Diabetes care in Dutch general practice

Differences between Turkish immigrants and Dutch patients

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Aim: To compare the adherence to clinical guidelines by GPs as registered and glycaemic control in Turkish and Dutch type 2 diabetes patients. Design: A retrospective cohort study. Search of general practice medical records for diabetes-related variables of Turkish and Dutch diabetes patients, stratified for age and gender. Setting: Seventeen general practices (37 GPs) in the inner city of Rotterdam. Subjects: 196 type 2 diabetes patients (106 Turkish and 90 Dutch), known with diabetes for at least 18 months, were followed for two years during the 1992–1997 period. Main outcome measures: 1) Level of care as registered in the medical records based on eight quantifiable criteria derived from the national guidelines for GPs; and 2) glycaemic control (fasting and non-fasting blood glucose levels). Results: Turkish patients visited the GP for periodic control more often than Dutch patients. The other seven criteria were followed in an equal number of Turkish and Dutch patients. Turkish patients had a higher mean non-fasting plasma glucose level (12.9 mmol/l) than Dutch patients (10.8) (p=0.001) during the two-year follow-up. Conclusions: Although adherence to clinical guidelines as registered in Turkish and Dutch type 2 diabetes patients is comparable, Turkish patients have higher mean non-fasting plasma glucose level than their Dutch counterparts.

Keywords: diabetes care, GP, guidelines, Turks

METHOD

In nine districts of the inner city of Rotterdam (about 100,000 inhabitants) characterized by a high percentage of Turkish migrants (estimated mean 13%), 46 GPs working in 23 practices were approached. Nine GPs declined participation; four were not interested and five had no Turkish diabetes patients listed in their medical records.

An inventory of all type 2 diabetes patients, treated for their diabetes by the GP exclusively, was made from the computer-based patient records and, if present, diseases register. Patients were identified as type 2 diabetics if they were specifically marked in the patient records as having type 2 diabetics, or using oral anti-diabetic medication or insulin. Patients were considered Turkish by surname as assigned by a Turkish assistant; Dutch patients were identified by surname, by a Dutch research assistant. Dutch patients were selected according to a stratified (for age, gender and practice) sample scheme. Ethnic assignment was checked by the GP, where the patient was listed. Because the elderly population among Turks in the Netherlands is small and diabetes tends to occur in ethnic minorities at a younger age, the mean age of the Turkish type 2 diabetes patients is younger than the mean age of the Dutch diabetes patients. It was therefore decided to stratify the Dutch and Turkish samples on age (within a 5-year range), gender and practice.

From this first selection we included only those patients, known to have had diabetes for at least 1.5 years, and who could be followed for two years during the period January 1992 to December 1997. The period of 1.5 years after diagnosis was chosen, because the guidelines for type 2 diabetes assume that an optimal glycaemic control is possible within this period for newly diagnosed patients. The medical records of these patients were searched manually and all diabetes-related variables were recorded.

GP’s adherence to the 1989 published Dutch national guidelines was assessed by using recommendations that could be assessed quantitatively; i.e. frequency of consultation, frequency of laboratory tests including plasma glucose, total cholesterol, creatinine, frequency of physical examination including weight, blood pressure, foot and eye examination. Over the two-year
period the total number of registered diabetes-related consultations and measurements was counted. Medication treatment aims at achieving normo-glycaemia, but according to national guidelines, fasting blood glucose levels <8.0 mmol/l and non-fasting blood glucose levels <10.0 mmol/l are acceptable. Therefore fasting plasma glucose levels >8.0 mmol/l and non-fasting plasma glucose levels >10.0 mmol/l should be followed by a medication adjustment. Medication adjustments were counted that were performed within three months after a poor glucose level was measured, only if in that period no good or acceptable plasma glucose level was registered. A period of three months was chosen to allow the GP to take measures other than adjusting the medication (e.g. advice on diet or medical compliance). Guideline recommendations are shown in table 2. To measure glycaemic control, we assessed

- the number of patients that reached acceptable blood glucose levels (fasting or non-fasting),
- mean fasting and non-fasting blood glucose level, calculated as the weighted mean (weights are half the interval between former and next plasma glucose measurement), over the two-year follow-up period.

