# Quality assessment of care provided to patients with type 2 diabetes based on Clinical Practice Guidelines

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Received; 2016/03/8 revised; 2016/04/5 accepted; 2016/05/24

## Abstract

**Introduction:** Diabetes is one of the usual medical problems that had an important negative effect on patient's health. Researches demonstrate that there is a wide gap between recommended medical actions and received care by patients with diabetes. The aim of study was to assess the quality of care provided to patients with type 2 diabetes.
**Materials and methods:** A cross-sectional study was carried out among 180 people with type 2 diabetes in diabetic's clinics using convenience sampling method in Tabriz, Iran in 2011. Using a questionnaire we assessed the reported adherence to minimum recommended annual care for 23 processes indicators based on Iranian Diabetes Guidelines.
**Results:** The proportions of the participants who received recommended annual care for all three top clinical and all six top lifestyle indicators were 82.26% and 43.96%, respectively. For lifestyle and management indicators, reported adherence rates to guidelines were low (38.9% for medication review, 67.7% for self-management evaluation, 55% for physical activity review, and 58.3% for nutrition consultation). From the participants' perspective, most of the participants (87%) had well-controlled diabetes.
**Conclusion:** A substantial proportion of people with type 2 diabetes indicated receiving suboptimal care and there is a notable gap between their expectations and what they have actually received in most aspects of the provided care.

**Keywords:** Type 2 diabetes, Quality assessment, Clinical practice guideline

## Introduction

In recent years the number of the people with diabetes has increased dramatically. It has mainly resulted from the increasing prevalence of Type 2 diabetes worldwide. In 1997, there were over 120 million people with diabetes around the world. According to WHO, the number of people affected with diabetes will increase to around 300 million by 2025 (1) .Most diabetes complications are related to the individuals' lifestyle and poorly controlled blood glucose (2). Regular monitoring of clinical indicators, such as eye and feet examination, blood pressure and serum lipid controls, are associated with decreased complications (3).Standard diabetes management guidelines have been broadly demonstrated to improve diabetes control, increase quality of health services (4, 5), prevent micro and macro-vascular



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[ DOI: 10.18869/acadpub.jbrms.4.1.1 ]

complications (6), improve patients' satisfaction and decrease inappropriate medication, referrals (7) and hospital admissions (8). Donabedian 1980 in defines the quality of health services as "the degree to which health services meet the needs, expectations and standards of care of the patients". Donabedian introduced a framework to assess the quality of health care which consists of technical quality, process quality and structural quality (9). Technical quality is one of the most important dimensions of quality in health care. It is widely accepted that improving disease specific aspects of care (technical quality) improves health outcomes (7, 10, 11).Technical Quality deals with the disease specific aspects of care as reflected by care processes and care outcomes (12).Technical quality differs from condition to condition and shows how well health systems deal with the specific condition (13). Service quality includes such aspects as communication or interaction between providers and patients, autonomy, attentiveness or respect for patients (14). Structural quality includes dimensions such as accommodation, continuity of care, accessibility and affordability (15).The present study aimed to assess the technical quality of delivered health care from the perspective of people with type 2 diabetes in Tabriz, Iran.

## Materials and methods

The data were obtained from a cross-sectional type 2 diabetes quality study in Tabriz, Iran in 2011. The study participants were 180 people with type 2 diabetes that had been diagnosed at least one year ago. Eligible participants aged 25 years and older with diagnosed Type 2 diabetes at least one year prior to data collection. Participants who were not able to answer questions and were not willing to participate in the study were excluded from the study. Participations were selected using convenience sampling method. The used questionnaire consisted of four parts, including demographic information, clinical history, self-reported risk factors status such as tobacco smoking and adherence to guidelines from the patients' perception. For the major outcome variables, diabetes control status and having complications, participants were asked to assess their status of diabetes control over the past 12 months as poor or well controlled based on their own health condition. Body Mass Index (BMI) was calculated from self-reported height and weight and categorized in four levels, Malnutrition, normal weight, over weight and obese . Recommended frequency of annual care for sixteen clinical, lifestyle and management practices (indicators) was defined as process measures based on standard diabetes management guidelines. Participants were asked to report "how many times (none, once, twice, three or more times and do not know) in the last 12 months" they received target care for each indicator. Validity of questionnaire was confirmed with CVR=0.8 and CVI=0.9. Reliability was confirmed with $\alpha$=0.7. Analyses of data were conducted by descriptive statistic. The findings were reported by frequency and average, Statistical analyses were carried out using SPSS software version 13.

