

Diabetic Patients' Knowledge of Therapeutic Goals in Kuwait

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Key Words

Diabetes · Patients' knowledge · Therapeutic goals · Kuwait

Abstract

Objective: This study was conducted to analyze patients' knowledge about therapeutic goals for diabetic patients and factors associated with good knowledge. **Methods:** A total of 266 diabetic patients were randomly selected from 6 diabetes clinics in Kuwait to be included in a cross-sectional patient survey. Data were collected via face-to-face structured interviews using a pretested questionnaire. Descriptive and logistic regression analysis was used in data analysis. **Results:** The response rate was 93% (n = 247). The percentages [95% confidence interval (CI)] of patients who reported knowing their recent levels of low-density lipoprotein cholesterol (LDL-C), blood pressure (BP), and glycosylated hemoglobin (HbA1c) were 5% (2–8), 54% (48–60), and 8% (5–11), respectively. The percentages (95% CI) of patients who admitted knowing the target goals for LDL-C, BP, HbA1c, fasting, and postprandial blood glucose levels were 3% (1–6), 49% (43–55), 6% (3–9), 62% (56–68) and 55% (49–61), respectively. Correct target goals for LDL-C, BP, HbA1c, fasting, and postprandial blood glucose levels were reported by 2% (1–4), 43% (37–49), 5% (2–8), 60% (54–66), and 47% (41–53), respectively. Those with a high education (OR = 4.76; 95% CI

2.34–9.68) and those with a family history of diabetes (OR = 3.05; 95% CI 1.50–6.19) had good knowledge about correct targets. **Conclusion:** The current findings revealed that lack of knowledge about recent levels of BP, LDL-C and HbA1c and therapeutic goals was alarmingly high, which highlights the need for the implementation of an effective multidisciplinary team approach to encourage patient education and self-care.

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Introduction

Diabetes is a widespread chronic illness. The number of people worldwide living with diabetes is more than 180 million, but this number is expected to double by 2030 [1]. Six countries in the Middle East (Bahrain, Egypt, Kuwait, Oman, Saudi Arabia and United Arab Emirates) are among the 10 leading countries in the world for diabetes prevalence [2]. The incidence of diabetes in Kuwait has doubled in the last 15 years and is still on the rise.

Diabetes results in chronic complications including microvascular and macrovascular disorders [3]. It has been implicated as the underlying cause of 12% of all new cases of legal blindness, over one third new cases of end-stage renal disease, and nearly half of nontraumatic lower-

extremity amputations [4]. Evidence has also shown that cardiovascular disease is the major cause of morbidity and mortality for diabetic patients and has contributed significantly to the direct and indirect costs of diabetes [3]. Studies have confirmed that the complications of diabetes can be reduced by proper control of blood glucose [5, 6]. The primary goals of diabetes management are to reduce the risk for microvascular and macrovascular disease complications, to ameliorate symptoms, to reduce mortality, and to improve quality of life [3]. Appropriate care requires goal setting for glycemia, blood pressure, and lipid levels, regular monitoring for diabetic complications, dietary and exercise modifications, appropriate medications, appropriate self-monitoring of blood glucose, and assessment of the aforementioned parameters [3].

Randomized controlled trials have emphasized the importance of the achievement of therapeutic goals in order to prevent the long-term complications of diabetes [3, 7, 8]. It is recommended that the therapeutic goals for diabetic patients to reduce the increased risk of cardiovascular events include achieving glycosylated hemoglobin (HbA1c) <7%, blood pressure (BP) <130/80 mm Hg, low-density lipoprotein cholesterol (LDL-C) <2.6 mmol/l and 1.8 mmol/l for those at very high risk (i.e. 100 and 70 mg/dl) [3]. Underutilization of drugs, poor patient adherence to medication, unawareness of the importance of therapeutic goal attainment, and lack of knowledge with regard to therapeutic goals have been recognized as limitations to patients achieving these goals [9].

The goal of diabetic education is the improvement of individual self-management abilities. Good self-management is a critical pathway to success. Knowledge of patients' actual and target health outcomes seems to be a prerequisite for effective patient involvement in managing chronic diseases, such as diabetes [10, 11]. In Kuwait, there is little published data on patients' knowledge about diabetes, its treatment and treatment goals [12, 13]. This kind of information is needed as part of a quality assurance framework aimed at ensuring optimal patient care. Hence, the present study was designed to investigate patients' knowledge about therapeutic goals for diabetic patients and factors associated with good knowledge.

