JRHS 2011; 11(1): 33-38

JRHS
Journal of Research in Health Sciences
journal homepage: www.umsha.ac.ir/jrhs

Original Article

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

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**ARTICLE INFORMATION**

***Article history:***
***Received:*** *23 February 2011*
***Revised:*** *24 April 2011*
***Accepted:*** *29 May 2011*
***Available online:*** *12 June 2011*

***Keywords:***
*Self care*
*Diabetes Mellitus*
*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 statues, and self-care practice. Patients' self-care practice was classified to good, moderate, and poor levels. ANOVA and Chi–square tests were used to exam 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.

**Citation:** Yekta Z, Pourali R, Aghassi MR, Ashragh N, Ravanyar L, Rahim Pour MY. Assessment of self-care practice and its associated factors among diabetic patients in urban area of Urmia, northwest of Iran. JRHS. 2011;11(1):33-37.

## 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 decades [1]. 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 years [2]. Apart from the health impact, the economic cost of diabetes and its complications is considerable [3]. 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 Boushehr [4]. 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 Iran [4].

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 cases [4]. Diabetes education programs can have long-term benefits on increasing the knowledge, improving the psychosocial function, and controlling the blood sugar in diabetic patients [3].

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 behavior [5].

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 diet [6]. 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 complications [7-10]. 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 used [11-14]. 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 control 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 sue 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 | | | |
|---|---|---|---|---|
| | Poor | Moderate | Good | *P* value |
| 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 (542.) | 27 (39.1) | 154 (54.2) | 35 (417) | 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 2030 [15]. More than 1% of the Iranian urban population older than 20 years develops type 2 diabetes each year [15]. 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 complications [16-17].

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 practice [19]. 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 complications [22]. On the other hand, they may have less attention to their training role as the most effective part of chronic disease control [17]. Tan et al. indicated that insulin users achieved better using medical advice than patients using other treatments did [23]. Yun et al. showed that educational level and duration of diabetes were the most important predictors of knowledge of patients[24].

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 glucose [5]. Another study in Malaysia reported that 15% of subjects practiced self-monitoring [23]. However, financial barriers play an important role in self-monitoring blood glucose [25].

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.

## Acknowledgments

We acknowledge health care providers who contributed to interviewing. We are also grateful to the Urmia Deputy of Health services for giving us permission to conduct this study at public health settings.

## Conflict of interest statement

We declare that there is no conflict of interest.

## Funding

This study was supported by Urmia University of Medical Sciences and was approved by the ethical committee (No: 708).

## References

1. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care.* 2004;27(5):1047-1053.
2. Esteghamati A, Gouya MM, Abbasi M. Prevalence of diabetes and impaired fasting glucose in the adult population of Iran: National Survey of Risk Factors for Non-Communicable Diseases of Iran. *Diabetes Care.* 2008;31(1):96-98.
3. Caliskan D, Ozdemir O, Ocaktan E, Idil A. Evaluation of awareness of diabetes mellitus and associated factors in four health center areas. *Patient Educ Couns.* 2006;62(1):142-147.
4. Larijani B, Zahedi S, Aghakhani Sh. Epidemiology of Diabetes Mellitus in Iran. Shiraz E-Medical Journal. 2003;4(4), 1-8.
5. Aghamollaei T, Eftekhar H, Shojaeizadeh D, Mohammad K, Nakhjavani M, Ghofrani Pour F. Behavior, Metabolic Control and Health-related Quality of Life in Diabetic Patiens at Bandar Abbas Diabetic Clinic. *Irannian J Publ Health.* 2003;32(3):54-59.
6. Katon W, von Korff M, Ciechanowski P. Behavioral and clinical factors associated with depression among individuals with diabetes. *Diabetes Care.* 2004;27(4):914-920.
7. Arcavi L, Behar S, Caspi A, Reshef N, Boyko V, Knobler H. High fasting glucose levels as a predictor of worse clinical outcome in patients with coronary artery disease: results from the Bezafibrate Infarction Prevention (BIP) study. *Am Heart J.* 2004;147(2):239-245.

