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Assessment of Self-Care Practice and Its Associated Factors among Diabetic Patients in Urban Area of Urmia, Northwest of Iran

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ABSTRACT

Background: Self care of diabetes is essential for control of disease and improvement of quality of patients' life. The aim of this study was to assess factors influencing self-care practice of patients in urban area of Urmia, Northwest of Iran.

Methods: In this cross-sectional study, 400 diabetic patients were randomly selected from eight healthcare centers in Urmia City in 2010. Data collection tools was a questionnaire included data on demographic characteristics, diabetes status, and self-care practice. Patients' self-care practice was classified to good, moderate, and poor levels. ANOVA and Chi-square tests were used to examine the association between self-care practice and clinical and behavioral factors. Spearman's rho correlation was used to examine the relation between self-care practice and control of glycemia.

Results: The patients' self-care practice was good in 15.1%, moderate in 58.7%, and poor in 26.2%. There was a significant association between education ($P=0.030$), duration of disease ($P=0.04$), and treatment intensity ($P=0.001$) and self-care practice of patients.

Conclusion: Despite the important role of self-care practice in management of diabetes and preventing its serious complications, most patients who have medical record in health care centers had inappropriate self-care practice especially in SMBG, which has critical role in controlling diabetes.

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Introduction

Diabetes is the most common chronic disease with devastating complications. The Middle East is expected to bear one of the greatest burdens of diabetes worldwide in the coming decades¹. Based on the results of a national survey for non-communicable disease conducted in Iran in 2008, the prevalence of diabetes was 7.7%, equivalent to 2 million cases when extrapolated to the Iranian population aged 25 to 64 years². Apart from the health

impact, the economic cost of diabetes and its complications is considerable³. Furthermore, the burden of diabetes is considerably high especially in developing countries where financial resources are limited. Epidemiological studies indicated that the distribution of diabetes in Iran was diverse. Accordingly, the prevalence of diabetes among adults aged older than 35 years was 7 to 8% in Isfahan, 16.3% in Yazd, and 13.6% in Boushehr⁴. Screening programs conducted in different parts of Iran re-

vealed that nearly half of patients with type 2 diabetics are unaware of their disease and may be the reason of common complications of diabetes in Iran⁴.

In recent years, a national program has been designed for primary, secondary, and tertiary prevention of diabetes. The major strategies of this program are training specialized health care providers for diabetes education, identification of high-risk groups, and screening for unrecognized cases⁴. Diabetes education programs can have long-term benefits on increasing the knowledge, improving the psychosocial function, and controlling the blood sugar in diabetic patients³.

Health care centers are the first line for providing primary health care and have an important role in helping the diabetic patients to manage their disease and to prevent its complications. The patients themselves play critical role in this setting. The success of long-term maintenance therapy and good metabolic control for diabetes depends mainly upon the patients' compliance with the therapeutic plan and a fundamental change in their behavior⁵.

Despite the importance of self-care practices in controlling diabetic adverse outcomes, there is limited information available on the self-care practices of individuals who are recognized as diabetic patient through screening.

The aim of this study was to evaluate self-care practice in diabetic patients and to assess the influence of demographic characteristics and the severity of the disease on the practice of patients in urban area of Urmia City.

Methods

This cross-sectional study was conducted from April to July 2010 in urban area of Urmia City, the northwest of Iran using a two-stage cluster random sampling. Based on power analysis using moderate effect size (0.5), at the 0.05 significance level, power of 92%, and considering design effect of cluster sampling, a sample size of 400 was estimated. First, a sample of 8 out of 30 health care centers was selected as clusters. Then, 50 diabetic patients who met inclusion criteria were chosen from each center randomly. The currently diagnosed

type 2 diabetic patients aged more than 30 years were enrolled voluntarily and consecutively into the study.

The aim of the study was explained to all participants. Permission to conduct this research was approved by the ethical committee of Urmia University of Medical Sciences. All participants signed the inform consent.

A pre-defined questionnaire was used for data collection regarding clinical status, age of diabetes onset, duration of disease, family history of diabetes, complications of diabetes (such as nephropathy, retinopathy, diabetic foot, and myocardial infarction detected according to medical record), current smoking, body mass index (BMI), and treatment intensity. The type of treatment intensity included insulin therapy, oral agents, and control of diet⁶. Due to limited availability of HbA1c results, the cut point of well-controlled blood glucose was defined as fasting blood sugar (FBS) less than 7 mmol/l in at least three specimens during the previous year. Previous studies reported that FBS more than 7 mmol/l was associated with micro and macro vascular complications⁷⁻¹⁰. Demographic data which were assessed in this study included: age, sex, and education. Educational level was classified dichotomously as low (illiterate, primary, or middle school) or high (high school or academic).