## Results

The majority of the participants were women (67%), under 64 years old (76%), living in major city (79%) and over weight (46%). Few participants had a history of smoking and the majority of them were nonsmoking. Almost half of the participants were illiterate and most of them were thrifty and had private health insurance (Table1).

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**Table 1.** Characteristics of the participants with type 2 diabetes.

| Characteristics | | No. (%) |
|---|---|---|
| **Sex** | Female | 120 (66.7) |
| **Age** | 64≥ | (76.1)137 |
| | 74-65 | (15) 27 |
| | ≥75 | 16 (8.9) |
| **Residential areas** | Major city | (79.4) 143 |
| | Outer region | 37 (20.6) |
| **Body mass index (kg/m$^2$)** | Malnutrition | (0.6) 1 |
| | Normal weight | (31.7) 57 |
| | Over weight | (45.5) 82 |
| | Obese | 40 (22.2) |
| **History of smoking** | No | 167 (92.8) |
| **Education status** | Some high school | 85 (47.2) |
| | Completed high school | 73 (40.6) |
| | University | 14 (7.8) |
| **Employment status** | Employed | (15.6) 28 |
| | Thrifty | (62.2) 112 |
| | Retired | 40 (22.2) |
| **Private health insurance** | Yes | 176 (97.8) |

From the participants perspective, most of the participants (87%) had well-controlled diabetes and type 2 diabetes duration for one-third of patients was more than 10 years. The majority of the participants (45%) took medical therapy and more than half of them took both medical and life style therapy. More of the participants (70%) had diabetes complication (Table 2).

**Table 2.** Self-reported type 2 diabetes status, treatment and complications.

| Characteristics | | No. (%) |
|---|---|---|
| **Well controlled diabetes** | | 156 (86.7) |
| **Disease duration (year)** | <5 | 63 (35) |
| | 5-9 | 56 (31.1) |
| | ≥10 | 61 (33.9) |
| **Diabetes treatment** | Medical | 81 (45) |
| | Lifestyle | 4 (2.2) |
| | Both | 93 (51.1) |
| | None | 2 (1.1) |
| **Having complications** | Yes | 125 (69.4) |

For Blood creatinine measurement 52.2% met the recommended care. About 52.2% reported, receiving ophthalmologic examination by specialists and 85.6% reported blood lipids testing for checking feet by principal care provider 40.6% reported meeting the recommended care. Almost 82% reported having blood pressure measurement and 88.3% reported having an HbA1c test in the previous 12 months. For two clinical indicators (Infl. Vaccination, Penu. Vaccination) less than



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5% reported satisfying the recommended level of care. Around 67.7% reported meeting medication and self-management review at the recommended levels and physical activity status was assessed for only 55% of the participants. 58.3% reported nutrition consultation. Fewer than 50% of the participants reported receiving recommended level of care for all six lifestyle and management indicators. For lifestyle and management indicators, reported adherence rates to guidelines were lower than for clinical indicators (Table3).

**Table 3.** Diabetes received care over the past 12 months based on patient report.

| Diabetes care | DIG* | The percentage of received care (%) | The percentage of not received care (%) |
|---|---|---|---|
| **Clinical indicators** | | | |
| Doctor's visit | A/B | 88.9 | 11.1 |
| HbA1c measurement | A | 88.3 | 11.7 |
| Blood glucose measurement | B | 88.3 | 11.7 |
| Blood lipid measurement | A/D | 85.6 | 14.4 |
| Blood pressure measurement | A | 82.8 | 17.2 |
| Body weight | A | 74.4 | 25.6 |
| Blood creatinine measurement | A/B | 52.2 | 47.8 |
| Ophthalmologic exam by SP1 | D | 52.2 | 47.8 |
| Kidney problems review | A/C | 53.9 | 46.1 |
| Feet examination | A | 40.6 | 59.4 |
| Teeth examination | D | 15.6 | 84.4 |
| Infl. vaccination | - | 4.4 | 95.6 |
| Penu. vaccination | - | 0 | 100 |
| **Management and life style indicators** | | | |
| Self-management | A | 47.4 | 32.3 |
| Nutrition consultation | A | 58.3 | 41.7 |
| Physical activity | A | 55 | 45 |
| diabetes education programs | A | 42.2 | 57.8 |
| Treatment programs review | A | 38.9 | 61.1 |
| Heart consultation | A | 31.7 | 68.3 |
| Heart patient education | A | 1.7 | 98.3 |

A: Every 3 months. B: Every 6 months. C: Every 2 months. D: Annually.
* Iranian Diabetes Guidelines



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## Discussion

The 2005/6 Diabetes Iranian Guideline "National Diabetes Prevention and Control programs" (16)is widely disseminated and advocated as a guide to care for people with type 2 diabetes mellitus. The level of care received will always be subject to individual clinician and patient variation. However, on a population basis, it would be expected that the rates at which minimum recommended frequency of care, as defined by such guidelines, is received should be a reasonable indicator of the overall quality of diabetes care provided by the health system. This approach is well established in clinical audit and our approach only varies in that we have used patient reports of frequency of care activities rather than doctor reports or clinical records.

