Screening for deprivation using the EPICES score: A tool for detecting patients at high risk of diabetic complications and poor quality of life

H. Bihan a, M. Ramentol b, M. Fysekidis a, C. Auclair c, L. Gerbaud c,d, F. Desbiez b, F. Peyrol c, P. Thieblot b, R. Cohen a, I. TAUVERON b,e

a Service d’endocrinologie, diabétologie, maladies métaboliques, hôpital Avicenne, AP–HP, Paris XIII University, 125, route de Stalingrad, 93009 Bobigny cedex, France
b Service d’endocrinologie-diabétologie, CHU de Clermont-Ferrand, hôpital Montpied, 58, rue Rataflembert, 63000 Clermont-Ferrand, France
c Santé publique, CHU de Clermont-Ferrand, 63058 Clermont-Ferrand, France
d Faculté de médecine, université d’Auvergne Clermont I, 63001 Clermont-Ferrand, France
e EA 975, UFR médecine, université d’Auvergne, place Henri-Dunant, 63001 Clermont-Ferrand, France

Received 3 October 2011; received in revised form 25 October 2011; accepted 25 October 2011
Available online 14 December 2011

Abstract

Aim. – Deprivation has been linked to more complicated and uncontrolled diabetes. The validated Évaluation de la précarité et des inégalités de santé dans les centres d’examens de santé (EPICES; Evaluation of the Deprivation and Inequalities of Health in Healthcare Centres) score could help to identify such deprived patients. The present study evaluated the relationships between deprivation and prevalence of complications, uncontrolled diabetes and quality of life.

Methods. – This prospective study was conducted in the diabetology department of a tertiary university hospital from November 2006 to July 2007. Patients with diabetes were divided into two groups, according to their deprivation status [non-deprived: EPICES score < 30.17; deprived: EPICES score ≥ 30.17 (56.5%)]. Diabetes control, complications and quality of life [Short Form Health Survey (SF-36)] were compared in the two groups.

Results. – Of a total of 102 patients, 97 completed all of the questionnaires: 18 had type 1 diabetes and 79 had type 2 diabetes, in a geographical area moderately affected by deprivation. No statistical relationship could be demonstrated between deprivation and HbA1c. Deprived patients with diabetes presented with higher levels of fasting blood glucose, lower levels of LDL cholesterol and a significantly higher risk of obesity (P = 0.0020). As for complications, microalbuminuria was linked to deprivation (P = 0.03), but no associations with other complications were found. Quality of life was poorer for all physical, mental and social dimensions in deprived patients.

Conclusion. – In this diabetic population, deprivation and glycaemic control were not associated. However, more deprived subjects with diabetes were at higher risk of renal disease. A deprived state was related to an altered quality of life as assessed by the SF-36 score.

© 2011 Elsevier Masson SAS. All rights reserved.

Keywords: Diabetes; Deprivation; Microalbuminuria; SF-36; EPICES

Résumé

Dépistage de la précarité par le score EPICES : un outil pour détecter des patients à haut risque de complications du diabète et d’une mauvaise qualité de vie.

Objectif. – La précarité est un facteur de risque de complications et de moins bon équilibre du diabète. Le score Évaluation de la précarité et des inégalités de santé dans les centres d’examens de santé (EPICES, outil validé, permet d’identifier les patients les plus démunis. Nous avons évalué les liens entre précarité et prévalence des complications, contrôle du diabète, et qualité de vie.

Méthodes. – Cette étude prospective a été menée de novembre 2006 à juillet 2007 dans le service de diabétologie du CHU de Clermont-Ferrand (zone de précarité modérée). Les patients diabétiques ont été séparés en patients précaires (score EPICES < 30,17) et non précaires (score EPICES ≥ 30,17 (56,5 %)). L’équilibre glycémique, les complications du diabète et la qualité de vie (SF 36) ont été comparés entre les deux groupes.

* Corresponding author. Tel.: +33 1 48 95 51 51; fax: +33 1 48 95 55 60.
E-mail address: helene.bihan@avc.aphp.fr (H. Bihan).
Résultats. — Parmi 102 patients, 97 ont complété tous les questionnaires: 18 avaient un diabète de type 1 et 79 de type 2. Aucune relation statistique n’a pu être démontrée entre la précarité et le taux d’HbA1c. Les patients diabétiques précaires ont une glycémie à jeun plus élevée, un LDLc plus bas et une prévalence de l’obésité significativement plus élevée. La microalbuminurie était associée à la précarité (P = 0,03), ce qui n’est pas démontré pour les autres complications. Pour les patients précaires, la qualité de vie était très inférieure dans toutes les dimensions du score SF36.