A frequently used and validated self-care questionnaire including 15 questions was used¹¹⁻¹⁴. An endocrinologist, a community medicine specialist, and health educator reviewed independently the questionnaire for face and content validity, the reliability of questionnaire was approved in a pilot study carried out among 20 diabetic patients. The Cronbach's alpha coefficient was 0.75. Four domains of self-care practice including dietary intake, physical activity, using medical advice and management of complications were assessed four-choice questions. Dietary intake was evaluated for the recent years. The minimum physical activity level was determined as 30 minutes moderate activity for at least three days per week. The level of prevention and management of complications of diabetes was determined by the Ministry of Health and Medical Education guideline for diabetic patients. The

frequency of medical advices was assessed by the frequency of physician visits during last year, having a regular plan for checking blood pressure, taking medication according to physician recommendations, and self-monitoring of blood glucose. The total score of questionnaire was 100. The level of self-care practice was classified into poor (<49), moderate (50 to 74), and good (>75) considering to the total score of questionnaire. Two trained medical students interviewed with patients and filled out the questionnaires.

ANOVA and Chi-square tests were used to examine the association between self-care practice and clinical and behavioral factors. Logistic regression analysis was applied to predict the impact of demographic and clinical variables on good self-care practice. Spearman's rho correlation coefficient was used to examine the relation between self-care practice and con-

trol of blood sugar. The data analysis was performed at 95% significant level using statistical program SPSS version 16.

Results

The total number of patients who met inclusion criteria was 400. Three patients were excluded from the study due to cognitive disorders and five patients due to incomplete records regarding complications of diabetes. Therefore, 392 patients (283 women and 109 men) remained for analysis. The mean age of participants was 58.46 [95% CI: 57.1 to 59.7]. The mean age was not statistically different for men and women. Only 2% of participants performed weekly self-monitoring of blood sugar, 17.1% monthly, 45.7% every three months, and 35.2% did not have a regular plan for checking blood glucose.

Table 1: The association between self-care practices, clinical and demographic characteristics

| Variables | Self-care practice level | | | P value |
|---|--------------------------|----------|------|---------|
| | Poor | Moderate | Good | |
| Mean age(years) | 57.7 | 58.8 | 58.4 | 0.702 |
| Sex (Male/Female) (%) | 51.5 | 34.5 | 34.1 | 0.265 |
| Education level (High/Low) (%) | 25.0 | 50.0 | 25.0 | 0.031 |
| BMI | 29.2 | 29.9 | 30.8 | 0.232 |
| Positive family history (%) | 26.0 | 5.0 | 18.9 | 0.162 |
| Duration of diabetes (years) | 3.9 | 4.1 | 5.1 | 0.042 |
| Complications of diabetes (%) | 24.2 | 58.0 | 17.1 | 0.121 |
| Type of treatment (Insulin therapy) (%) | 12.0 | 60.0 | 28.0 | 0.001 |

Self-care practice was good in 15.1% of patients, intermediate in 58.7%, and poor in 26.2%. The level of self-care practice had positive association with patient's education status ($P=0.030$) the duration of diabetes ($P=0.04$), and type of treatment (Insulin therapy) ($P=0.001$). There was no statistically significant association between the self-care practice and gender, age, family history of diabetes, complications, and BMI. Table 1 shows the details of association between self-care practice level and clinical and demographic characteristics.

About 31.2% of the patients maintained their fasting blood sugar below the cut point level of 7 mmol/l and considered as well-controlled blood sugar. There was a negative correlation between self-care score and fasting

blood glucose, but it was not statistically significant ($r = 0.78$, $P=0.16$). However, there was a significant relationship between self-care score in dietary intake domain and diabetes control ($P=0.010$).

Almost 35.2% of the patients did not control their blood glucose regularly (at least four times per year based on the ministry of Health and Medical Education guideline), although, all of them had medical record in health centers. There was a significant difference between mean age and the level of activity so that younger patients had better physical activity status. High educated patients had better level of physical activity ($P=0.02$). Considering complication, prevention practice was actually better in older patients and those who had longer diabetic duration. There was a statistically

significant difference between dietary intake and gender (Table 2). Using medical advice was significantly better among female patients. Patients with at least one complication had higher level of dietary intake self-care practice.

The adjusted odds ratio (OR) estimates of good self-care practice was 1.8 [95% CI: 1.3, 3.7] for high educational level, 1.5 [95% CI: 1.1, 4.1] for length of diabetes more than 5 years, and 3.6 [95% CI: 2.1, 5.7] for insulin treatment.

