Prevalence of anxiety and depression among diabetic African patients in Guinea: Association with HbA1c levels

A. Camara a,b,∗, N.M. Baldé a, S. Enoru c, J.S. Bangoura a, E. Sobngwi c, F. Bonnet b,d

a Department of Endocrinology, University Hospital, Conakry, Guinea
b Inserm, CIC 0203, University Hospital of Pontchaillou, Rennes, France
c Central Hospital and Faculty of Medicine and Biomedical Sciences University, Yaoundé, Cameroon
d Department of Endocrinology, University Hospital, Rennes, France

Received 24 January 2014; received in revised form 23 April 2014; accepted 25 April 2014
Available online 28 May 2014

Abstract

Aim. – The prevalence and risk factors associated with symptoms of anxiety and depression were determined in African people with diabetes.

Methods. – This cross-sectional study involved 491 outpatients with type 2 diabetes (T2D) recruited from four diabetes clinics (Conakry, Labé, Boké and Kankan) in Guinea. The Hospital Anxiety and Depression Scale (HADS) was used to evaluate symptoms of anxiety and depression. Logistic regression analysis stratified by gender was performed to identify the associated risk factors.

Results. – Anxiety and depression symptoms were present in 58.7% and 34.4%, respectively, of the 491 patients with T2D (62.7% women; mean ± SD age: 57.9 ± 10.2 years). Odds ratios (95% CI) of risk factors independently associated with anxiety were urban residence [2.98 (1.81–4.89)] in women, and low socioeconomic status [0.19 (0.05–0.70)] and HbA1c ≥ 9.0% [2.61 (1.0–6.39)] in men. Factors associated with depression were urban residence [2.13 (1.27–3.58)], older age [1.03 (1.01–1.06)], low socioeconomic status [2.21 (1.34–3.66)] and no previous measurement of HbA1c [12.45 (1.54–100.34)] in women, and insulin therapy [2.28 (1.05–4.92)] and HbA1c ≥ 9.0% [3.85 (1.02–14.48)] in men.

Conclusion. – Anxiety and depression symptoms in people with type 2 diabetes are common in Guinea. Urban residence, low socioeconomic status and high levels of HbA1c were significantly associated with a greater risk of anxiety and depression, highlighting the psychological burden related to diabetes in Africa.

© 2014 Elsevier Masson SAS. All rights reserved.

Keywords: Anxiety; Depression; Type 2 diabetes; Risk factors

1. Introduction

According to the World Health Organization, we are facing an epidemic of diabetes in the developing countries. Currently, over 80% of people with diabetes live in low- and middle-income countries (LMICs) [1]. This clinical situation also refers to Guinea, where the age-standardized prevalence of diabetes according to the Guinean census was 6.5% (95% CI: 5.3–7.7%) [2].

A large body of evidence has highlighted both anxiety and depression as more common in people with diabetes than in the general population [3,4]. Furthermore, it has been consistently shown that depression is associated with an increased risk of morbidity and mortality in people with diabetes [3,4], and that depression may have a deleterious impact on adherence to glucose-lowering treatments [5]. However, recent studies suggest that psychological disorders often remain undiagnosed and are therefore not appropriately treated among people with diabetes [6,7]. This issue is particularly relevant in Africa where healthcare infrastructures have mainly focused on infectious diseases rather than on type 2 diabetes (T2D). Yet, the combination of depression and diabetes among the poorer populations in LMICs could favour the development of diabetic complications and, ultimately, greater morbidity and mortality [8].
Epidemiological data on the characteristics of T2D patients most affected by anxiety/depression in LMICs remain sparse, yet are essential for implementing public-health programmes in these countries [8]. The goal of the present study was to assess the prevalence of both anxiety and depression in people with T2D in Guinea and to identify the factors associated. Furthermore, the study examined whether the association between psychological distress and diabetes is affected by level of glycaemic control in such people from a low-income country with limited access to regular healthcare.

2. Materials and methods

2.1. Study setting and design

This cross-sectional multicentre study was conducted at four health institutions in Guinea: the Endocrinology, Diabetology and Metabolic Disease Unit of the University Teaching Hospital (UTH) of Conakry, and the diabetes units of regional hospitals at Boké, Kankan and Labé.

2.2. Population

Between August 2009 and October 2010, a study to improve glycated haemoglobin (HbA1c) in diabetic patients was carried out in Cameroon and Guinea. The study included patients aged ≥ 16 years with T2D for at least 12 months. They were contacted at the outpatients clinic of the four study sites and invited to participate in the study. Patients who had lost a family member (parent, brother, sister, husband, children) and/or their job in the month preceding the study were excluded from the study. In total, 491 patients with T2D were included in the study.

