Jundishapur Journal Chronic Disease Care
Quarterly Journal of Ahvaz Faculty of Nursing and Midwifery

Barriers in controlling blood glucose in type 2 diabetes patients with diabetic foot ulcer, Ahvaz Razi Hospital, 2012

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Abstract

Introduction: Diabetes mellitus is the most prevalent cause for non- traumatic amputations, which starts with an ulcer in the lower limb. About 15% of patients with diabetes suffer from this ulcer. By controlling blood sugar, we can highly prevent the ulcer. The study was aimed to survey the barriers to control blood sugar in the patients with diabetic foot ulcer in three fields of interpersonal factors, extra-personal factors, and barriers related to the health system.

Materials & Methods: A descriptive study was conducted on 56 patients with diabetic foot ulcer admitted Ahvaz Razi Hospital. The Study population was selected applying a convenience sampling. Collected data through researcher- made questionnaire were analyzed using statistical descriptive elements (mean and standard deviation, frequency and percentage). The analytical statistical methods of Mann-Whitney and Kruscal-Wallis tests were also applied analyzing data using SPSS version 19.

Results: Extracted findings showed intrapersonal barriers are the most important factors for blood sugar control failures in diabetic foot ulcer patients. The total mean score for intrapersonal barriers, extra personal barriers, and barriers related to the health system were 38.30±7.8, 33.91±8.03 and 32.66±7.15, respectively. No significant relation existed between the mean score of intrapersonal barriers with the sex, age, and education. However, a significant relation existed between the mean score of intrapersonal barriers and the Arabian ethnicity ($p<0.05$).

Conclusion: Intrapersonal barriers had the most importance in blood sugar controlling for patients with diabetic ulcer compared to extra personal and health system barriers with a significant correlation in Arabian ethnicity.

Keywords: Barriers to control blood sugar, Foot ulcer, Type 2 diabetes

Introduction

The chronic hyperglycemia and metabolic disorders of carbohydrates, protein, and fat are caused by a decrease or lack of insulin, and lead to damage of different organs of the patient (1).

It is predicted that the prevalence of this disease reaches 4.4% of the world population up to the year 2030. The World Health Organization (WHO) estimated that the number of patients with diabetes will be more than six millions up to year 2030 in Iran (2).

This disease can cause disabilities like retinopathy (51.5%), renal failure (47.7%), neurological complications (68.8%), myocardial infarction (MI), brain stroke and physical deformity (16.8%) (3). One of the most important long-term complications of the diabetes is the diabetic foot ulcer, which is among the most importance and rather prevalent causes of hospitalizations in patients with diabetes, and billions dollars are spent to treat this disease all over the world, annually. About 15% of patients with diabetes suffer from the diabetic foot ulcer

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Received:4June2012 Accepted: 5Nov2012

(4), which means one out of six people suffer from the foot ulcer. The foot ulcer is the most prevalence reason for the amputation of the distal limb in the patients with diabetes. In %50 cases, 18 months after amputation, an infective wound will be present in the remained limb and %50-60 cases three-five years after the first amputation; another amputation will be performed in the other limb.Three years after the first amputation, the death rate is about 50% (4).

In recent years, several strategies have emphasized on continuity of care role in diabetes control, but unfortunately, despite all these efforts, statistics indicate different communities have still no access to control blood sugar and prevent diabetes complications (5). A major solution is to find the factors that can influence on their care. Among the factors influencing the diabetes control, the disease related factors have been mentioned, including social and economic class; lifestyle, duration of diabetes, awareness, attitude towards disease and the factors associated with physician such as knowledge, personality and consulting method in Health Care Center facilities (9); Also, several qualitative studies have introduced the environmental and individual barriers as a barrier to the optimal care of diabetes (6).

Considering the wide prevalence of the diabetic foot ulcer, which is a long term complication caused by diabetes, and the importance of blood sugar control in the patients with diabetes and the necessity for detecting the barriers to the blood sugar control, it is needed to know the obstacles recognized by the patient to design and plan the intervention. In several qualitative studies about the physical effects of the therapy, the psycho - emotional state of the patient, the lack of familial and social supports, an inadequacy of public knowledge; Psycho- cognitive factors such as hygiene beliefs, side effects of the therapy and the pain caused by catching blood for monitoring blood sugar; low level of the patient's knowledge, the inadequate data about services, income, the care accessibility, and the physician's opinion about the therapy were mentioned as the barriers to control blood sugar (5,10,11). Moreover, some studies have mentioned the effect of demographic variables like the education, age, and sex in controlling diabetes besides the effects of drug and diet (12). Nurses as the key members of the education team of self-care for diabetes, have an important role in improving self-care quality both in hospital and in society; they should pay attention that in nursing the important factors to prepare essential and clinical care are the patient's need and support. One of the most powerful ways to recognize the illness is to see the disease and its result from the patient's viewpoint (5) to distinguish the reasons that prevented the patient to control blood sugar.

