellitus (22). Also, Subhi et al. in a qualitative study conducted in Muscat, Oman applied Health Belief Model to understand the barriers to diabetes care (27).

5.5. Strength and Limitations

This is a qualitative study and its results may help to a deep understanding of the related factors of the behavior of regular visiting by diabetic patients. The advantage of this study was the location of it which was in a rural area. Most of the previous studies have been done in diabetes clinics in cities. In addition to the limitations caused by the nature of the study (qualitative approach), the current research was conducted in rural settings and cannot be generalized to urban areas with different cultural beliefs and different patterns of access to health care.

5.6. Conclusions

The findings of this study provide an in-depth understanding of factors affecting rural health centers' appointments among diabetic patients. According to the participants' experiences, the status of visiting is a phenomenon that is shown by understanding the contributing factors which are necessary to promote the quality of health care, treatment, and follow-up of patients. Identifying the barriers and benefits of the status of visits by diabetic patients may be helpful in the planning of the national health system to control disease and prevent its complications.

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Footnotes

Authors' Contribution: It was not declared by the authors.

Conflict of Interests: The authors have no conflict of interest.

Data Reproducibility: The dataset presented in the study is available on request from the corresponding author during submission or after publication.

Ethical Approval: The study proposal was approved by the ethics committee of Ahvaz Jundishapur University of Medical Sciences with the reference number of IR. AJUMS. REC. 1395. 502.

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Informed Consent: Written consent was taken from participants before the interview and they were assured about the confidentiality of their identity and details of the interview.

References

- American Diabetes Association. Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes. *Diabetes Care*. 2018;**41**(Suppl 1):S13-27. [PubMed ID: 29222373]. <https://doi.org/10.2337/dc18-S002>.
- Grau-Perez M, Kuo CC, Spratlen M, Thayer KA, Mendez MA, Hamman RF, et al. The Association of Arsenic Exposure and Metabolism With Type 1 and Type 2 Diabetes in Youth: The SEARCH Case-Control Study. *Diabetes Care*. 2017;**40**(1):46-53. [PubMed ID: 27810988]. [PubMed Central ID: PMC5180459]. <https://doi.org/10.2337/dc16-0810>.
- Feig DS, Shah BR, Lipscombe LL, Wu CF, Ray JG, Lowe J, et al. Preeclampsia as a risk factor for diabetes: a population-based cohort study. *PLoS Med*. 2013;**10**(4). e1001425. [PubMed ID: 23610560]. [PubMed Central ID: PMC3627640]. <https://doi.org/10.1371/journal.pmed.1001425>.
- da Rocha Fernandes J, Ogurtsova K, Linnenkamp U, Guariguata L, Seuring T, Zhang P, et al. IDF Diabetes Atlas estimates of 2014 global health expenditures on diabetes. *Diabetes Res Clin Pract*. 2016;**117**:48-54. [PubMed ID: 27329022]. <https://doi.org/10.1016/j.diabres.2016.04.016>.
- Wang J, Zuo H, Chen X, Hou L, Ma J. Analysis of factors influencing the frequency of primary care visits among diabetic patients in two provinces in China. *BMC Public Health*. 2019;**19**(1):1267. [PubMed ID: 31519162]. [PubMed Central ID: PMC6743148]. <https://doi.org/10.1186/s12889-019-7591-6>.
- Kumar L, Mohammadnezhad M. Health Care Workers' Perceptions on Factors Affecting Diabetes Self-Management Among Type 2 Diabetes Mellitus Patients in Fiji: A Qualitative Study. *Front Public Health*. 2022;**10**:779266. [PubMed ID: 35444994]. [PubMed Central ID: PMC9013814]. <https://doi.org/10.3389/fpubh.2022.779266>.
- Yazdani F, Abazari P, Haghani F, Iraj B. Restrictors of the effectiveness of diabetes self-management education: A qualitative content analysis. *J Educ Health Promot*. 2021;**10**:18. [PubMed ID: 33688527]. [PubMed Central ID: PMC7933700]. https://doi.org/10.4103/jehp.jehp_914_20.
- Daniati N, Widjaja G, Olalla Gracia M, Chaudhary P, Nader Shalaby M, Chupradit S, et al. The Health Belief Model's Application in the Development of Health Behaviors. *Health Educ Health Promot*. 2021;**9**(5):521-7.
- Dadkhah Tehrani B, Tavakoli R, Jazayeri SA. The Effect of an Educational Intervention Based on Health Belief Model on Nutritional Behaviors in Type 2 Diabetics. *Mil Caring Sci*. 2019;**5**(4):303-11. <https://doi.org/10.29252/mcs.5.4.303>.
- Tripathy JP, Sagili KD, Kathirvel S, Trivedi A, Nagaraja SB, Bera OP, et al. Diabetes care in public health facilities in India: a situational analysis using a mixed methods approach. *Diabetes Metab Syndr Obes*. 2019;**12**:1189-99. [PubMed ID: 31410044]. [PubMed Central ID: PMC6650449]. <https://doi.org/10.2147/DMSO.S192336>.
- Mohammadi A, Valinejadi A, Sakipour S, Hemmat M, Zarei J, Askari Majdabadi H. Improving the Distribution of Rural Health Houses Using Elicitation and GIS in Khuzestan Province (the Southwest of Iran). *Int J Health Policy Manag*. 2018;**7**(4):336-44. [PubMed ID: 29626401]. [PubMed Central ID: PMC5949224]. <https://doi.org/10.15171/ijhpm.2017.101>.
- Tavakoli Ghouchani H, Niknami S, Aminshokravi F, Kaveh Hojat S. Comparing Reasons for Quitting Substance Abuse with the Constructs of Behavioral Models: A Qualitative Study. *J Educ Community Health*. 2014;**1**(4):22-31. <https://doi.org/10.20286/jech-010422>.
- Guba EG, Lincoln YS. Competing paradigms in qualitative research. *Handbook of qualitative research*. 2. Sage Publications; 1994. 105 p.
- Sun CA, Taylor K, Levin S, Renda SM, Han HR. Factors associated with missed appointments by adults with type 2 diabetes mellitus: a systematic review. *BMJ Open Diabetes Res Care*. 2021;**9**(1). [PubMed ID: 33674280]. [PubMed Central ID: PMC7938983]. <https://doi.org/10.1136/bmjdr-2020-001819>.
- Dantas LF, Fleck JL, Cyrino Oliveira FL, Hamacher S. No-shows in appointment scheduling - a systematic literature review. *Health Policy*. 2018;**122**(4):412-21. [PubMed ID: 29482948]. <https://doi.org/10.1016/j.healthpol.2018.02.002>.
- Davoodi M, Dindamal B, Dargahi H, Faraji Khiavi F. Barriers and Incentives for Patients with Type II Diabetic Referring to Healthcare Centers: A Qualitative Study. *J Diabetes Nurs*. 2020;**8**(4):1223-36. eng.
- Gristwood J. Applying the health belief model to physical activity engagement among older adults. *Illuminate*. 2011;**9**.
- Zare-Farashbandi F, Lalazaryan A, Rahimi A, Hassanzadeh A. The Effect of Patient-Physician Relationship on Health Information Seeking Behavior of Diabetic Patients. *Med Ethics J*. 2017;**10**(38):37-50. <https://doi.org/10.21859/mej-103837>.

