Prevalence and Pattern of Depression among Individuals with Diabetes Mellitus in Kano, Nigeria

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Abstract

Diabetes mellitus (DM) is a syndrome characterised by chronic hyperglycemia due to deficiency or diminished effectiveness of circulating insulin. Individuals with DM are more likely to experience depression than their apparently healthy counterparts. This cross-sectional survey was undertaken to determine the prevalence and pattern of depression among individuals with DM. A total of 144 persons with DM at the three major health facilities in Kano State, Nigeria were recruited using convenience sampling. The Beck Depression Inventory II was used to assess depression while weight and height were assessed using standard protocols. Descriptive statistics (frequencies and percentages) were used to summarise the data and Spearman rank order correlation was used to test the relationship between depression and socio-demographics (age, gender, marital status, monthly income and level of education) with clinical characteristics (body mass index [BMI]), glycaemic control, co-morbidity and duration of diabetes [DOD]). Depression occurred in 22.3% of the respondents with 25 (17.4%), 4 (2.8%) and 2 (1.4%) of them presenting with mild, moderate and severe depression respectively. There was no significant relationship between depression and each of age, gender, marital status, monthly income, BMI, glycaemic control, co-morbidity and DOD) ($p > 0.05$). Nevertheless, a significant relationship was found between depression and respondents' educational level ($p < 0.05$). It was concluded that the prevalence of depression among individuals with DM attending clinics in Kano was low and seemed to be more related to individuals with lower educational attainment. Giving attention to individuals with lower educational level to prevent and manage depression among individuals with DM might be warranted.

Keywords: *Prevalence; Diabetes mellitus; Depression; Hyperglycaemia*

Introduction

Diabetes mellitus (DM) is an endocrine disorder characterised by chronic hyperglycemia due to deficiency or diminished effectiveness of circulating insulin (American Diabetes Association, 2014). About 422 million people worldwide have diabetes, with the majority of them living in low-and middle-income countries. The prevalence of diabetes has been rising more rapidly in low-and middle-income countries than in high-income countries with 1.6 million deaths directly attributed to the disease each year (World Health Organisation [WHO], 2020). In Africa, there is an

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estimated 19.4 million adults aged 20-79 years living with diabetes and Nigeria accounts for 14% of this number (International Diabetes Federation, [IDF], 2019).

A range of physiological impairment occurs among persons with DM which includes diabetic neuthropathy, nephropathy, retinopathy and peripheral vascular disease (Ahmed & Banji, 2012). Diabetes also results in mental health problems such as depression, in a large number of individuals, which can progress to become clinically significant (Gebre *et al*., 2020).

Depression is a common mental disorder that presents with decreased mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration (National Institute for Health and Clinical Excellence [NICE], 2009; WHO, 2012). It occurs as a result of adverse life events, such as loss of a significant person, object, relationship or health (NICE, 2009). Depression is twice likely to occur in individuals with DM compared with apparently healthy individuals (Ali, Stone, Peters, Davies & Khunti, 2006). The prevalence rates of depression ranged from 11% to 60%, and may vary depending on settings and assessment methods (Ali *et al*., 2006). The presence of depression among individuals with DM is affected by characteristics such as gender, socio-economic class and the presence of co-morbidities (Mier *et al.,* 2008). Depression has a negative influence on the quality of life (QoL), treatment outcome and adherence to medication of individuals with DM (Lustman & Clouse, 2005; Issa, Yussuf, & Baiyewu, 2007). Depression could also adversely impact diabetes patients' adherence to medication, proper nutrition as well as their level of participation in routine exercise and rehabilitation. Studies on the prevalence and pattern of depression among individuals with DM could provide information that policy makers can use to develop strategies or improve on existing ones to enhance mental health in diabetes. Therefore, this study aimed at determining the prevalence and pattern (the frequencies of the levels of severity of depression [mild, moderate and severe]) of depression among individuals with diabetes mellitus in Kano State, Nigeria.