Table 1 Characteristics of the Turkish and Dutch study population at the start of the 2-year follow-up period

<table>
<thead>
<tr>
<th>Item</th>
<th>Turkish patients</th>
<th>Dutch patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>106</td>
<td>90</td>
</tr>
<tr>
<td>Male (%)</td>
<td>43.3</td>
<td>51.1</td>
</tr>
<tr>
<td>Age in years (SD)</td>
<td>50.5 (7.5)</td>
<td>55.3 (8.2)</td>
</tr>
<tr>
<td>Years since diagnosis (SD)</td>
<td>3.5 (3.1)</td>
<td>4.6 (4.8)</td>
</tr>
<tr>
<td>Treatment received</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet alone (%)</td>
<td>32.1</td>
<td>51.1</td>
</tr>
<tr>
<td>Oral medication (%)</td>
<td>65.1</td>
<td>42.2</td>
</tr>
<tr>
<td>Insulin (%)</td>
<td>2.8</td>
<td>6.7</td>
</tr>
<tr>
<td>Macro vascular complications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular disease (%)</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Stroke (%)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Micro vascular complications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retinopathy (%)</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Nephropathy (%)</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 2 Actual delivered care as registered in the general practice medical records during check-up in 106 Turkish and 90 Dutch type 2 diabetes patients compared with the Dutch national guideline recommendations for type 2 diabetes

<table>
<thead>
<tr>
<th>Item</th>
<th>Guideline recommendations</th>
<th>Percentage of patients in which the standard is reached</th>
<th>Turkish patients</th>
<th>Dutch patients</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of control visits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 times a year</td>
<td></td>
<td></td>
<td>No visits 4.7</td>
<td>10</td>
<td>0.024</td>
</tr>
<tr>
<td>1 visit</td>
<td></td>
<td></td>
<td>15.1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2 visits</td>
<td></td>
<td></td>
<td>14.2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>3 visits</td>
<td></td>
<td></td>
<td>15.1</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>≥4 visits</td>
<td></td>
<td></td>
<td>50.9</td>
<td>35.6</td>
<td></td>
</tr>
<tr>
<td>Blood glucose</td>
<td>4 times a year</td>
<td></td>
<td>38.7</td>
<td>31.1</td>
<td>0.296</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>Once a year</td>
<td></td>
<td>7.5</td>
<td>16.7</td>
<td>0.073</td>
</tr>
<tr>
<td>Creatinine</td>
<td>Once a year</td>
<td></td>
<td>14.2</td>
<td>6.7</td>
<td>0.108</td>
</tr>
<tr>
<td>Weight</td>
<td>4 times a year</td>
<td></td>
<td>7.5</td>
<td>6.7</td>
<td>1.000</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Once a year</td>
<td></td>
<td>26.4</td>
<td>24.4</td>
<td>0.870</td>
</tr>
<tr>
<td>Inspection feet</td>
<td>Once a year</td>
<td></td>
<td>20.8</td>
<td>17.8</td>
<td>0.717</td>
</tr>
<tr>
<td>Eye control</td>
<td>Once every two years</td>
<td></td>
<td>19.8</td>
<td>21.1</td>
<td>0.860</td>
</tr>
<tr>
<td>Medication adjustments</td>
<td>a</td>
<td></td>
<td>27.6</td>
<td>28.3</td>
<td>0.998</td>
</tr>
</tbody>
</table>

Differences in GPs’ adherence to clinical guidelines for Turkish type 2 diabetes patients and Dutch patients were assessed by comparing percentages of Turkish and Dutch patients in which the targets according to the recommendations from the Dutch GP guidelines on diabetes care were achieved, using the Chi-square test. Fasting and non-fasting plasma glucose level were compared between Turkish and Dutch patients and statistically tested using the independent samples t-test.