19. Dehi M, Norozi K, Aghajari P, Khoahbakht M, Vosoghi N. [The effect of home visit on quality of life of patients with type ii diabetes]. *Iran J Diabetes Metab.* 2018;**17**(1):38-1. Persian.
20. Bigdeli MA, Hashemi Nazari SS, Khodakarim S, Brodati H. Factors Affecting Self-Care in Patients with Type II Diabetes Using Path Analysis. *Iran J Health Sci.* 2016;**4**(3):10-21. <https://doi.org/10.18869/acadpub.jhs.4.3.10>.
21. Sabzmakan L, Mazloomi Mahmoodabad S, Morowatisharifabad MA, Mohammadi E, Naseri MH, Mirzaieae M, et al. Patients, experiences with cardiovascular disease risk factors and healthcare providers of determinants of the nutritional behavior: a qualitative directed content analysis. *Iran J Endocrinol Metab.* 2013;**15**(3):292-302.
22. Melkamu L, Berhe R, Handebo S. Does Patients' Perception Affect Self-Care Practices? The Perspective of Health Belief Model. *Diabetes Metab Syndr Obes.* 2021;**14**:2145-54. [PubMed ID: 34012280]. [PubMed Central ID: PMC8128344]. <https://doi.org/10.2147/DMSO.S306752>.
23. Jones CL, Jensen JD, Scherr CL, Brown NR, Christy K, Weaver J. The Health Belief Model as an explanatory framework in communication research: exploring parallel, serial, and moderated mediation. *Health Commun.* 2015;**30**(6):566-76. [PubMed ID: 25010519]. [PubMed Central ID: PMC4530978]. <https://doi.org/10.1080/10410236.2013.873363>.
24. Kulmala T, Vaahtera M, Ndekha M, Cullinan T, Salin ML, Koivisto AM, et al. Socio-economic support for good health in rural Malawi. *East Afr Med J.* 2000;**77**(3):168-71. [PubMed ID: 12858895]. <https://doi.org/10.4314/eamj.v77i3.46616>.
25. Schwarzer R. Modeling Health Behavior Change: How to Predict and Modify the Adoption and Maintenance of Health Behaviors. *Appl Psychol.* 2008;**57**(1):1-29. <https://doi.org/10.1111/j.1464-0597.2007.00325.x>.
26. Guo YJ, Tang Q, Gu Y. Measurements of Self-Efficacy in Patients with Chronic Kidney Disease: A Literature Review. *Nephrol Nurs J.* 2017;**44**(2):159-66. [PubMed ID: 29165967].
27. Subhi L, Kendall P, Al-Shafae M, Al-Adawi S. Health Beliefs of People with Type 2 Diabetes in Primary Health Care in Muscat, Oman: A Qualitative Approach. *Int J Clin Nutr Dietetics.* 2016;**2**(1). <https://doi.org/10.15344/2456-8171/2016/106>.