Methods

Study Design and Population

This descriptive, cross-sectional survey was conducted during February to May 2008 after approval and permission from the Ministry of Health, Kuwait. The inclusion criteria were patients with type 1 or type 2 diabetes of an age ≥ 18 years.

Study Sample

The sample size was determined using Java Applets for Power and Sample Size [14]. It was calculated that a sample size of 186 diabetic patients would be required to determine a 20% difference in population between 2 groups (e.g. male vs. female) with an 80% power and a 5% significance level. A larger sample of 266 patients was selected to adjust for possible nonresponse, using multistage stratified clustered sampling. This involved randomly selecting 2 governorates from which 6 primary diabetes clinics and then patients were selected, using systematic random sampling.

Study Questionnaire

The basis of developing the study questionnaire was obtained from a study that investigated patients' knowledge of diabetes therapeutic goals, medication adherence, and goal achievement [9]. The questionnaire contained both closed and open-ended questions. It was translated into Arabic, pretested for content, design, readability, and comprehension on 15 diabetic patients, and modifications were made as necessary so that the questionnaire was simple to answer, yet gave accurate data.

The final version of the pretested questionnaire was composed of 2 parts: part A to provide information about the demographics and other respondents' characteristics (gender, age, weight, height, nationality, educational level, household monthly income, type of diabetes, duration of diabetes, family history of diabetes, smoking, and current use of medications), and part B to describe the respondents' knowledge about (1) own recent levels of LDL-C, BP, and HbA1c, and (2) target goals for LDL-C, BP, HbA1c, fasting, and postprandial blood glucose levels. Those who reported that they knew the recent and/or target levels were asked to state the level.

Data Collection

Data were collected via face-to-face structured interviews of the respondents in the waiting rooms of the diabetes clinics using the developed and pretested questionnaires. The English version of the questionnaire was used for non-Arabic-speaking patients. The interview lasted approximately 15–20 min. The diabetic patients were provided with an explanation by the researcher about the purpose of the study. They were assured of confidentiality and gave written consent to participate in the study. At the end of each interview, the patients were provided with feedback regarding the knowledge of the therapeutic goals.

Data Analysis

Data were entered into the Statistical Package for Social Sciences (SPSS, version 17) and descriptive analysis conducted. Continuous data are presented as mean \pm standard deviation. Prevalence of knowledge was reported as percentage and 95% confidence intervals (CI). The 95% CI were computed using Epi-Calc 2000 (Centers for Disease Control and Prevention, Atlanta, Ga., USA). Simple cross-tabulations and logistic regression models were used to study the association between background variables [gender, age, nationality, body mass index (BMI), family history of diabetes, duration of diabetes, education and knowledge about targets and own recent levels]. Good knowledge was defined as knowing at least 1 of the 5 target goals and 1 of 3 own recent levels. Level of education was categorized as follows: (a) low to intermediate education for those who never

went to school, completed primary, intermediate, or secondary school, and (b) high education for those who had a diploma, bachelor, or postgraduate degree. Age was dichotomized into those aged less than 50 years and those aged 50 years or more based on mean age.

Results

The response rate was 93% (n = 247), 19 patients declined to take part in the survey. One hundred and forty-three (58%) were males. The mean (standard deviation) age was 51.1 (10.6) years, the mean BMI was 30.8 (6.3) and the mean duration of diabetes was 8.8 (7.1) years (table 1). The majority (96%) had type 2 diabetes. Twenty-nine percent of the patients were smokers. Oral antidiabetic therapy alone was used by 65%, insulin therapy alone by 12%, and 23% used both types of medications. Forty-eight percent of the patients used antihypertensive drugs, 51% used aspirin, and 31% used lipid-lowering medications.

Correct knowledge about target goals varied from 60 and 47% for fasting blood glucose and postprandial blood glucose to 5% for HbA1c (table 2). Knowledge about systolic blood pressure was correct for 43%, while only 1% reported the correct target for diastolic blood pressure. Also, knowledge about the target goal for LDL-C was poor as only 4 patients gave a correct answer. Only 8% of the patients knew their recent level of HbA1c and 5% knew their LDL-C, while 54% knew their recent BP. Of those who reported to know their recent levels, 1 met the target goal for HbA1c, 3 met the target for LDL-C, and 8 for BP.

