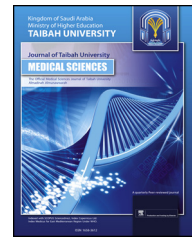




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Original Article

## Distress and psychopathology among Sudanese patients with type 2 diabetes mellitus and its relation to glycaemic control

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### المخلص

**أهداف البحث:** العلاقة بين التحكم بداء السكري والاكتئاب علاقة متناقضة ومتعارضة. الاضطراب العاطفي هو سمة واحدة ومستمرة ذات خاصيتين أساسيتين؛ المحتوى والشدة، وهذا يمكن أن يوفر حلقة وصل بين الاكتئاب الشديد، وضائقة السكري، وأعراض الاكتئاب. في هذه الدراسة، نهدف للبحث في العلاقة بين الاكتئاب وضائقة السكري للسيطرة على نسبة السكر في الدم.

**طرق البحث:** أجريت هذه الدراسة الوصفية المقطعية في مركز السكري في أم درمان، السودان خلال الفترة من يونيو إلى أغسطس ٢٠١٦. تمت مقابلة ٨٩ مريضاً يعانون من داء السكري النوع ٢ و ٢٩ عينة ضابطة للأمراض النفسية باستخدام النسخة الإنجليزية المحتوية على ١٢ بنداً لاستبانة الصحة العامة وضائقة السكري. كما أخذت عينة دم للهيموجلوبين السكري من جميع المشاركين لتقييم السيطرة على نسبة السكر في الدم.

**النتائج:** أجريت هذه الدراسة على ٨٩ مريضاً بالسكري و ٢٩ عينة ضابطة، متطابقة للعمر والجنس. سجل أكثر عدد ممكن ٨٧.٦٪ من مرضى السكري أكثر من ثلاث ضوابط للسكري، كما سُجّلت الأمراض النفسية في ٧٨.٨٪ من مرضى السكري مقارنة ب ٢١.٢٪ في المجموعة الضابطة. كان العبء العاطفي الأعلى بين مكونات ضائقة السكري متبوعاً بالأمور المتعلقة بالطبيب. كما وجدت علاقة بين الهيموجلوبين السكري والعبء العاطفي والأمور المتعلقة بالحمية لضائقة السكري. لم توجد علاقة بين أمور الضيق الأخرى والأمراض النفسية ومدة الإصابة بمرض السكري.

**الاستنتاجات:** تنتشر ضائقة السكري والاكتئاب بين مرضى السكري السودانيين. ويرتبط الهيموجلوبين السكري بالعبء العاطفي من ضائقة السكري والأمور المتعلقة بالحمية وليس الاكتئاب أو مدة الإصابة بداء السكري.

**الكلمات المفتاحية:** ضائقة السكري؛ السكري والاكتئاب؛ الهيموجلوبين السكري؛ الأمراض النفسية؛ العبء العاطفي

### Abstract

**Objectives:** The link between diabetes control and depression is contradictory and inconsistent. Emotional distress is a single and continuous characteristic that has two primary components: content and severity. This finding could provide a link between major depression, diabetes distress, and depression symptoms. In the present study, we aimed to investigate the relationship between depression and diabetes distress and glycaemic control.

**Methods:** This cross-sectional descriptive study was conducted at a diabetes centre in Omdurman, Sudan, from June to August 2016. Eighty-nine patients with type 2 diabetes and 29 control subjects for psychopathology were interviewed using an English version of the structured 12-item diabetes distress general health questionnaire. Glycaemic control was assessed by measuring glycated haemoglobin in a blood sample drawn from each participant.

**Results:** Eighty-nine diabetic patients and 29 age- and sex-matched controls compose the study cohort. As many as 87.6% of diabetic patients scored >3 for diabetes distress, and psychopathology was reported in 78.8% of diabetic patients vs. 21.2% in control subjects. Emotional burden was most correlated among the components of diabetes distress followed by the physician-related domain. HbA1c level was related to the emotional burden and regimen-related domains of diabetes distress (P-value <0.05). No relationship was evident among other distress domains, psychopathology, or the duration of diabetes.

**Conclusion:** Diabetes distress and depression are prevalent among Sudanese diabetic patients. Glycated

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haemoglobin level was related to the emotional burden of diabetes distress and the regimen-related domain but not to depression or diabetes duration.