Conclusion. — Dans cette population, nous n’avons pas mis en évidence d’association entre la précarité et l’équilibre glyémique. Cependant, les patients diabétiques les plus défavorisés avaient plus souvent une néphropathie incipient et une altération majeure de la qualité de vie évaluée par le score SF36.

Mots clés : Diabète ; Précarité ; Microalbuminurie ; Qualité de vie ; SF 36 ; EPICES

1. Introduction

Some studies have reported a higher prevalence of poor glycaemic control and/or complications in patients with diabetes and low socioeconomic status [1–5]. In these studies, socioeconomic status was measured using several indicators that can represent different dimensions of socioeconomic position [3], such as occupation [3], education [4], income [4] and living in a deprived area [5]. The Évaluation de la précarité et des inégalités de santé dans les centres d’examens de santé (EPICES; Evaluation of the Deprivation and Inequalities of Health in Healthcare Centres) is a validated deprivation score in France [6] that takes into account multiple dimensions of socioeconomic conditions, including psychological aspects. The usefulness of this score was previously shown in a diabetic population living in a geographical area with a high prevalence of deprivation and immigration. Deprived patients were at higher risk of poor glycaemic control, and had higher rates of retinopathy and longer durations of hospitalization [7].

The aim of the present study was to assess the associations between glycaemic control, diabetes complications and deprivation using the EPICES score in the Auvergne region of France (an area of mixed rural and small towns). The study evaluated, for the first time, the effects of deprivation on quality of life, as assessed by the Short Form Health Survey (SF-36) questionnaire in a diabetic population.

2. Patients and methods

In this prospective and blinded study, the investigators were unaware of the EPICES scores during data collection. Patients were recruited from the Endocrinology and Diabetes Unit of a university hospital between November 2006 and July 2007. A total of 102 consecutive patients with diabetes were ultimately recruited. For each patient, a medical report was obtained that included the characteristics of their disease as well as its type, duration and complications.

2.1. Measuring deprivation: the Évaluation de la précarité et des inégalités de santé dans les centres d’examens de santé (EPICES) score

This score is calculated according to an algorithm based on the responses to 11 questions, and varies from 0 (the least deprived) to 100 (the most deprived) [6]. A deprivation state is defined as a score ≥ 30.17, a threshold established in a large cohort study carried out by Centre technique d’appui et de formation des centres d’examens de santé (CETAF; Technical Centre of Support and Training for Health Centres). Although the EPICES score can be considered as a continuous variable, most of the studies of health conditions assessed by this score use this threshold to define deprivation.

2.2. Quality-of-life measurement: the SF-36 questionnaire

The SF-36 questionnaire [8] contains 36 items assigned to eight scales: physical functioning; role-physical; mental health; role-emotional; social functioning; bodily pain; vitality; and general health. For each scale, an algorithm allows scores to be calculated between 0 and 100, with a higher score indicating a better quality of life.

2.3. Biological assessments

HbA1c levels (normal range: 4–5.5%) were measured by microcolumn chromatography (Bio-Rad Laboratories, Hercules, CA, USA). Serum levels of lipids were measured by automated enzymatic methods (Randox Laboratories, Crummlin, Co. Antrim, UK). Microalbuminuria was measured by immunonephelometry (Immage analyzer, Beckman-Coulter, Villepinte, France). Serum creatinine was measured by an automated Jaffe method, and creatinine clearance was calculated by the Cockcroft formula.

2.4. Statistical analyses

The study population was divided in two subgroups: non-deprived patients (scores < 30.17) and deprived patients (scores ≥ 30.17). The baseline characteristics of the two groups were compared by χ² tests for categorical variables, and by Mann-Whitney tests for continuous variables. Logistic regression was used to analyze the link between deprivation and nephropathy or microalbuminuria, with adjustments made for determinant factors. Associations were considered statistically significant at a two-tailed α value of 0.05. As multiple comparison tests were performed to compare baseline characteristics and the dimensions of quality of life, a Bonferroni correction was applied to keep the meaningful threshold at 0.05, resulting in significance thresholds of 0.0027 and 0.0064, respectively.
3. Results

During the 9-month period of recruitment, 97/102 patients completed the questionnaire, with 73.2% recruited while in hospital and 26.8% recruited from diabetic foot clinics or follow-up consultations. Most patients had type 2 diabetes (n = 79). Treatment modalities were lifestyle modification alone for 5.2% of patients, oral antidiabetic drug (OAD) therapy for 24.7%, insulin alone for 40.2% and combined insulin–OADs for 29.9%. The mean EPICES score was 33.2 ± 20.7.