Methods

The research design utilised in this study was a cross sectional survey. Convenience sampling technique was used to recruit individuals diagnosed with DM attending diabetic clinics of Aminu Kano Teaching Hospital (AKTH), Muhammad Abdullahi Wase Teaching Hospital (MAWTH) and Murtala Muhammad Specialist Hospital (MMSH) in Kano State, northern Nigeria.

Ethical approval was sought and obtained from the ethics committees of AKTH and Kano State Ministry of Health for permission to recruit patients from MAWTH and MMSH. Only those that consented and met the inclusion criteria were recruited into the study. The data capture form was used to obtain socio-demographic information (age, gender, marital status, level of education and income). Depression and anthropometric variables were measured (as described in the sections that follow) while information on glycaemic control, co-morbidity and duration of diabetes was obtained from patients' case notes and confirmed from the patients during an interview session.

Assessment of depression

Depression was assessed using the Beck Depression Inventory II (BDI-II). This is a 21-question multiple-choice self-report inventory developed by Beck *et al*. in 1961. It is used to measure the severity of depression in different conditions. The internal consistency of the BDI-II was $\alpha = 0.9$ and the retest reliability ranged from $r = 0.73$ to 0.96 (Wang & Gorenstein, 2013). Each respondent was administered the questionnaire and responses were recorded. The items on the questionnaire are scored on a four-point scale that ranges from 0 to 3 with possible total score ranging from 0 to 63. Scores are considered as normal (1-10), mild mood disturbances (11-16), borderline clinical depression (17-20), moderate depression (21-30), severe depression (31-40) and extreme depression (>40) (Wang & Gorenstein, 2013). The instrument has been translated and used in a Hausa population (Ibrahim *et al*., 2014) and respondents were administered either the English language version or the Hausa-translated version.

Assessment of height and weight

Respondents' height was measured using a stadiometer that has an adjustable head piece component and their body weight was measured on the weighting scale component using the National Health and Nutrition Examination Survey's protocol (NHANES, 2007). The measurements were recorded to the nearest 0.1 cm and kg for height and weight respectively. Body mass index (BMI), in kg/m^2, was computed using the following formula:

$BMI = weight/height^2$

Data analysis

Descriptive statistics of frequencies and percentages were used to summarise the data while inferential statistics of Spearman rank order correlation was used to determine the relationship between depression and socio-demographics (age, gender, marital status, level of education and income) as well as between depression and clinical characteristics (BMI, glycaemic control, co-morbidity and duration of diabetes). All analyses were conducted using the Statistical Package for the Social Sciences (SPSS, version 20) of IBM at a level of probability of $p < 0.05$.

Results

A total of 149 individuals with diabetes mellitus were contacted, but only 144 met the inclusion criteria and completed the study. Majority of the respondents 119 (82.6%) were within the age range of 18-57 with females slightly outnumbering males as shown in Table 1. Furthermore, the BMI of the majority of the respondents 77 (53.5%) was within the health weight range. In addition, the majority of the respondents (136 [94.4%]) had poor glycaemic control (Table 2). The result showed that depression occurred in 32 (22.3%) of the respondents. It was found that among the individuals with depression, 25 (17.4%), 4 (2.8%) and 2 (1.4%) experienced with mild, moderate and severe symptoms respectively. as shown in Table 2. There was no significant relationship between depression and each of age, gender, marital status, monthly income, BMI, glycaemic control, co-morbidity and duration of diabetes ($p > 0.05$). However, there was a significant relationship between depression and respondents' level of educational ($p < 0.05$) as shown in Table 3.

Table 1: *Socio-demographic characteristics of the respondents, N =144*

Variables	n (%)
Age (years)	
18-37	50 (34.7)
38-57	69 (47.9)
58-77	24 (16.7)
78 and above	1 (0.7)
Gender	
Male	66 (45.8)
Female	78 (54.2)
Marital status	
Single	19 (13.2)
Married	121 (84.0)
Divorced	4 (2.8)
Monthly income (₦)	
<18,500	101 (70.1)
18,501-30,000	25 (17.4)
30,001-85,500	18 (12.5)
Highest Educational attainment	
Primary	47 (32.6)
Secondary	52 (36.1)
Tertiary	45 (31.3)