2.3. Methods

A semi-structured questionnaire and a standardized interview were completed for all participants. Data on socioeconomic status (SES), history of diabetes, and levels of anxiety and depression were collected.

2.3.1. Sociodemographic profiles

The sociodemographic data collected included age, gender, zone of residence (rural or urban), marital status (single or married) and unemployment status (yes or no). Level of education was divided into two classes (< 7 years of school and ≥ 7 years of school). SES was assessed from unemployment status and level of education, and dichotomized into low (lower level of education and unemployment) or high (higher education or/and employment).

2.3.2. History of diabetes and clinical data

Other information collected included type of glucose-lowering treatment, duration of diabetes and previous measurement of HbA1c (yes or no). HbA1c was classified into <7.0%, 7.0–8.9% and ≥ 9.0%.

The clinical data collected included current tobacco smoking (yes or no) and known hypertension (yes or no). Alcohol consumption during the previous month was self-reported. Body mass index (BMI) was calculated.

2.3.3. Level of anxiety and depression

Symptoms of anxiety and depression were evaluated using the Hospital Anxiety and Depression Scale (HADS) [9]. The French version used in our study had previously been validated in both family medicine and hospital settings [10]. The HADS measures levels of symptoms during the past week. There is a medium-to-strong correlation between the HADS score and other instruments used to measure anxiety and depression, including the Beck Depression Inventory, the Spielberger State-Trait Anxiety Inventory, the Symptom Checklist-90 Scale and the Montgomery–Asberg Depression Rating Scale [11]. The main characteristic of HADS is that items that could be attributed to physical illnesses, such as insomnia, fatigue, headaches, dizziness, sleep and appetite disturbance, have been omitted to avoid false-positive cases among individuals with somatic diseases. HADS has 14 questions: seven are related to depression (HADS-D), and seven to anxiety (HADS-A). Each question has four possible responses on a scale of 0 (no symptoms) to 3 (maximum symptoms). Severity of symptoms is determined by the total score obtained for each subscale (HADS-A and HADS-D), and is classified as normal (0–7), mild disorder (8–10) and marked disorder (11–21). HADS-D covers mainly anhedonia and loss of interest, which are core depressive symptoms, while HADS-A covers the core anxiety features of worry and tension.

2.4. Ethical considerations

The ethics committee of the Ministry of Public Health of Guinea approved the study. Only patients who signed the informed consent form were included in the study.

2.5. Statistical analysis

The prevalence of symptoms of anxiety and depression was determined using the HADS and classified as normal, or mild or marked disorder. For the logistic regression analysis, the HADS scores were dichotomized as normal (score 0–7) or the presence of anxiety/depression (score 8–21) to include all possible cases of anxiety and depression, as suggested by Zigmond and Snaith [9]. Univariate logistic regression analyses evaluated the relationships between anxiety and depression and the associated factors, and the results are presented as odd ratios (OR) and 95% confidence intervals (CI). As interactions were tested by gender and revealed a significant interaction for some variables, all results are presented stratified by gender. Variables with P values < 0.20 in the univariate tests were selected as covariates for the multivariable models. A P value < 0.05 was considered statistically significant. All analyses used SAS version 9.3 software (SAS Institute, Cary, NC, USA).
3. Results

3.1. General patients’ description

General characteristics of the 491 patients with T2D included in this study are presented in Table 1. The majority were female (62.7%), married (76.4%), employed (54.2%) and had high levels of education (50.5%). No patient was being treated with antidepresant drugs. Mean age was 57.9 ± 10.2 years, and the men were older (59.8 ± 9.7 years) than the women (56.7 ± 10.3 years). Only 6.7% of patients had a previous measurement of HbA1c. Of all the study patients, 15.7% had good glycaemic control (HbA1c < 7.0%), and 29.1% (n = 143) were being treated with insulin, with the remainder taking oral glucose-lowering drugs.

3.2. Prevalence of anxiety and depression

On the HADS, a mean score of 8.5 ± 3.2 and a median of 8 for anxiety were recorded. For depression, the mean score was 6.3 ± 3.3 with a median of 6. Table 2 presents the prevalence of anxiety and depression as classified by the HADS according to gender. Symptoms of anxiety were present in 58.7% of patients, while 34.4% had symptoms of depression. The prevalence of marked anxiety was 27.5%, and was more common in women (36.1%) than in men (13.1%). Marked depression was present in 11.4% of the population, and again was more common in women (14.0%) than in men (7.1%). Of our 491 diabetic patients, 127 (25.9%) had both anxiety and depression, and neither anxiety nor depression was related to overweight/obese status.