Table 1. Characteristics of study participants

Characteristics	Number	Percent
Gender		
Male	143	58 (52–64)
Female	104	42 (36–48)
Age, years		
19–39	29	12 (8–16)
40–59	163	66 (60–72)
60–79	55	22 (17–27)
Education		
Low/intermediate	147	60 (53–66)
High	100	40 (34–47)
BMI, kg/m ²		
18.8–24.9	34	14 (10–18)
25.0–29.9	89	36 (30–42)
≥30.0	124	50 (44–56)
Family history of diabetes		
No	57	23 (18–28)
Yes	190	77 (72–82)
Duration of diabetes, years		
<5	85	34 (28–40)
5–10	89	36 (30–42)
>10	73	30 (24–36)
Medication use		
Oral antidiabetic therapy	160	65 (59–71)
1 drug	96	39 (33–45)
2+ drugs	64	26 (21–31)
Insulin therapy alone	29	12 (8–16)
Both oral antidiabetic and insulin therapy	58	23 (19–29)
Lipid-lowering medications	76	31 (25–37)
Antihypertensive therapy	119	48 (42–54)
Aspirin	127	51 (45–57)

Figures in parentheses indicate 95% CI.

Table 2. Self-reported knowledge about target goals, correct goals and knowing own recent level

Target topic	Reports target			Knows correct target			Knows own recent level		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
Fasting blood glucose	153	62	56–68	148	60	54–66	NA		
Postprandial glucose	135	55	49–61	115	47	41–53	NA		
Glycosylated hemoglobin	14	6	3–9	13	5	2–8	19	8	5–11
Low-density lipoprotein cholesterol	6	3	1–6	4	2	1–4	11	5	2–8
Blood pressure (systolic or diastolic)	122	49	43–55	107	43	37–49	134	54	48–60

NA = Not available.

Table 3. Background factors associated with correct knowledge about target goals and own recent level

Factor	Knowledge of at least 1 target goal			Knowledge of 1 of own recent level		
	%	OR	adjusted OR	%	OR	adjusted OR
Gender						
Female (n = 104)	62	reference		45	reference	
Male (n = 143)	75	1.86 (1.08–3.21)	1.61 (0.82–3.19)	64	2.19 (1.31–3.67)	1.70 (0.91–3.18)
Age, years						
<50 (n = 107)	79	2.23 (1.25–3.95)	1.44 (0.75–2.75)	67	2.24 (1.33–3.78)	1.66 (0.93–2.97)
≥50 (n = 140)	62	reference		48	reference	
Nationality						
Kuwaiti (n = 73)	58	reference		43	reference	
Non-Kuwaiti (n = 174)	74	2.12 (1.19–3.76)	1.57 (0.77–3.21)	62	2.22 (1.27–3.87)	1.36 (0.69–2.68)
Education						
Low/intermediate (n = 147)	57	reference		42	reference	
High (n = 100)	88	5.66 (2.85–11.22)	4.76 (2.34–9.68)	78	5.00 (2.81–8.89)	4.25 (2.35–7.66)
Family history of diabetes						
No (n = 57)	53	reference		51	reference	
Yes (n = 190)	74	2.59 (1.40–4.78)	3.05 (1.50–6.19)	58	0.33 (0.73–2.40)	1.34 (0.68–2.62)

Figures in parentheses indicate 95% CI.

The background variables age, gender, nationality, education, and family history of diabetes were significantly associated with knowledge in bivariate analysis. A more detailed analysis showed that women aged 50 or more had a significantly poorer knowledge ($p < 0.001$) compared to other gender-age groups. They also had a significantly lower education than the others. After adjustment for the covariates in a logistic regression analysis (table 3), only 2 background variables remained significant for target knowledge, i.e. education (OR = 4.76; 95% CI 2.34–9.68, $p < 0.001$) and family history of diabetes (OR = 3.05; 95% CI 1.50–6.19, $p = 0.004$). Knowledge about own levels was only associated with education (OR = 4.25; 95% CI 2.35–7.66, $p < 0.001$).