Table 2: Association between the level of self-care domains and subjects' characteristics

| Domain of practice | | Sex (%) | | Education (%) | | Complication of diabetes (%) | | Treatment (%) | | Age (year) | Duration of diabetes (year) |
|----------------------------------|----------|--------------|----------------------------|------------------|---------------------------|------------------------------|---------------------------|---------------------------|---------------|-------------------|-----------------------------|
| | | Male | Female | Low ^b | High ^b | No | Yes ^c | Insulin | Other | | |
| Physical activity | Poor | 37 (33.9) | 152 (53.7) | 164 (51.3) | 156 (48.8) | 139 (47.4) | 50 (50.5) | 10 (40.0) | 179 (48.8) | 60.1 | 4.4 |
| | Good | 72 (66.1) | 131 (46.3) | 25 (32.8) | 47 ^a (65.2) | 154 (52.6) | 49 (49.5) | 15 (60.0) | 188 (51.2) | 54.1 ^a | 4.0 |
| Dietary intake | Poor | 4 (3.7) | 0 (0.0) | 2 (0.6) | 2 (0.2) | 2 (0.7) | 2 (2.0) | 0 (0.0) | 4 (1.1) | 51.2 | 8.0 |
| | Moderate | 41 (37.6) | 94 (33.2) | 105 (32.8) | 30 (41.6) | 111 (37.9) | 24 (24.2) | 8 (32.0) | 127 (34.6) | 57.8 | 4.3 |
| | Good | 64 (58.7) | 189 ^a (66.8) | 213 (66.6) | 40 (55.5) | 180 (61.4) | 73 ^a (73.7) | 17 (68.0) | 236 (64.3) | 58.8 | 4.1 |
| Medical adherence | Poor | 32 (30.2) | 47 ^a (17.9) | 60 (20.1) | 19 (27.5) | 57 (20.1) | 22 (26.2) | 8 (32.0) | 72 (19.7) | 57.4 | 3.7 |
| | Moderate | 48 (45.3) | 141 (53.8) | 162 (54.2) | 27 (39.1) | 154 (54.2) | 35 (41.7) | 6 (24.0) | 203 (55.6) | 58.7 | 4.1 |
| | Good | 26 (24.5) | 74 (28.2) | 77 (25.8) | 23 (33.3) | 73 (25.7) | 27 (32.1) | 11 ^a (44.0) | 90 (24.7) | 58.6 | 4.9 |
| Complication Prevention practice | Poor | 22 (20.2) | 33 (11.7) | 42 (13.1) | 12 (16.0) | 45 (15.3) | 10 (10.1) | 3 (12.0) | 51 (13.9) | 57.2 | 4.0 |
| | Moderate | 65 (59.6) | 178 (62.9) | 198 (61.9) | 46 (63.8) | 179 (61.1) | 64 (64.6) | 11 (44.0) | 232 (63.2) | 57.2 | 3.9 |
| | Good | 22 (20.2) | 72 (25.4) | 80 (25.0) | 14 (19.4) | 69 (23.5) | 25 (25.3) | 11 (44.0) | 83 (22.6) | 62.4 ^a | 5.0 ^a |

^a *P* value < 0.05

^b Low educational level (illiterate, primary, or middle school), high educational level (high school/ or academic)

^c Having at least one complication

Discussion

The Middle East is estimated to have the largest increase in prevalence of diabetes by 2030¹⁵. More than 1% of the Iranian urban population older than 20 years develops type 2 diabetes each year¹⁵. The management of diabetes self-care is mainly related to the patients' compliance. Hence, improvement of patients' knowledge and their self-care skill is a fundamental strategy for controlling diabetes and its complications¹⁶⁻¹⁷.

The overall findings of this study indicated that inadequate self-care practice had negative correlation with poor-controlled blood sugar. All three domains of self-care practice level except dietary intake were relatively poor. The previous studies reported a correlation between poor knowledge and inadequate self-care practice^{3, 18}.

We indicated that insulin therapy, high educational status, and duration of diabetes had positive effects on level of self-care practice.

Tan et al. revealed that educational level is an important variable in improving self-care practice¹⁹. Some studies also reported a correlation between low educational level and poor diabetes-related knowledge^{3, 19-21}. According to the national guideline for diabetes, health care providers must train diabetic patients in order to be able to control their blood sugar. Most illiterate patients had low level of self-care practices whereas they are under supervision of health care centers. There may be two reasons. Health care providers may have inadequate knowledge of diabetes and its complications²². On the other hand, they may have less attention to their training role as the most effective part of chronic disease control¹⁷. Tan et al. indicated that insulin users achieved better using medical advice than patients using other treatments did²³. Yun et al. showed that educational level and duration of diabetes were the most important predictors of knowledge of patients²⁴.

Only two percent of our participants had weekly self-monitoring blood glucose. A study in Iran reported that 6.3% of patients performed self-monitoring blood glucose⁵. Another study in Malaysia reported that 15% of subjects practiced self-monitoring²³. However, financial barriers play an important role in self-monitoring blood glucose²⁵.

There were few limitations and potential biases in this study: (a) the data on self-care practice was collected through self-reporting rather than direct observation. It may raise the possibility of information bias; (b) the questionnaire was developed and was reviewed as critically as possible. However, it was not sufficient for assessing physical activity domain. This might introduce information bias to the study results.

Conclusion

Despite the importance role of self-care practice in management of diabetes and preventing its serious complications, most patients who have medical record in health care centers had inappropriate self-care practice especially in SMBG, which has critical role in controlling diabetes. Improvement of the knowledge of both patients and health care providers may

have may have an impact on diabetic patients' self-care practice in health care settings.

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Conflict of interest statement

We declare that there is no conflict of interest.

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