3.3. Factors associated with anxiety

As shown in Table 3, anxiety in men was significantly associated with low SES [odds ratio (OR): 0.19 (95% CI: 0.05–0.70)], HbA1c 7–8.9% [OR: 2.80 (1.13–6.93)] and HbA1c ≥ 9.0% [OR: 2.61 (1.07–6.39)] in the multivariable model. In women, only residence in urban areas [OR: 2.98 (1.81–4.89)] was associated with anxiety in the multivariable model.

3.4. Factors associated with depression

In a multivariate model (Table 4), depression in men was significantly associated with insulin therapy [OR: 2.28 (1.05–4.92)] and HbA1c levels ≥ 9.0% [OR: 3.85 (1.02–14.48)]. In women, age [OR: 1.03 (1.01–1.06)], residence in an urban area [OR: 2.13 (1.27–3.58)], low SES [OR: 2.21 (1.34–3.66)] and no previous measurement of HbA1c [OR: 12.45 (1.54–100.34)] were independently associated with depression.

4. Discussion

The present study has shown that both anxiety and depression are commonplace in patients with T2D attending outpatient clinics in Guinea. Also, the prevalence of depression and anxiety in our sample population was higher than previously observed in Caucasian T2D populations [12,13]. However, a recent large-scale cross-sectional multinational study found no association between diabetes and prevalence of depressive symptoms in Africa, in contrast to other continents [14].

Other studies have reported a higher prevalence of depression with diabetes in developing countries with results similar to ours; for example, in Pakistan, 57.9% had anxiety and 43.5% had depression [15]. In a recent review, the percentage of people with depression among those with diabetes was 45.9% in South Africa, and between 15% and 30% in Nigeria [8]. This high prevalence of anxiety and depression in LMICs such as Guinea could be explained by gender inequality, social insecurity, low educational levels and poverty [16].

In the present study, it was observed that poor glucose control was independently associated with both anxiety and depression in men. Previous reports have shown a positive association...
between HbA1c levels, fasting blood glucose and levels of anxiety [4,6,17]. Depressive mood has been also associated with glucose levels in T2D [18]. In a recent study in The Netherlands, several individual depressive symptoms were related to higher HbA1c levels in outpatients with T2D, and these associations persisted over time [19]. Underlying mechanisms proposed to explain the increase in glycaemia are enhanced inflammation [20], insulin resistance [21], alterations in insulin secretion [22] and activation of the hypothalamic–pituitary–adrenal axis [23]. Furthermore, depression and anxiety are also linked with poorer behavioural management of diabetes and glycaemic control [24].

The use of insulin therapy in our study was independently associated with symptoms of depression. This is in agreement with previous reports [25,26]. Insulin therapy could be associated with negative beliefs about the future and risk of death for the patient. However, the need for insulin therapy often indicates a more severe stage of the disease, which is characterized by age, poorer glycaemic control and a higher rate of complications. Nevertheless, in our study, this association

Table 2
Prevalence by severity of symptoms of anxiety and depression\(^a\) in 491 diabetic Guinean outpatients by gender.

<table>
<thead>
<tr>
<th>HADS score</th>
<th>Anxiety, n (%)</th>
<th>Depression, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td>95% CI</td>
</tr>
<tr>
<td>Normal (0–7)</td>
<td>203 (41.3)</td>
<td>36.9–45.6</td>
</tr>
<tr>
<td>Mild disorder (8–10)</td>
<td>153 (31.2)</td>
<td>27.1–35.3</td>
</tr>
<tr>
<td>Marked disorder (11–21)</td>
<td>135 (27.5)</td>
<td>23.5–31.4</td>
</tr>
</tbody>
</table>

\(^a\) Measured by Hospital Anxiety and Depression Scale (HADS) score.

Table 3
Factors associated with symptoms of anxiety (HADS-A score ≥ 8) in outpatients with type 2 diabetes in Guinea.