Few studies have examined the barriers to glycemic control among patients with the diabetic foot ulcers in Iran and Ahvaz city has different cultural, ethnical and socioeconomic situations; in addition, most of the studies about barriers to control the blood sugar were qualitative; therefore recognition and correction of the most important barriers can be effective in preventing the long term complications of diabetes. According to the mentioned cases, the barriers in three fields of intrapersonal factors, extra-personal factors and barriers related to the health system were surveyed to prevent amputation and the disability causing handicap by prioritizing these barriers in the patients with type-2 diabetes, who have the foot ulcer.

Materials and Methods

A descriptive-analytic study, which was single-phase and cross-sectional was carried out. Contributors' consents were obtained and a convenience sampling was applied by being present in the endocrine ward and by telephone for the patients released from Razi Hospital, affiliated to the Ahvaz Jundishapur University of Medical sciences. The inclusion criteria were having a record of the history of foot ulcer (aside for the

duration of suffering and the ulcer rank) in the endocrine ward of Razi Hospital in the year 2010, having type 2 diabetes, and not having psychological disorders. Using pilot study sample size was verified. First, questionnaires were completed by 17 patients with foot ulcer, and then, using the mean and standard deviation (SD) obtained from the scores responded to the questions the sample size was determined as 56 people. Considering admitted patients with foot ulcer were in the ward for a long time (at least one month), surveying the patients with the hospitalization history due to the foot ulcer was performed by phone according to the records from March 2010. The number of the needed samples was collected based on the released patients. On the condition of death or no response by phone, from research units, sampling continued to reach the determined sample size. Explaining objectives of the study, consent was completed by research units. In this study, 56 people contributed. The data were collected after completing the written questionnaire by face-to-face or telephonic interview by the researcher or co-researcher (educated MSc student of midwifery, well versed in Arabic to study the Arab patients) or completing the written questionnaire by the survey sample with the presence of the researcher or co-researcher. Collecting data tool in this study was a researcher-made questionnaire, which was adjusted according to the study of books, scientific journals, and available standard questionnaire about the barriers to control blood sugar. The questionnaire included 65 questions, made up of two parts. The first part included demographic characteristics and the second part was about questions of the barriers to control blood sugar. From the questions related to the barriers to control blood sugar, 44 questions were about the importance of the present barriers to control blood sugar which was made up of three parts about intrapersonal barriers (19 questions), extra-personal barriers (12 questions), and barriers related to the health system (13 questions). Evaluating the importance of barriers to control blood sugar was done by Likert scale. Score one, two, three, four, and five showed very low importance, moderate importance, high importance, and very high importance of the barrier to control blood sugar, respectively.

The questionnaire was validated by the content-validity method. As it was judged and consulted with professors and experts, the corrected opinions were collected and after the needed correction, the final questionnaire was composed. In addition, for the questionnaire's validity Cronbach's Alpha test, a method of surveying the internal relationship was used. Therefore first, the tool for collecting the data was used for 17 studied samples qualified for entering the study.

Then Cronbach's Alpha coefficient of %82 was calculated, supporting the scientific trust of the tool.

Essential variables of this study were; patient's opinion about intrapersonal and extra personal and health system barriers. For analyzing the data, SPSS software version 19 was descriptive statistical methods (the Mean, SD. Frequency and percentage) and inferential statistics (considering the being non-normality society, Mann-Whitney test and Kruskal-Wallis test).

Results

In this study, 56 patients (32 women and 24 men) with type 2 diabetes that had diabetic foot ulcer participated, with the mean age of 58.7±9.8, 60.3±9.1, respectively. The sixty-six percent of the patients with foot ulcers had diabetes history of more than 10 years and 33.9% less than 10 years. Among these, 85.7% of the patients had previous hospitalization for at least once due to foot ulcer, which in 51.8% of these patients was blistered the first cause for the foot ulcer.