**Keywords:** Diabetes depression; Diabetes distress; Emotional burden; Glycated haemoglobin; Psychopathology

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## Introduction

Diabetes mellitus is a global health burden; the number of people affected by the disease is expected to rise from the current 285 million to 438 million by the year 2030.<sup>1</sup>

Diabetes mellitus is a lifelong condition that represents a major health problem; it imposes an enormous emotional and financial burden on the patient and the whole community.<sup>2</sup> Due to the adoption of diets with high saturated fat and refined sugar, coupled with a lack of physical activity, diabetes mellitus is emerging as a significant health problem in Sudan. According to the World Health Organization report, half a million people were affected by diabetes in Sudan in the year 2000, and the number is projected to reach one million by the year 2030.<sup>3</sup>

The American Diabetes Association recommendations call for a target for glycated haemoglobin of <7 in both type 1 and type 2 diabetes mellitus to reduce microvascular complications such as retinopathy, nephropathy, and neuropathy.<sup>4</sup>

There is an increasing awareness of the psychological effects of diabetes self-management and diabetes control and the emotional burden of carrying a diagnosis of diabetes mellitus. Being diagnosed with diabetes is a stressful life condition that requires both physical and mental coping strategies. Depression is common among Sudanese patients with diabetes mellitus, and when present together, these conditions exacerbate one another and can lead to deleterious consequences or even fatal complications.<sup>5</sup>

Psychological stressors, by activating the hypothalamic–pituitary–adrenal axis, can stimulate the sympathetic nervous system, release inflammatory markers, and increase platelet aggregation. This leads to insulin resistance, thereby contributing to poor glycaemic control and increasing the risk of vascular complications.<sup>6</sup>

Diabetes distress captures the fear, worries, and concerns among patients suffering from a chronic, progressive and demanding disease such as diabetes mellitus. Major depressive disorder requires the presence of five out of nine well-defined symptoms that lead to significant functional impairment and emotional distress. The symptoms must be present for at least two weeks.<sup>7,8</sup>

Diabetes distress differ from depression in the following: It implies aetiology rather than focussing on the presence or absence of specific symptoms, diabetes distress is content related and distinguishes between different causes so that appropriate intervention can be implemented, and diabetes

distress is not necessarily considered a co-morbid or psychopathology but, rather, is a reaction to a demanding chronic disorder such as diabetes.<sup>7</sup>

Few researchers have studied the relationship between depression, diabetes distress, and glycaemic control in Sudan. Sudan is a vast country with ethnic and cultural diversity, so the effect of diabetes distress and psychopathology on diabetes mellitus observed in Western countries may not apply. Therefore, we conducted this research to assess the effects of depression and diabetes distress on glycaemic control in Sudan.

## Materials and Methods

This is a cross-sectional descriptive study involving 89 patients with a diagnosis of type 2 diabetes mellitus according to the American Diabetes Association guidelines<sup>4</sup> who were seen for routine follow-up and 29 age- and sex-matched control subjects (used as controls for psychopathology). The study was conducted at a diabetes centre in Omdurman, Sudan, during the period of June 2016 to September 2016. The sample size was calculated using the formula  $n = Z^2 P-Q/d^2$  where  $Z = 95\%$  confidence (1.96),  $P =$  Prevalence of diabetes mellitus in Sudan,<sup>9</sup>  $Q = 100\%$  prevalence, and  $d =$  tolerated error. The sample size was calculated to be 76 and increased to 89 to minimize error. The control subjects were randomly chosen from relatives and co-patients to address confounding factors such as socio-economic factors and education level<sup>10</sup>

The participants were asked to sign a written informed consent and were then interviewed in a ratio of 1:2 using a structured questionnaire based on the English versions of the diabetes stress scale and the general health questionnaire-12. The questionnaires were translated into Arabic by experienced translators and the principal researcher. Co-patients explained any difficulties that arose during the interview to ensure that every question was clear to the participants. Patients aged above 35 years with type 2 diabetes were approached in a ratio of 1:1 and those with severe diabetes complications, psychosis, or dementia were excluded. The diabetes distress scale is a well-validated 17-item questionnaire<sup>11</sup> that measures different stressors. Each question has six answer choices: 1 = no problem, 2 = slight problem, 3 = moderate problem, 4 = somewhat serious problem, 5 = a serious problem and 6 = a very serious problem. The questionnaire is further divided into four subscales as follows:

- Questions 1, 3, 8, 11, and 14 (emotional burden)
- Questions 2, 4, 9, and 15 (physician-related)
- Questions 5, 6, 10, 12, and 16 (regimen related)
- And questions 7, 13, and 17 (interpersonal relationship)

The cut-off value for the diagnosis of diabetes distress was a sum of  $\geq$ three on the scale.<sup>12</sup>

The 12-item general health questionnaire was used for the diagnosis of psychopathology. It is well validated<sup>13</sup> for the measurement of depression in diabetic patients and is widely used as a proxy for affective disorders in public health surveys. It also has excellent discriminant validity.<sup>14</sup> The questionnaire asks about being able to concentrate on

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