Quality of Care of Diabetes Mellitus Type II patients in Iran

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Diabetes mellitus type II is the most prevalent metabolic condition worldwide. It causes 9% of the global mortality corresponding to four million deaths per year. It can result in complications such as ischemic heart disease, hypertension, heart failure, retinopathy, nephropathy, and cataract. In 2002, approximately 100,000 deaths occurred as a consequence of diabetes in Iran.1 Diabetes is highly related to obesity, aging, and ethnicity.2 Specific racial and ethnic subgroups, e.g., blacks, are more likely to be affected.3

Type II diabetes is now more likely to be observed earlier in life as obesity is increasing in children and teenagers. A fasting blood glucose of more than 100 mg/dL has been detected in 4.1% of Iranian school-age children and adolescents with the maximum prevalence between ages 10 and 14.4 The prevalence of diabetes in 25 to 64 years old Iranian adults is estimated to be 7.7%, corresponding to about two million adults; only about half of the cases are diagnosed.5 In a study conducted in 2001, the burden of diabetic retinopathy and nephropathy were estimated at 20,532 years and 33,686 years lost, respectively. For diabetic foot, the burden was 5,848 years lost.
and for organ amputation, the burden was 1573 years lost. It is now well-evident that a good clinical care and self-care activities can postpone complications and improve the quality of the patient’s life. On the other hand, improving the quality of care can result in a significant decrease in diabetes complications costs. Therefore, better management and more effective and efficient use of limited health resources to improve the quality of diabetes care is very important. A variety of barriers counters the improvement of quality of care of diabetes. These may be related to: 1) patients, e.g., financial limitations, 2) healthcare providers working for health systems, e.g., lack of enough knowledge on how to manage patients, and 3) health systems, e.g., insufficient access to special care.

This study aimed to describe the quality of diabetes care in Iran using a set of criteria mainly introduced by the National Healthcare Quality Report (NHQR).

**Materials and Methods**

The data we used were collected alongside the first nationwide survey of noncommunicable diseases (NCD) risk factor surveillance conducted in 2005. The methodology of the survey has been already published and here we describe the way our study was attached to the main survey.

In the main survey, data were collected through interview and physical examination at individuals’ houses followed by assessment of blood biochemistry at a referral laboratories. A multistage cluster sampling model was used to select eligible subjects. The national zip code system was used to randomly identify the index household that was our entry point to a cluster; other households of the cluster were addressed through moving clockwise inside the cluster. A representative sample of 15 to 64 years old Iranians participated in the survey. The survey tool was a standard and locally-validated questionnaire developed by the World Health Organization for its stepwise approach to NCD surveillance.

An additional questionnaire based on NHQR measures was completed through an interview for those participants who reported to be known diabetics in the main survey and for their diabetic relatives in the same household, regardless of the age limit of 64 years. As the population of those who were older than 65 years of age were infrequent, we had to continue addressing households of the clusters to find enough samples. Maximum households approached in a single cluster were 40.

**Results**

A total of 2692 respondents who had diabetes type II accepted to enter the second survey. About 25% of the patients reported more than 10 years of suffering from diabetes. Females comprised 61.7% of the patients, and 69.1% were younger than 65 years; 14 participants could not report their exact age. About 9.2% of the patients did not use any treatment to control their disease, 11.1% followed diabetic diet and/or physical activity recommendations, 36.3% used medications, and 43.5% of the respondents used medication in