3.1. Comparison between deprived and non-deprived patients

The two groups of patients did not differ in age, gender or HbA1c values, or duration of diabetes or hospitalization at the time of the study. Deprived patients had higher fasting plasma glucose (FPG) levels and lower low-density lipoprotein (LDL) cholesterol, and the differences were statistically significant. Moreover, body mass index (BMI) was significantly different between the two groups, with higher values among the deprived patients (Table 1).

Regarding complications, no statistical relationship was established between deprivation status and hypertension, diabetic foot disease, neuropathy, arteriopathy or retinopathy. More than 50% of patients in each group had nephropathy, but this had no association with the EPICES score. However, microalbuminuria was significantly more present in the deprived patients (43.2% vs 21.7% for non-deprived patients; P = 0.0296) when not taking into account the Bonferroni correction. Nevertheless, the link remained significant (P = 0.0251) after adjusting for gender, age, BMI, duration of diabetes, HbA1c and hypertension.

3.2. Deprivation and quality of life

Deprived patients with diabetes had significantly lower scores for quality of life, as assessed by the SF-36 questionnaire, in most dimensions of physical and mental health. In fact, only general health did not differ significantly between the deprived and non-deprived patients (Table 1).

4. Discussion

The present study demonstrated that the deprivation state assessed by the EPICES score is significantly related, according to the gold-standard questionnaire of quality of life: the SF-36 score. Scores for all dimensions of the SF-36, except general health, were significantly lower in the deprived patients with diabetes. Although this Clermont-Ferrand study had similar goals and design to our previous study in Bobigny [7], the results do differ. Deprivation was associated with higher FPG, but not with HbA1c. The first stage of diabetic nephropathy (microalbuminuria) appeared to be statistically linked to deprivation, and the relationship remained significant after adjusting for HbA1c, but no other complications were found to be associated with deprivation. Another finding is that the burden of a deprivation state in diabetes may be influenced by specific factors that have yet to be determined, such as genetic, environmental and diabetes-history characteristics.

In fact, the populations included in the two regional studies were not similar. In Clermont-Ferrand, the mean deprivation score was lower (33.3 vs 38.9 in Bobigny). In Bobigny, patients had shorter durations of diabetes with lower rates of complications and higher HbA1c values. The prevalence of immigrant patients (with different genetic backgrounds) was higher in Bobigny (19%) compared with 3.3% in Clermont-Ferrand. Nevertheless, an immigrant status was still associated with the lowest socioeconomic status and with deprivation [9].

The association between deprivation and renal complications was consistent with previous data [4,10]. In most studies, patients with diabetes of lower socioeconomic status have more cardiovascular risk factors, such as hypertension, tobacco use [4] and obesity. Indeed, overweight patients (BMI > 30 kg/m²) were more prevalent in our deprived group (62.5% vs 25.5% in non-deprived patients; P = 0.0005). However, there was no