<table>
<thead>
<tr>
<th>Anxiety (HADS-A score ≥ 8–21 vs 0–7)</th>
<th>Men (n = 183)</th>
<th>Women (n = 308)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR crude (95% CI)</td>
<td>P value</td>
</tr>
<tr>
<td>Age (years)</td>
<td>0.98 (0.96–1.02)</td>
<td>0.34</td>
</tr>
<tr>
<td>Zone of residence (Urban vs rural)</td>
<td>1.17 (0.64–2.13)</td>
<td>0.61</td>
</tr>
<tr>
<td>Married (Yes vs no)</td>
<td>0.75 (0.18–3.09)</td>
<td>0.69</td>
</tr>
<tr>
<td>Socioeconomic status (Low vs high)</td>
<td>0.22 (0.06–0.77)</td>
<td>0.02</td>
</tr>
<tr>
<td>Insulin therapy use (Yes vs no)</td>
<td>1.06 (0.53–2.10)</td>
<td>0.88</td>
</tr>
<tr>
<td>Duration of diabetes (years)</td>
<td>0.99 (0.94–1.03)</td>
<td>0.57</td>
</tr>
<tr>
<td>Previous measurement of HbA1c (No vs yes)</td>
<td>1.29 (0.45–3.72)</td>
<td>0.63</td>
</tr>
<tr>
<td>HbA1c (yes)</td>
<td>2.55 (1.05–6.23)</td>
<td>0.04</td>
</tr>
<tr>
<td>7.0–8.9%</td>
<td>2.38 (1.00–5.75)</td>
<td>0.04</td>
</tr>
<tr>
<td>≥ 9.0%</td>
<td>0.57 (0.27–1.22)</td>
<td>0.14</td>
</tr>
<tr>
<td>Known hypertension (Yes vs no)</td>
<td>0.97 (0.89–1.05)</td>
<td>0.49</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>1.63 (0.48–5.54)</td>
<td>0.43</td>
</tr>
<tr>
<td>Current smoker (Yes vs no)</td>
<td>1.30 (0.61–2.77)</td>
<td>0.49</td>
</tr>
</tbody>
</table>

HADS-A: Hospital Anxiety and Depression Scale for anxiety.
Factors associated with symptoms of depression (HADS-D score ≥ 8) in outpatients with type 2 diabetes in Guinea.

<table>
<thead>
<tr>
<th></th>
<th>Men (n = 183)</th>
<th>Women (n = 308)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>1.03 (0.99–1.07)</td>
<td>1.04 (1.01–1.06)</td>
</tr>
<tr>
<td>Zone of residence (Urban vs rural)</td>
<td>0.96 (0.49–1.88)</td>
<td>1.69 (1.04–2.75)</td>
</tr>
<tr>
<td>Married (Yes vs no)</td>
<td>0.57 (0.13–2.51)</td>
<td>0.81 (0.50–1.30)</td>
</tr>
<tr>
<td>Socioeconomic status (Low vs high)</td>
<td>1.34 (0.48–3.75)</td>
<td>2.61 (1.63–4.18)</td>
</tr>
<tr>
<td>Insulin therapy use (Yes vs no)</td>
<td>3.03 (1.46–6.27)</td>
<td>1.42 (0.87–2.31)</td>
</tr>
<tr>
<td>Duration of diabetes (years)</td>
<td>1.03 (0.97–1.08)</td>
<td>0.99 (0.95–1.04)</td>
</tr>
<tr>
<td>Previous measurement of HbA1c (No vs yes)</td>
<td>5.87 (0.75–45.73)</td>
<td>11.22 (1.47–85.75)</td>
</tr>
<tr>
<td>HbA1c (≤ 7.0%)</td>
<td>3.51 (0.96–12.88)</td>
<td>1.34 (0.63–2.87)</td>
</tr>
<tr>
<td>≥ 9.0%</td>
<td>5.47 (1.53–19.55)</td>
<td>1.44 (0.71–2.91)</td>
</tr>
<tr>
<td>Known hypertension (Yes vs no)</td>
<td>0.78 (0.34–1.78)</td>
<td>0.64 (0.33–1.26)</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>0.91 (0.83–1.00)</td>
<td>0.94 (0.90–0.99)</td>
</tr>
<tr>
<td>Current smoker (Yes vs no)</td>
<td>0.61 (0.13–2.92)</td>
<td>0.97 (0.92–1.92)</td>
</tr>
<tr>
<td>Alcohol consumption (Yes vs no)</td>
<td>1.07 (0.46–2.49)</td>
<td>0.38 (0.04–3.45)</td>
</tr>
</tbody>
</table>

HADS-D: Hospital Anxiety and Depression Scale for depression.