N = size of sample

Table 2: *Clinical characteristics of the respondents*

Variable	n (%)
Body mass index	
Normal	77 (53.5)
Overweight	43 (29.9)
Obesity	24 (16.7)
Duration of diabetes	
1-14 years	136 (94.4)
15-24 years	8 (5.6)
Depression	
Normal	112 (77.8)
Mild mood	25 (17.4)
Border line	1 (0.7)
Moderate	4 (2.8)
Severe	2 (1.4)
Glycaemic control	
Normoglycemia	8 (5.6)
Hyperglycemia	136 (94.4)
Co-morbidity	
None	20 (13.9)
Single	72 (50.0)
Multiple	52 (36.1)

Table 3: *Relationship between depression and socio-demographic with clinical characteristics of the respondents, N = 144*

Variable	ρ	*p*
Age	0.074	0.381
Gender	-0.143	0.088
Marital status	-0.157	0.060
Monthly income	-0.013	0.881
Educational level	-0.184	0.027*
Body mass index	0.099	0.235
Glycaemic control	0.059	0.479
Co-morbidity	0.023	0.786
Duration of diabetes	0.038	0.655

ρ = Spearman rank order correlation, N = size of sample, * = $p < 0.05$

Discussion

This study evaluated the prevalence, pattern of depression and its relationship with socio-demographic and clinical characteristics among individuals with DM in Kano. The study outcome revealed that depression occurs among 22.3% of individuals attending diabetic clinics of three major hospitals in Kano. This implies that less than one-quarter of the individuals attending clinics in question suffered from depression. This is similar to the findings of Darwish *et al.* (2018) which showed that depression occurred in 20% of individuals with DM. The result of the present study also indicates that there was no significant relationship between the age of the respondents and their level of depression which implies that the development of symptoms of depression in persons with DM may not be influenced by different categories of age. This finding is similar to the outcome of a study conducted by James *et al.* (2010) in a Nigerian teaching hospital which reported no significant relationship between age and level of depression among individuals with DM. We also found no significant relationship between gender and depression; this is in contrast to the findings of Demmer *et al.* (2015) which reported significant relationship between gender and depression in persons with DM. Furthermore, Hyassat *et al.* (2017) observed also that depression was more likely to occur in women with diabetes than in their male counterparts.

The negative relationship between depression and level of educational among the respondents in the current study corroborates the study outcome of Mier *et al.* (2008) which reported a significant relationship between depression and level of education among individuals with DM. Our finding was also supported by the study of Ali *et al.,* (2006) which reported a strong relationship between depression and level of education among persons with diabetes. This implies that higher levels of education are associated with lower risk of developing depression. This may be due to high levels of educational conferring a better understanding of the processes of the condition (DM) and the implications of its diagnosis which could lead to better adherence to medication, diet and exercise and overall healthy lifestyle that could lead to minimal diabetes-related complications.

Our finding of no significant relationship between depression and glycaemic control is in line with that of the study of Alonso-Morán *et al.* (2014). This might be related to the respondents coming to terms with the condition and presently living positively with it. The insignificant relationship between depression and co-morbidity in the present study is contrary to the result of Onyike *et al.* (2003) in which a significant relationship between depression and co-morbidity was observed. This may be as a result of the significant number of respondents with single or no co-morbidity. The non significant relationship between depression and BMI we noted was dissimilar to a finding by Cui *et al*. (2018). As it is about the relationship between depression and co-morbidity, we expected that no relationship between depression and BMI would be observed due to the significant number of respondents with BMI within the healthy weight range. Overall, the lack of correlation observed in the present study could be due to the respondents' experience of no or only mild depression. In spite of the high number of respondents with hyperglycaemia, they were generally younger and had shorter duration since diagnosis of the condition. Hence, the lower risk of developing co-morbidities and depression as well.

Conclusion

The prevalence of depression among individuals with DM was low in the selected hospitals in Kano. Depression was more common among the individuals with lower educational level. Healthcare providers should give more attention to individuals with low levels of education for effective prevention and management of depression among individuals with diabetes.

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