Extracted data from results showed that the total mean scores for intrapersonal barriers, extra-personal barriers and barriers related to the health system were 38.30±7.8, 33.91±8.03, and 32.66±7.15, respectively. Thus, the highest total

mean score was for the intrapersonal barriers, and after that, extra personal barriers and health system barriers had the lower score, respectively.

According to the given score, intrapersonal barriers had the most importance in lack of blood pressure control. As it is observed in table 1, the mean scores for "lack of patient's knowledge about diabetes and its complication", "not paying attention to regular measurement of blood sugar and essential test", "physical disability (old age, optical problems,…) for self-care" were 3.85 ±1. 2, 3.30± 1.30, and 3.12± 1.4, which had the highest mean score among intrapersonal barriers to lack of blood sugar control, respectively, and they are known as the most importance barriers. About demographic characteristics (age, sex, ethnicity, education) related to the barriers of controlling blood sugar, Kruskal-Wallis test showed a significant relation between the mean score of intrapersonal barriers and Arab ethnicity (p=0. 01). Sixty-seven percent of the patients with foot ulcer were Arab ethnicity. In this study, no significant relation existed between the mean score of the intrapersonal barriers with sex, age (over 50 years and under 50 years), education and income using Mann-Whitney test.

According to the score, the total mean score for extra personal barriers is 33.91± 8.03 which is the most importance in lack of blood sugar control after intrapersonal barriers. As it is seen in table 2, the mean scores for "low income", "high cost of controlling diabetes and treating its complications", "expensive cost for laboratory" are 3.92±1.2, 3.82±1.09, and 3.71±1.2, which had the highest mean score among extra-personal barriers, respectively.

In addition, for other personal factors related to barriers of controlling blood sugar, Mann-Whitney test showed a significant relation between the mean score of extra personal barriers and income (p=0. 05). In this study, no significant relation existed between the mean score of extra personal barriers with sex, age (over 50 years and under 50 years), education, and ethnicity by using Mann-Whitney and Kruscal-Wallis tests.

The total mean score for the barriers related to the health system, which is after intrapersonal and extra-personal barriers from the viewpoint of their importance in lack of controlling blood sugar, is 32.66±7.2. As Table 3 shows, "lacking financial support from insurance", "inadequate acknowledgement to the patient about the diabetes control centers (clinics and diabetes society) and their function", "low number of specific centers to provide services (clinics and diabetes society) for diabetes patients" with the mean scores of 4.00±1.2, 3.48±1.17, and 3.48±1.23, are among the most importance barriers related to the health system, respectively. Using Mann-Whitney and Kruskal-Wallis tests, no significant relation existed between the mean score of health systems with sex, age (over 50 years and under 50 years) education, ethnicity, and income.

Discussion

Diabetes metabolic control is an effective factor for foot ulcer remission. In fact, one of the basic methods to cure diabetic foot ulcer and to control infection is controlling blood sugar. Studies show that controlling blood sugar has an important and useful effect on remission of diabetes complications (13). In this study, according to the obtained mean score, the most importance barrier effective in lack of blood sugar control from the view point of patient with type 2 diabetes with foot ulcer is intrapersonal barriers. This result is incoherent with the results of Shafiei et al.'s study which consider the barriers related to health system as the effective barrier to lack of blood sugar control (5). This conflict may be due to the difference in the type of the study. As the present study was conducted on patients with foot ulcers; in addition, differences in the social, economical, and ethnical factors can be among the effective reasons.

Table 1: The mean score of intrapersonal barriers

Intrapersonal barriers	The mean score
Patient's unawareness about diabetes and its complications	3.85± 1.2
Not paying attention to regular measurement of blood sugar and conducting essential tests	3.30± 1.30
Tiredness from repetitive blood-catch for blood tests	3.30±1.60
Physical disability(old age, optic problems,…) for self-care	3.12±1.4
Discouragement in controlling blood sugar despite the therapeutic perseverance	2.28±1.2
Fear of fall in the blood sugar following diabetic food diet	1.94±1.08
Not using the blood sugar reducer pills accurately and regularly because of believing that they are useless	1.85±1.06
Believing in ineffectiveness of obeying diabetic food diet	1.85±0.05
Believing that blood sugar is uncontrollable	1.76±1.02
Difficulty in drawing accurate amount of Insulin for injection	1.67±1.16
Fear of fall in the blood sugar due to using blood sugar reducer drugs	1.58±1.0
Painful injection of Insulin	1.55±1.06
Feeling of being fiddling and discomfort between colleagues and friends because of diabetes	1.53±1.09
Not having adequate trust to the presented educations of the nurse	1.50±0.80
Painful sensation of the needle tip for measuring blood sugar	1.48±1.02
Not believing in diabetes(deny their diabetes)	1.46±0.9
The fear of fall in the blood sugar after exercise	1.41±0.78
Not having trust to adequate education presented by the physician	1.41±0.7
Not obeying injecting Insulin according to the physician's prescription because of believing that it is useless	1.37±1.0