RESULTS
From the inventory of all diabetes patients 219 Turkish and 186 Dutch patients were identified. Of the 219 Turkish patients, 106 patients (48%) met the inclusion criteria of having 3.5 years diabetes (1.5 years after diagnosis and 2 years follow-up), treated exclusively by their GP; 43% male, mean age 50.5 (SD 7.5) years, mean time since diagnosis at start of the follow-up 3.5 (SD 3.1) years. Of the 186 Dutch patients 90 (48%) were included; 51% male, mean age 55.3 (SD 8.2) years, mean time since diagnosis 4.6 (SD 4.8) years. For 16 Turkish patients we were not able to select Dutch patients with corresponding age and gender in the same practice.

Table 1 shows the characteristics of the included Turkish and Dutch patients, who in the period January 1992 to January 1998 were followed for two years. The recommendation of four control visits a year was reached more often in the Turkish (51%) than in the Dutch patients (36%) (p=0.024). Regarding the other quantitatively assessed recommendations, no clear differences were observed between Turkish and Dutch patients.

The outcome of care, as measured by the percentage of patients with a good or acceptable fasting blood glucose level, showed no difference between Turkish and Dutch patients. Less Turkish than Dutch diabetes patients had good or acceptable non-fasting blood glucose levels (table 2). Furthermore, the mean non-fasting blood glucose level was poorer in Turkish patients than in Dutch patients (table 3).

DISCUSSION
In this study it was expected that GPs would have more problems following guideline recommendations with Turkish diabetes patients than with Dutch patients. Results show that GPs performed an equal number of examinations on Turkish and Dutch patients, while Turkish patients had more control visits than Dutch patients. Nevertheless, non-fasting blood glucose levels were significantly poorer in Turkish than in Dutch patients, as indicated by the mean non-fasting blood glucose level. Moreover, the number of patients that met the inclusion criteria of having 3.5 years diabetes was higher in Turkish patients (48%) than in Dutch patients (36%).
levels were poorer in Turkish than in Dutch patients. Since the Turks already had worse blood glucose levels in the period before the follow-up period, this finding seems to be consistent and in line with former reported results of poorer glycaemic control in ethnic minority groups. 3, 4 It supports the experience of GPs that it is more difficult to control diabetes in ethnic minority patients effectively, and that poor adherence to the guidelines is not a valid explanation.

One problem concerns the assessment of GPs’ adherence to the guidelines. Given the retrospective approach of registered data we could only make use of a synopsis of quantifiable data as findings of laboratory results, but we did not gain any insight into other recommendations directed towards patient education, medication compliance and lifestyle advice. These recommendations could be affected by communication problems, which exist in elderly Turkish people, since many of them are poorly educated and, although living in the Netherlands for many years, are still unable to speak or understand the Dutch language. Little is known about their knowledge or beliefs with regard to diabetes. Communication problems and consequently lack of mutual understanding could result in poorer patient compliance, 5 and also less knowledge of diabetes is likely to have consequences on the glycaemic control. 6

Due to low number of Dutch patients in some practices, we were not able to identify an equal number of Turkish and Dutch patients in each category, which resulted in some small differences between Turkish and Dutch patients. Turkish patients were somewhat younger than Dutch patients (50.5 (SD 7.5) versus 55.3 (SD 8.2) years) and the percentage of males in the Turkish group was somewhat lower (43.3% versus 51.1%). However, since the guidelines advises less strict glycaemic control only in patients over 75 years old, when life expectancy becomes significantly lower, 7 we do not expect that the difference in age between Turkish and Dutch patients influenced our results. Also the lower percentage of Turkish males will not have influenced the results, since we did not observe any differences in actual delivered care between the sexes in our study.

