Diabetes management by hospital-affiliated diabetes centres in Lazio, Italy

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Background: In Italy, diabetes centres are considered to provide adequate care but little is known about their performance. Methods: Inpatient and outpatient administrative databases were used to select and study a cohort of 2,568 diabetic patients. Adherence to guidelines and effect of patient characteristics and diabetes centre on treatment was assessed. Mortality rate was calculated. Results: Patients averaged 9.3 outpatient visits per year. Each patient received a mean of 21.8 ambulatory services per year but only 2.21 Haemoglobin A1C tests, and only 0.56 procedures suggested by the guidelines. Diabetes management depended mainly on the care centre. A mortality rate of 6.9 per hundred person-years was observed. Conclusions: Hospital-affiliated centres do not ensure adequate diabetes management.

Keywords: diabetes, quality of care, services evaluation

Good quality diabetes care has proved effective in improving outcomes. 1–9 Guidelines for diabetes management, 10 focus on strict glycaemic control, early detection of complications, and a healthy lifestyle. Diabetes centres have been shown to be effective in providing quality diabetes care because of the full range of services they offer. 11,12 In Italy attendance to diabetes centres was associated with a reduced risk of death at a five-year follow-up 13 but no studies have been performed regarding the quality of treatment they provide. Therefore a population of diabetics who attended hospital-affiliated diabetes centres in 1999 was studied, evaluating the features of the care they received, adherence to guidelines, and other possible factors affecting disease management.

METHODS

In Lazio, outpatient services are registered in a computerized information system (Information System on Ambulatory Services, ISAS), which records patient data (personal code, sex, date and place of birth, residence), type of service, and provider code. ISAS 1999 data from ten hospital-affiliated diabetes centres which registered more than 90% of the ambulatory services provided (mean=92.3%) 14 were used. Three centres affiliated with general hospitals (GHA, GHB, GHC), two centres affiliated with university hospitals (UHA and UHB), and five centres affiliated with research hospitals (RHA, RHB, RHC, RHD, RHE) were included. All subjects with at least one Haemoglobin A1C test at any of the centre, according to the ISAS database, were considered. Since diagnosis is not reported by ISAS, ISAS data were linked with hospital discharge data from 1996 to 1999 to reliably identify patients with diabetes. Hospital discharge abstracts include patient data, dates of admission and discharge, procedures performed, DRG, and institution code, and are routinely registered in a computerized information system. Only subjects from the eligible population who met the following criteria were included in the study cohort:

- at least 1 non-pregnancy-related hospital admission with a discharge diagnosis of diabetes in 1996–1999;
- inpatient and outpatient treatment exclusively received at the same hospital or affiliated diabetes centre.

In 1999, 12,995 patients received at least one Haemoglobin A1C test from hospital-affiliated centres, 2,568 satisfied all selection criteria and were selected for the study.

All outpatient services provided to the selected patients were identified and classified into the following groups:

- Haemoglobin A1C tests (HbA1C).
- Services recommended by the guidelines. 10
- Services related to diabetes but not recommended by the guidelines (glicemia, lipid metabolism tests, liver function test and urinanalysis).
- Services unrelated to diabetes.

The dataset used did not include information on investigation results, treatment regulation, general support or kind of dietary advice provided to diabetic patients. However, specialist visits which were specified to type such as neurology, foot care, and dermatology, were considered.

All hospital admissions for the selected patients were identified and classified admissions into the following groups:

- Diabetes-related dayhospital admissions: DRG at discharge 294 or 295.
- Diabetes-related ordinary admissions: DRG at discharge 294 or 295.
- Ordinary admissions for diabetes-related complications, considering as diabetes complications all DRGs indicating infections, renal failure, heart and vascular disease, dermatologic disease, diseases of the eye and all neurological diseases.
- Admissions unrelated to diabetes: all other admissions.

A measure of proper diabetes care (Proper Care Measure: PCM) was obtained for each patient by adding the number of HbA1C – 1 (1st HbA1C was a marker for selection) to the number of guideline recommended services provided. Since no patient in the sample diabetic population received all of the HbA1C and services recommended by the guidelines, and no risk of overtreatment existed, PCM was considered to indicate quality of care.

Deaths from any cause occurring in 1999 among the sample diabetics were ascertained by record linkage with the regional Death Registry which records all deaths. Mortality rate was calculated as number of deaths per hundred person-years. Factors that may possibly influence PCM were investigated through multiple regression analysis, 15 which included the following variables:

- gender and age;
- total number of ambulatory services;
- number of visits, considering as visit any access to ambulatory care;
- ordinary admissions for diabetes-related complications (0=no admissions; 1=at least 1 admission);
There were 1,378 male patients (53.7%), and 2085 (81.2%) were older than 40 years.

Table 1

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>&lt;17 Mean CI</th>
<th>17–40 Mean CI</th>
<th>41–65 Mean CI</th>
<th>&gt;65 Mean CI</th>
<th>All Mean CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin A1C</td>
<td>1.50 1.30–1.70</td>
<td>2.73 2.44–3.01</td>
<td>2.24 2.13–2.35</td>
<td>2.12 1.99–2.24</td>
<td>2.23 2.15–2.31</td>
</tr>
<tr>
<td>Services related to diabetes but non recommended</td>
<td>1.28 0.82–1.34</td>
<td>4.29 3.85–4.73</td>
<td>9.69 9.45–9.94</td>
<td>10.64 10.29–11.00</td>
<td>8.90 8.72–9.08</td>
</tr>
<tr>
<td>Unrelated services</td>
<td>1.71 1.32–2.11</td>
<td>5.02 4.83–5.41</td>
<td>9.64 9.41–9.87</td>
<td>10.77 10.46–11.08</td>
<td>9.05 8.86–9.24</td>
</tr>
<tr>
<td>Proper Care Measure (PCM)</td>
<td>0.55 0.35–0.75</td>
<td>1.91 1.61–2.20</td>
<td>1.80 1.65–1.96</td>
<td>1.92 1.75–2.09</td>
<td>1.80 1.70–1.91</td>
</tr>
</tbody>
</table>
DISCUSSION

The age distribution of the sample diabetics differs from that previously reported in Italy, possibly because one centre was affiliated with a pediatric hospital. Male patients are also overrepresented, possibly because male patients are more prone to complications at earlier ages, and hospital admission was a selection criterion. The number of hospital admissions for complications (1795 admissions in 2568 patients over a four-year period) suggests a population of quite severely ill diabetics. The large number of visits and procedures observed confirms that treatment was satisfactorily documented, as already suggested by the estimate of registration coverage. A large proportion of the services provided were not related to diabetes or were diabetes-related but not recommended by the guidelines, while tests and procedures recommended by the guidelines were infrequently performed.

Patients without diabetes complications did not receive as many guideline recommended services as their sicker counterparts, leading us to suspect that guideline recommended services were not used for the early detection of future complications but for monitoring existing ones. The direct relationship between frequency of visits and quality of care suggests that recommended services were not offered according to a scheduled treatment plan but were performed if patients applied often enough to the diabetes centre. Finally, apart from patient severity and number of visits, the quality of care depended heavily on the providing centre.

Mortality rate in patients older than 40 years was larger than expected, possibly because the selection criteria used have identified sicker patients than those included in other studies. No significant difference in overall mortality was observed in patients older than 40 between centres, however, the observation interval was too short to meaningfully explore mortality trends. In addition no information was available on observation interval was too short to meaningfully explore mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends. In addition no information was available on the duration of exposure to mortality trends.