The lack of previous measurements of HbA1c was independently associated with the presence of depression in women. A number of studies have shown that depression is associated with poor perceived control of diabetes and poor self-care behaviours [27,28]. In addition, it may be speculated that a previous measurement of HbA1c might be an indirect indicator of the patient’s participation in a structured diabetes medical programme, which may have contributed to giving more reassurance to the patient, thereby explaining why these patients were less depressed. The lack of information on glycaemia status might also be potentially worrying to the patient. In addition, depression may prevent efforts dedicated to health, resulting in a lower probability of having an HbA1c measurement. Nevertheless, reverse causality, by which poor glycaemic control may induce greater psychological distress, cannot be excluded.

It was observed that age was independently associated with symptoms of depression, whereas duration of diabetes was not an independent risk factor after accounting for age. Findings for the relationship between age and depression in diabetes have been conflicting, with some studies reporting age as a risk factor for depression [15,29] whereas, in other studies, younger age was related to depressive symptoms [30].

Our study provides new findings concerning the relationship between socioenvironmental factors and the presence of anxiety/depression in people with T2D in a developing African country. Our results for women showed that those of low SES were twice as likely to be depressed compared with those of high SES. This is in agreement with other studies showing that the risk of depression is higher for diabetic patients with lower SES [29,31]. In contrast, however, a higher SES was independently found to be associated with symptoms of anxiety. Unemployment is also a consistent risk factor for psychological disorders, suggesting the importance of taking into consideration the presence of depression among patients with diabetes who are unemployed or who have less education, which is common in Africa [32]. It has been shown that depression is more commonly seen among those with low family income, non-professional/administrative employment, no current employment and so are dependent, and those living alone.
and with less social support [29]. Indeed, it has long been recognized that individuals with lower SES suffer a disproportionate share of the burden and consequences of numerous diseases than those with higher SES [33].

It was also revealed that an urban area of residence was independently associated with symptoms of both anxiety and depression in women, a relationship that remains controversial in the developing countries. A study in Pakistan showed a greater prevalence of mental disorders in urban areas than in rural areas [34]. In contrast, no significant association between depression comorbidity and place of residence was found in a study from Nigeria [35].

Our present study has several intrinsic limitations. First, as symptoms of depression and anxiety were only measured at one time point, this study cannot directly evaluate the long-term impact of diabetes on the incidence of anxiety/depression. Thus, the observational nature of the study allows no conclusions to be drawn on the causality of the link between depression and poor glycaemic control. Second, the study population was not randomly sampled, which limits attempts to generalize the results to all populations with T2D in Guinea. Third, the HADS-D score predominantly reflects melancholic depressive symptoms over the past week. Thus, levels of lifetime depression and the proportion of subjects with atypical depressive symptoms might have been underestimated in our cohort. Also, the study may have slightly underestimated the prevalence of anxiety and depression because patients who had lost a family member and/or their job in the month preceding the study were excluded. Finally, it was not possible to adjust for risk factors such as a previous or family history of depression, childhood experiences, life experiences and sickle cell disease. The prevalence of the latter is high in Guinea, and its presence is known to affect measurements of HbA1c [36].

Our findings show that people with T2D in Sub-Saharan Africa are at risk of anxiety and depression just as reported in high-income countries [37]. The high prevalence of anxiety and depression in Guinea is an important additional public-health burden, as the country faces an alarming increase in the prevalence of T2D in Africa [38].

These findings also suggest that the healthcare infrastructure, which has traditionally focused on infectious diseases in Guinea, needs to evolve to take better account of the psychological burden associated with diabetes, particularly in urban areas. The screening and monitoring of psychological disorders in people with diabetes are still neglected in Africa, and the treatment of diabetes-related depression is rare in these countries, too [39,40]. Medical-economic studies have shown that the coexistence of depression and diabetes is associated with greater use of healthcare services and medical costs [4].

In conclusion, our results show that both anxiety and depression are common in people with T2D living in Guinea, irrespective of overweight/obesity status. Poor control of glycaemia, residence in an urban area, no previous measurements of HbA1c, and use of insulin therapy appear to be risk factors for depression in this population. These findings suggest that depression in T2D patients in Africa needs to be screened for and taken into consideration in their medical care.

Disclosure of interest

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

Acknowledgment

This project is supported by a BRIDGES subsidy of the International Federation of Diabetes. BRIDGES is a project of the international Federation of diabetes, supported by a subsidy for the education of the Company Eli Lilly and Company.

We thank the French Society of Diabetes (SFID) for the award to Dr Alioune Camara in 2009.

We thank warmly the health professionals who contributed to the recruitment and monitoring of patients, and those who participated in the study.

Appendix A. Supplementary data

The French abstract may be found on line at http://dx.doi.org/10.1016/j.diabet.2014.04.007.

References