A substantial proportion of the participants reported receiving suboptimal care. From the perspective of people with Type 2 diabetes there is a notable gap between their expectations and what they have actually received in most aspects of provided care.

The key finding of this study was that, based on patient report, adherence to national guideline recommended frequency of care was relatively high (more than 50%) for clinical factors and low(less than 50%) for management and lifestyle factors.

Somewhat, reassuringly our results indicated that almost participants (88.3%) had measured HbA1c at least once annually. Other researchers have reported between 24 and 85% of patients receiving at least one HbA1c test over one year (17-19, 6).

HbA1c is well established as a measure of long-term blood glucose levels and an essential component of adequate management of diabetic patients(18). Levels are closely linked to the risk of complications, in a way that the United Kingdom Prospective Diabetes Study (19) reported that one percentage point reduction in HbA1c level resulted in a decrease of 35% incidence of micro-vascular complications. The evidence suggests that adherence to guidelines and increasing the frequency of HbA1c measures improve disease outcomes (6, 20, 21), although Valk et al (11) cautioned that increasing the number of HbA1c measurements does not automatically result in HbA1c long-term improvement.

It is also reassuring that high levels of adherence were reported for measurement of blood pressure, blood lipids and blood glucose. It is well recognized that the risk of micro-vascular and macro-vascular complications is much higher when these risk factors are present (22). The evidence also suggested that the strict attention to blood pressure and blood lipids can reduce the risk of type 2 diabetes complications (6, 7, 17). Consistent with previous studies (23), almost all participants in our study reported receiving serum lipids and blood pressure measurements at the recommended level. Only 14.4% and 17.2% (respectively) did not receive these services at the recommended frequency compared to, for example, Coon and Bukowski (6) who reported 39% non-recorded lipid profile for their participants and non-adherence for blood lipid testing.

Diabetic patients reported lower rates of regular examination for ophthalmic, foot, kidney problems and teeth. Current study participants reported that eye and foot examinations were not performed for 47.8% and 59.4% of them. This is not dissimilar to American studies reporting that 37% and 45% of participants did not receive an annual eye and foot examination, respectively (19) or 52% adherence for eye examination. This study also found that compared to the clinical factors, less attention appears to be placed on lifestyle and management factors. Lifestyle factors such as obesity, physical activity and poor diet are well known and major modifiable risk factors for



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prevention of Type 2 diabetes complications (2) and good disease management has shown the potential to improve long term outcomes (5). These risk factors alone or altogether are the major concern for diabetic patients. Davidson and colleagues (20)argued that obesity and low physical activity increase the risk of complications in diabetic patients. In this study we found a very low proportion of adherence to lifestyle aspects of diabetes guidelines (less than 50%), which can be supported by the results of the Australian 2000 chronic diseases telephone survey (24) that only 16% of diabetic participants reported acceptable knowledge of their condition and its management. An American study also supports this finding that only 20% of smoking and 10% of alcohol habits were recorded by care providers (6).

In a study in a rural area of the United States, over 95% had no recorded information for diabetes education and referral to a dietitian (6)and in the present study the frequency of nutrition consultation was reported 58.3%. Our questionnaire covered consultation only with a dietitian or a nutritionist and patients may have had nutrition consultation with their doctor or diabetes educator, which was not reported as nutrition consultation. The results of this study might be limited by data collection from the participants' perspective. As in other self-reported studies, in this study the possibility of recall bias still exists and the accuracy of patient reports of the frequency of the medical care practices is, of course likely to be variable. The finding that the respondents who reported receiving recommended care based on diabetes guidelines were also more likely to report better diabetes control provides at least some internal evidence of validity.

## Conclusion

In conclusion, this study found that based on patient reports there were significant opportunities for improved diabetes care compared to a relevant national guideline, particularly for some clinical examinations and self-management. This study suggests in particular that there is a need for systems that will improve the self-management and lifestyle aspects of diabetes care. Potential changes include wider access to effective diabetes education programs, clinicians' and patients' incentives to increase the relevant activities and a patient reminder system .

## Acknowledgements

This study was supported by Student Research Committee of Tabriz University of Medical Science.

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