**8.** Danaei G, Murray CJL, Ezzatie M, Lawes CM, Vander Hoom MS. Global and regional mortality from ischemic heart disease and stroke attributable to higher-than-optimum blood glucose concentration:comparative risk assessment. *Lancet.* 2006;368:1651-1659.

**9.** Engelgau MM, Thompson TJ, Herman WH. Comparison of fasting and 2-hour glucose and HbA1c levels for diagnosing diabetes. Diagnostic criteria and performance revisited. *Diabetes Care.* 1997;20(5):785-791.

**10.** Wild SH, Smith FB, Lee AJ, Fowkes FG. Criteria for previously undiagnosed diabetes and risk of mortality: 15-year follow-up of the Edinburgh Artery Study cohort. *Diabet Med.* 2005;22(4):490-496.

**11.** Baecke JAH, Burema J, Frijters JER. Beacke guestionnaire of habitual physical activity. *Med Sci Sports Exerc.* 1997(29):15-18.

**12.** Fitzgerald JT, Funnell MM, Hess GE. The reliability and validity of a brief diabetes knowledge test. *Diabetes Care.* 1998;21(5):706-710.

**13.** Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. *Diabetes Care.* 2000;23(7):943-950.

**14.** Wong FK, Mok MP, Chan T, Tsang MW. Nurse follow-up of patients with diabetes: randomized controlled trial. *J Adv Nurs.* 2005;50(4):391-402.

**15.** Harati H, Hadaegh F, Saadat N, Azizi F. Population-based incidence of Type 2 diabetes and its associated risk factors: results from a six-year cohort study in Iran. *BMC Public Health.* 2009;9:186.

**16.** Collins MM, Bradley CP, O'Sullivan T, Perry IJ. Self-care coping strategies in people with diabetes: a qualitative exploratory study. *BMC Endocr Disord.* 2009;9:6.

**17.** Tang YH, Pang SM, Chan MF, Yeung GS, Yeung VT. Health literacy, complication awareness, and diabetic control in patients with type 2 diabetes mellitus. *J Adv Nurs.* 2008;62(1):74-83.

**18.** West JD, Goldberg KL. Diabetes self-care knowledge among outpatients at a Veterans Affairs medical center. *Am J Health Syst Pharm.* 1 2002;59(9):849-852.

**19.** Al-Shafaee MA, Al-Shukaili S, Rizvi SG, Al-Farsi Y, Khan MA, Ganguly SS, et al. Knowledge and perceptions of diabetes in a semi-urban Omani population. *BMC Public Health.*2008;8:249.

**20.** De Walt DA, Berkman ND, Sheridan S, Lohr KN, Pignone MP. Literacy and health outcomes. *J Gen Intern Med.* 2004(19):1228-1239.

**21.** Persell SD, Keating NL, Landrum MB,. Relationship of diabetes-specific knowledge to self-management activities, ambulatory preventive care, and metabolic outcomes. *Prev Med.* 2004;39(4):746-752.

**22.** Lee TW, Chan SC, Chua WT,. Audit of diabetes mellitus in general practice. *Med J Malaysia.* 2004;59(3):317-322.

**23.** Tan MY, Magarey J. Self-care practices of Malaysian adults with diabetes and sub-optimal glycaemic control. *Patient Educ Couns.* 2008;72(2):252-267.

**24.** Yun LS, Hassan Y, Aziz NA, Awaisu A, Ghazali R. A comparison of knowledge of diabetes mellitus between patients with diabetes and healthy adults: a survey from north Malaysia. *Patient Educ Couns.* 2007;69(1-3):47-54.

**25.** Vincze G, Barner JC, Lopez D. Factors associated with adherence to self-monitoring of blood glucose among persons with diabetes. *Diabetes Educ.* 2004;30(1):112-125.