Discussion

This is the first survey to our knowledge that has studied diabetic patients' knowledge of therapeutic goals in Kuwait. The current results would be the first step in providing a quantitative measurement, and could be utilized in designing and targeting interventions to alleviate the identified problems and improve diabetic patients' knowledge about therapeutic goals, since unawareness of the importance of therapeutic goal attainment and lack of knowledge with regard to therapeutic goals have been

recognized as limitations to patients achieving these goals [9].

The present findings revealed respondents' poor knowledge about the recent levels of their HbA1c, LDL-C, and the correct target goals for these parameters and diastolic BP. These are much in line with those reported by a study conducted in South Carolina [9]. This knowledge deficit may be attributed to the lack of patient education by the clinicians, which could be due to the patient load, and consequently the lack of time to allow the clinicians to effectively educate patients about diabetes. The percentages of patients who reported knowing the recent and target goal levels of HbA1c and LDL-C were quite low compared to those who reported knowing the levels of BP. The increased familiarity of the respondents with the BP levels could be attributed to the fact that BP is frequently measured at each visit to the clinic compared to HbA1c and LDL-C measurements, which are less frequently performed. Moreover, it was noticed during the interview that the majority of patients believe that knowledge about BP is essential because its control reduces the risk of complications, but their knowledge in relation to LDL-C and HbA1c is insufficient due to the fact that they had not been informed about these parameters and the importance of their control. The high knowledge of the respondents about the target goals for fasting and postprandial blood glucose levels compared to the aforemen-

tioned parameters may be attributed to the increased familiarity of the respondents with these monitoring parameters through the frequent use of glucometers at home, and the fact that they are commonly performed at each visit to the clinic.

Of the background factors included in this study, only high education proved to be associated both with good knowledge about target goals and own recent levels. Also, a family history of diabetes was associated with better knowledge about target goals. The other factors gender, age and nationality were not associated with knowledge in the adjusted regression model. However, a specific target group in any educational intervention should be women aged 50 years or more with a low basic education. In comparison to previous studies conducted in Kuwait which assessed different aspects of patients' knowledge of diabetes, our findings confirm the knowledge deficits among diabetic patients, and that high education and a positive family history of diabetes were significantly associated with better knowledge [12, 13, 15].

It was noticed during the interview that diabetes care is mainly provided by physicians, and most of the respondents admitted that they were eager to know more about their illness. One study showed that patients want more information and education from health care professionals and wish to take an active part in decisions about their own health [16]. A potential intervention should be the integration of an effective multidisciplinary team approach including physicians, pharmacists, nurses, and dieticians to encourage patient education and self-care, and share responsibility for patients achieving diabetes therapeutic goals [3]. In Kuwait, there has been little discussion about the potential role of the pharmacist in the multidisciplinary team. This highlights the need for the recognition of the areas for pharmacists to become involved in this team. Several studies have acknowledged the importance of pharmacist-provided counseling on the nature of diabetes, lifestyle modifications and medications. Other roles included encouraging the effective use of medicines to achieve glycemic targets, promoting healthy lifestyles, supporting self-care, carrying out medication reviews, and managing disease systemically within multiprofessional teams [17–19].

This survey was not primarily designed to study the outcomes of treatment, but it strongly indicates that very few of the patients had achieved the target goals for HbA1c, LDL-C and BP. The underutilization of lipid-lowering medications and antihypertensive drugs together with poor outcomes of treatment point to the need for a reassessment of current treatment practices. Also,

new and innovative ways and means of achieving better treatment outcomes are needed. Improved self-care and patient empowerment including educational interventions are integral components of these efforts. Better knowledge of diabetic medicines has been shown to be associated with better glycemic control [20].

In this study, structured face-to-face interviews were used to achieve a better response rate. Nevertheless, this may contribute to a potential limitation of this survey, which is social desirability and that respondents may have offered favorable answers (non-response bias). In this respect, this study had no way of verifying respondents' claims, which were taken at face value. Also, permission was not given to access the patients' medication records to verify the patients' responses and other concomitant chronic diseases.

Conclusion

The current findings revealed that lack of knowledge about recent levels of BP, LDL-C and HbA1c and therapeutic goals was alarmingly high. Our findings underline the need for multifaceted interventions including the implementation of an effective multidisciplinary team approach to encourage patient education and self-care, and share responsibility for patients achieving diabetes therapeutic goals.

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