Table 2: The mean score of the extra personal barriers

Extrapersonal barriers	The mean score
Low income	3.92± 1.23
High cost of controlling diabetes and treating its complications	3.82± 1.09
Expensive cost of laboratory	3.71± 1.20
Long distance from therapeutic centers to home	3.67± 1.40
Expensive strips of the blood sugar test and Glucometer	3.53± 1.17
Lack of financial support from family	3.28± 1.23
Expensive Insulin	2.75± 1.31
Regular preservance of therapy is time-consuming	2.58± 0.98
Extra costs for the family to obey the food diet	2.50± 1.27
No cooperation from the family for self-care of the patient	1.75± 1.08
Hiding the disease because of the fear to lose the job, unemployment, or not finding job	1.21± 0.75
Improper opinion of the society to the patient on the condition of injecting Insulin	1.14± 0.48

Table 3: The mean score of the barriers related to health system

Barriers related to health system	The mean score
Not having effective financial support by the health insurance	4.00± 1.29
Low number of specific centers providing services(clinics and diabetes society) for diabetes patients	3.48± 1.32
Inadequate information of the patient about the diabetes control centers	3.48± 1.17
Inadequate emphasize of therapeutic staff to perform tests, blood pressure control and carrying evaluations on a periodic schedule	3.33± 1.25
Inadequate education to the patient and family about the importance and the way blood sugar is measured regularly at home	3.03± 1.24
Not spending enough time to answer the patient's and their family's questions by the therapeutic staffs.	2.75± 1.23
Inadequate educational content presented to the patient and their family by the supportive-therapeutic centers about diabetes	2.67± 1.16
Paradoxical educations from different persons of the therapy staffs about diabetes	2.12± 1.01
Inadequate education about the way Insulin is drawn and injected	1.78± 0.96
Improper relation of the nurse with the patient and family	1.76± 1.09
Improper relation of the physician with the patient and family	1.60± 0.92
Not paying attention to the beliefs, patient's culture and family by the health staffs	1.35± 0.79
Not repeating educational classes	1.25± 0.85

In this study, the most important factor among intrapersonal barriers is the lack of patient's knowledge about diabetes and its complications, as most patients were not aware of the complications caused by long term lack of blood sugar control and foot ulcer. Eighty-seven percent of the patients had the hospitalization history of at least one time due to foot ulcer. The results showed that the source for 75% of the patients for the acknowledgment and education about diabetes and its complications was the physician, and only 7.1% of the patients were educated by nurses.

Although the nurse as one of the important key members of self-care team who spends the maximum time with the hospitalized patient in the ward, they assume to be more responsible for warning and educating patients Rakhshandeh et al.'s study shows that integrated educational programs raise the diabetes patients' awareness, outlook and function, and also improves their metabolic control (14). This could prevent many long term and life threatening complications by making these changes in diabetes patients (15). Overall, the results of the studies related to the complications and control of diabetes proved that good metabolic control and adequate education can improve the clinical side effects of diabetes patients (14). So, the nurses should educate the patients about blood sugar control and the importance of maintaining blood sugar at a normal level and they should emphasize on its relation to the prevention or delay of the long term complications (13).