**Table 1. Process and outcome measures in Iranian diabetic patients.**

<table>
<thead>
<tr>
<th>Measures studied</th>
<th>Definition</th>
<th>n</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HbA1c</td>
<td>Percentage of adult patients with diabetes who had a HbA1c measurement at least once in the past year</td>
<td>169</td>
<td>6.3</td>
</tr>
<tr>
<td>Lipid profile</td>
<td>Percentage of patients with diabetes who had a lipid profile in the past year</td>
<td>663</td>
<td>24.6</td>
</tr>
<tr>
<td>Eye examination</td>
<td>Percentage of adults with diabetes who had a retinal examination in the past year</td>
<td>1049</td>
<td>39.80</td>
</tr>
<tr>
<td>Foot examination</td>
<td>Percentage of adults with diabetes who had a foot examination in the past year</td>
<td>466</td>
<td>17.3</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HbA1c</td>
<td>&lt;7 mg/dL in most recent measurement: optimal control</td>
<td>30</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>7–9 mg/dL: needs improvement</td>
<td>40</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>&gt;9 mg/dL: poor control</td>
<td>2622</td>
<td>97.4</td>
</tr>
<tr>
<td>Low-density lipoprotein (LDL)</td>
<td>&lt;100 mg/dL in most recent measurement: optimal control</td>
<td>149</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>100–130 mg/dL: needs improvement</td>
<td>165</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>&gt;130 mg/dL: poor control</td>
<td>64</td>
<td>2.5</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Most recent blood pressure &lt;140/90 mmHg: optimal control</td>
<td>1751</td>
<td>65</td>
</tr>
</tbody>
</table>

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addition to being on a diet or following physical activity recommendations. Table 1 provides descriptive information on measures calculated for the diabetic participants. The measures are selected among those introduced by NHQR and what is routinely reported by the national diabetes control program.

In 50 cases, there was no history of HbA1c test as a process measure and only 169 patients met the NHQR definition. Those participants who had no laboratory reports of HbA1c test were considered as poorly controlled according to NHQR; that is why our estimation for this category was 97.4%. One hundred and thirteen patients could not provide a clear history of taking lipid tests during the past year. The participants were not questioned about vaccination against influenza because it is not included in the vaccination program or the clinical guidelines for diabetes management of the country.

Discussion

Only 6.4% of patients reported to have taken HbA1c test at least once in the past year. This is too far from the frequency of 72% reported by Diabetes Quality Improvement Project (DQIP) of the United States. Improvement of this measure, as indicated in Healthy People 2010, can result in a better quality of care. This urges the need to improve laboratory facilities and accessibility of services throughout the country.

Blood lipid examination is another measurement which has been done for only 25.7% of the patients compared with 62% reported by DQIP; this is another laboratory measurement that should be improved by the Iranian healthcare system.

Vaccination against influenza is not still included in the Iranian national vaccination program and the vaccine is only prescribed for the elderly and whenever a respiratory tract infection epidemic occurs. Therefore, its positive response was zero in diabetic patients. We recommend that the National Diabetes Committee to revise the guidelines to include influenza vaccination in Iran's national diabetes care practice.

About 20.5% of the patients had received foot examination that was almost half of the rate reported by DQIP. This is a simple intervention which does not require any equipment. It is simply related to the diabetic patient’s level of awareness and shows how physicians follow the standards of clinical guidelines. Promoting diabetes clinics and improving the management of healthcare teams are two strategies included in the National Diabetes Control and Prevention Program which was launched in 2004 and is hoped to improve foot care.

Retinal examination was the best among the evaluated processes with an estimated frequency of 39.8%; this resulted from a good access to ophthalmologic services in all districts of the country and special attention of physicians to visual complications of diabetes.

According to the results of a very recent study, the HbA1c level was desirable only in 1.1% of the patients addressed while most of the patients did not have a recent measurement or even had never measured their HbA1c levels. This urges the need to revise infrastructure and improve training programs for both patients and care providers regarding the quality of diabetes care issues.

Blood pressure is another parameter with a rather better status among other outcome measures; 65% of the patients had a desirable blood pressure, <140/90 mmHg. There are some potential causes that can explain this situation: supportive attitude of both patients and physicians towards the importance of hypertension in the prognosis of diabetes, easy and somehow low-cost access to hypertension management services because of the implementation of a national prevention and control program for hypertension, quality training programs for care providers, and standard clinical guidelines for hypertension management.

Establishment of a monitoring system to assess the quality of care provided for diabetic patients is highly suggested by the authors.

Acknowledgment

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