Unfortunately, we were not able to use HbA1c as a measure for glycaemic control, since measuring HbA1c was not common among GPs before 1998. However both fasting and non-fasting glucose measurements are good predictors for identifying poor glycaemic control 8 and it is reported that non-fasting blood glucose level is an even better marker of diabetic control 9 and a better predictor of mortality, 10 which means that having a higher non-fasting blood glucose level, diabetic control in Turks is worse and mortality risk is higher than in Dutch patients.

No significant differences were observed in the percentage of Turkish and Dutch patients in which the standard concerning laboratory measurements was reached, although some differences seem to exist in cholesterol (Turkish versus Dutch patients 7.5% versus 16.7%; p=0.07) and creatine (Turkish versus Dutch patients 14.2% versus 6.7%; p=0.11) measurements. However, alongside the opinion that the guidelines should be reached in 100% of the patients, we observe the same trend of poor following of guidelines in both groups.

The guidelines stated that patients should be seen at least once every three months. Although not optimal in this study we compared the mean number of consultations and measurement randomly over a 2-year period as an indicator of regular controls. A problem in using registered data is incompleteness. Not fully recording the results of measurements and performances will give an underestimate of the actual delivered care. 11 However, since we expect that this will equally apply to both Turkish and Dutch patient groups, we assume that these problems did not influence our results.

Providing good structural diabetes care will contribute in achieving good glycaemic control. 12 However, providing comparable diabetes care to Turkish and Dutch diabetes patients by GPs leads to poorer glycaemic control in Turks. Possible reasons for this finding are general practitioner factors (e.g. spending less time in patient education because the GP finds himself less understood, acceptance of higher blood sugar levels in Turkish patients as a kind of self-fulfilling prophecy because the GP thinks it is not possible to reach a good glucose level in Turkish patients), patient factors (non-compliance due to language/cultural problems so that the patient does not fully understand the importance of following the medical advice, or is not able to apply them), or biological explanations (different response to drug therapy). To identify the causative factors for this poorer glycaemic control further studies are needed.

In order to improve the glycaemic control in all diabetes patients, a possibly more tailor-made diabetes care with respect to individual needs is necessary.

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### Table 3

<table>
<thead>
<tr>
<th>Patients with good or acceptable</th>
<th>Turkish n=106</th>
<th>Dutch n=90</th>
<th>Difference T/D (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting blood glucose level (≤8 mmol/l) (%)</td>
<td>26.7</td>
<td>25.7</td>
<td>1.0 (-13.0 to 15.0)</td>
</tr>
<tr>
<td>Non-fasting blood glucose level (≤10 mmol/l) (%)</td>
<td>17.7</td>
<td>33.3</td>
<td>15.6 (-30.0 to -1.2)</td>
</tr>
<tr>
<td>Mean blood glucose level before start follow-up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fasting blood glucose (mmol/l)</td>
<td>10.2 (2.8)</td>
<td>9.0 (2.2)</td>
<td>1.0 (0.18 to 1.77)</td>
</tr>
<tr>
<td>Non-fasting blood glucose (mmol/l)</td>
<td>12.5 (3.1)</td>
<td>10.9 (2.6)</td>
<td>1.6 (0.65 to 2.53)</td>
</tr>
<tr>
<td>Mean blood glucose level during follow-up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fasting blood glucose (mmol/l)</td>
<td>10.4 (3.3)</td>
<td>9.8 (2.6)</td>
<td>0.6 (-0.30 to 1.58)</td>
</tr>
<tr>
<td>Non-fasting blood glucose (mmol/l)</td>
<td>12.9 (3.2)</td>
<td>10.8 (2.8)</td>
<td>2.1 (1.06 to 3.09)</td>
</tr>
</tbody>
</table>

Difference T/D (95% CI) = difference between Turkish and Dutch patients and 95% confidence interval. Missing values Turkish/Dutch patients: "/20;25/" by fasting and non-fasting capillary blood 1 registered in the period before the start of the two year follow-up, and 2) during the two-year follow-up in the study population.


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