Singh et al.'s study showed that physical disability for self-care due to the complications of diabetes and old age is the other important barrier to lack of blood sugar control. Obesity and optic disorder accompanied by diabetes may disrupt the self-care. In addition, foot ulcer worsens the quality of physical, psychological, and social lives, prominently. Preventing complications need both patient's impetus and health care system (16). The other barrier among intrapersonal barriers is not paying attention to the regular blood sugar measurement and essential tests. Sharifabadi's study (17) showed that the people should be educated to try to control their illness by programming about diabetes care themselves, and they are the basic factor in preventing the complications of diabetes by themselves. Achieving this point, the individuals should prefer the benefits and advantages of caring diabetes to the barriers and the cost (17). However, low income and expensive laboratory costs are important barriers mentioned in extra personal barriers. The income was among the variables, which had a significant relation with extra personal barriers. As in persons with the monthly income lower than 4000000 Rials, extra personal barriers have the priority. This result is consistent with Heidari et al.'s study showing that the individuals with good economical situations controlled their blood sugar better (18). The researches have proved that the costs for diabetes patients like physician visit, drug, and proper food are really expensive and costs of a healthy lifestyle and preparing such foods may be the barrier to control blood sugar in families with low income. A well economical state determines choosing and buying proper foods for diabetes. It also has a direct effect on self-care of these persons and as a result in proper blood pressure control (19-20). Results from this study showed that the most important intrapersonal barriers are low income; high cost of controlling diabetes, its complications; and expensive laboratory cost. Many researches exist that show the relation between financial cost and obeying pharmaceutical diet. According to these studies, those with improper financial state are vulnerable of not obeying the therapeutic diet (18). Results of Aghamollaie's study showed that the most importance reasons for not performing a blood sugar test at home are the costs of the blood sugar test kits and financial disability of the research units to prepare these kits (21). The other extra personal barrier with the highest score is the longest distance from therapeutic centers to home. Strauss et al.'s study showed that the long distance

from home to the primary care centers is related to poor control of blood sugar in old and villager patients (22), which corresponds to the present study. In addition, according to the obtained data, one of the most important barriers of the health system is an inadequate number of centers providing services to the diabetes patients, which corresponds to Shafiei et al.'s study (5). Larme's study showed that health care system needs changes to support care efforts of diabetes effectively (23). According to the results of this study, no relationship existed between the mean score of intrapersonal barriers with variables of the age, sex, and income in the patient with the diabetic foot ulcer. In addition, in a study conducted by Nikkhooy et al., no relationship existed between the amputation rate with the age and sex, which the results are consistent with present study (24).

The other obtained result of this study was the difference between the illiterate and literate people from the viewpoint of relationship with intrapersonal barriers, which the results show that no relationship existed between the intrapersonal, extra-personal, and health system barriers with education in controlling blood sugar. This result is reliable with the Sabet Sarvestani et al.'s study which shows no difference existed between the illiterates and literate people from the viewpoint of self efficiency score (25). In present study, a significant relationship existed between the mean score of the intrapersonal barriers and the ethnicity. The intrapersonal barriers are observed as important barriers among Arab ethnicity, which can be due to the difference in languages of the patient and the instructor.

Important limitations of the present study were; small sample size and a cross sectional type study. The other limitations that can be mentioned are non-random sampling and a specific time and place, which this issue restricts generalizing the results of the study to the whole society of diabetes. So, conducting another study with a random sampling, a bigger sample size and in the different places is suggested.

Conclusion

According to the results the most importance barrier in the Ahvaz to control blood sugar is unawareness of patients from diabetes and its complications due to the inadequate education, subsequently, nurses perform the least role in educating the patients, which can be due to the shortage of nurses compared to the number of patients in the ward. Moreover, according to the results, surveying the barriers to proper control of the blood sugar especially by prolongation of suffering from diabetes, encouraging the patients to measure blood sugar, surveying the present barriers in doing self-care and removal of these barriers, conducting educational courses about diabetes for patients and their family, and preparing special stratagem for patients with the economic problems are suggested.

According to the significance of the relationship between the ethnicity and interpersonal barriers, the native educational nurses are recommended to be employed to follow-up the therapeutic management for the diabetes people, which it can prevent the high costs of re-hospitalization and the long-term complications of diabetes. In spite of the results of this study, it is suggested to conduct similar studies in a bigger sample size in the different places and ethnicities to evaluate this relationship more accurately.

Acknowledgments

This study was the result of the proposal with the contract number: 90 S 118, act of the Ahvaz Jundishapur University of Medical sciences, and its costs were paid by the mentioned center. The authors thank the Razi Hospital staff and all the patients helped us by participating in this study. Furthermore, we show gratitude for Research Deputy Vice-chancellor for Research Affair of the Ahvaz Jundishapur University of Medical Sciences, particularly the Research Consultation Center (RCC) for technical support.

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