---

Table 1

<table>
<thead>
<tr>
<th>Characteristics of the study participants (n = 97).</th>
<th>Not deprived (n = 52)</th>
<th>Deprived (n = 45)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>58.9 ± 13.4</td>
<td>60.1 ± 12.7</td>
<td>0.64</td>
</tr>
<tr>
<td>Men</td>
<td>37 (71.2%)</td>
<td>26 (57.8%)</td>
<td>0.17</td>
</tr>
<tr>
<td>Diabetes duration (months)</td>
<td>201.8 ± 163.2</td>
<td>187.4 ± 148.1</td>
<td>0.76</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>8.6</td>
<td>8.5</td>
<td>0.51</td>
</tr>
<tr>
<td>HbA1c (mmol/mol)</td>
<td>71 ± 9</td>
<td>69 ± 10.5</td>
<td></td>
</tr>
<tr>
<td>Well-controlled diabetes a</td>
<td>12 (23.1%)</td>
<td>16 (35.6%)</td>
<td>0.18</td>
</tr>
<tr>
<td>Fasting plasma glucose (g/L)</td>
<td>1.1 ± 0.5</td>
<td>1.4 ± 0.6</td>
<td>0.010</td>
</tr>
<tr>
<td>Triglycerides (g/L)</td>
<td>1.4 ± 0.8</td>
<td>1.8 ± 1.4</td>
<td>0.18</td>
</tr>
<tr>
<td>Cholesterol (g/L)</td>
<td>1.7 ± 0.4</td>
<td>1.6 ± 0.6</td>
<td>0.10</td>
</tr>
<tr>
<td>LDL cholesterol (g/L)</td>
<td>0.5 ± 0.2</td>
<td>0.4 ± 0.2</td>
<td>0.08</td>
</tr>
<tr>
<td>HDL cholesterol (g/L)</td>
<td>1.1 ± 0.5</td>
<td>0.9 ± 0.4</td>
<td>0.024</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>27.9 ± 6.8</td>
<td>32.9 ± 7.7</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**Complications**

- Hypertension
  - 34 (73.9%)
  - 27 (69.2%) vs
  - 0.63
- Foot ulcers
  - 20 (38.5%)
  - 17 (37.8%)
  - 0.94
- Neuropathy
  - 29 (59.2%)
  - 34 (77.3%)
  - 0.06
- Arteriopathy
  - 33 (64.7%)
  - 25 (56.8%)
  - 0.43
- Nephropathy
  - 22 (47.8%)
  - 28 (66.7%)
  - 0.07
- Microalbuminuria
  - 10 (21.7%)
  - 19 (43.2%)
  - 0.03
- Retinopathy
  - 27 (51.9%)
  - 27 (62.8%)
  - 0.29

**SF-36 questionnaire**

- Physical functioning
  - 67.7 ± 27
  - 47 ± 30.2
  - 0.0006
- Role-physical
  - 42.3 ± 41.6
  - 17.8 ± 27
  - 0.0008
- Bodily pain
  - 61.4 ± 29.1
  - 42.1 ± 22.5
  - 0.0006
- Mental health
  - 60.5 ± 20.3
  - 45.3 ± 22.3
  - 0.0007
- Role-emotional
  - 57.1 ± 40.9
  - 25.9 ± 35.5
  - 0.0001
- Vitality
  - 50.3 ± 20.7
  - 35.3 ± 23.3
  - 0.0021
- Social functioning
  - 66.6 ± 21.7
  - 53.3 ± 25.1
  - 0.0063
- General health
  - 45.1 ± 19.2
  - 36.1 ± 17.2
  - 0.0193

Quantitative variables are expressed as means ± SD, and categorical variables as n (%).

*HbA1c < 7% if age < 80 years or < 8% if age > 80 years; HDL/LDL: high-/low-density lipoprotein; BMI: body mass index; SF-36: Short Form (36) Health Survey.*
link and no significant interaction between nephropathy and BMI. Dietary factors have been implicated in nephropathy (high levels of protein and fat intakes) [11], and these factors may have had an influence on our deprived subjects. One important factor of interest in the present study was the lower SF-36 scores (therefore, a poorer quality of life) found in the deprived patients. Quality of life appeared to be even worse in patients with diabetes and other co-morbidities, such as hypertension [12]. The associated impact of deprivation on quality of life was in agreement with the current knowledge. If diabetes and depression are related [13], then deprivation could certainly add more difficulties in patients attempting to cope with the changes in everyday life that are imposed when diabetes is diagnosed, including more constraints, polypharmacy, side-effects and financial difficulties as a result of diabetes management (treatment, consultations, examinations, transport). In previous studies, deprivation was clearly associated with poorer quality of life and psychological problems; deprived persons could be described as being “stuck” in the past and unable to project themselves into the future [14,15].

5. Conclusion

Our present study found no differences in HbA1c values between deprived and non-deprived patients, but there was a statistical link with incipient nephropathy. This study also demonstrated, for the first time, that a deprived state is related to an altered quality of life, as assessed by the multipurpose internationally validated SF-36 questionnaire. In this case, the EPICES score can identify deprivation and, given its correlation with quality of life, could also help us to better understand diabetic patients’ physical and psychosocial status.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References