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Original Research Article

Depression and its Risk Factors Among Type 2 Diabetics in Enugu, Nigeria

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Abstract: ***Background*:** Most of the emphases on treatment of Diabetes Mellitus (DM) have been on physical symptoms neglecting the psychological problems that also arise while one suffers Diabetes. ***Aim***: To demonstrate the occurrence of depression and the associated risk factors in patients with type 2 diabetes mellitus (T2DM). ***Method*:** It was a cross-sectional study of consecutive DM subjects who came for their routine follow-up visit at the out-patient department of Enugu State University Teaching Hospital (ESUT), Nigeria. They were interviewed with clinical and sociodemographic questionnaire to obtain information about their age, gender and employment status, HbA1c levels, duration of illness (type 2 diabetes), age at diagnosis, comorbidity, complications of diabetes. Patient`s Health Questionnaire-9 (PHQ-9) was used to assess for the presence of depression among the participants. Data collected was analyzed to find the mean, standard deviation and establish associations using Chi-Square test, T-test. ***Result*:** About 16% of the participants were depressed, and majority of them (82%) were females. Most of those with complications (73.5%), and comorbid conditions (59.6%) were not depressed. Association of gender, presence of complications and comorbidities, age of onset of diabetes, time duration of diabetes, HbA1c level and employment status to the manifestation of depression were not statistically significant. ***Conclusion*:** It is likely that the actual risk factors for depression among the diabetics are internal factors like one's genetic constitution and/or personality traits in this environment. Therefore, a more elaborate prospective studies considering the contribution of genetic and personality characteristics to development of depression in diabetics is recommended.

Keywords: Depression, Diabetes Mellitus, Risk factors.

INTRODUCTION

Diabetes mellitus (DM) is a chronic endocrine disorder resulting from either failure of the pancreas to produce enough insulin (type 1) or inability of the body to utilize the produced insulin (type 2) [1, 2]. Diabetes mellitus is now rapidly rising as a worldwide epidemic. It has been projected to be the seventh most important cause of death worldwide by 2030 [3]. The diabetes population has rapidly rose from 108 million in 1980 to 422 million in 2014 globally and the predominance is seen mostly in low and middle-income countries [4].

Depression is defined by the World Health Organization as "a common mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration." [5]. Depression is among the most common mental disorders affecting around 350 million people in the world [5]. In a cross-sectional study of 200 participants, using Schedule for Clinical Assessment in Neuropsychiatry (SCAN) to compare the prevalence of depression among diabetic and non-diabetic patients in a

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Nigerian teaching hospital, 30% of diabetic patients met SCAN diagnosis of clinical depression, while only 9.5% were depressed among the control group [6]. Also in Jos, Nigeria, using Halmiton Depression rating scale to assess 160 diabetic participants, 19.4% of them qualified for DSM-IV diagnosis of Major Depressive disorder [7]. Depression in diabetes is persistent and/or recurrent. In longitudinal and follow-up studies, the rates of persistence of depression or recurrence have been reported to range widely, between 11.6% and 92%, depending on sample sizes, depression diagnosis criteria and depression classification (major depression or elevated depressive symptoms) [8]. Lustman *et al*., followed up 25 patients who participated in a depression treatment clinical trial with Nortriptyline vs Placebo, identified persistence or recurrence of depression among 23 (92%) of them using Diagnostic Interview Schedule. Even after successful treatment, recurrence was also found in 80% of them [9]. A randomized controlled trial (RCT) in 164 diabetic patients assigned to collaborative care intervention against 165 diabetic patients assigned to usual care, Katon *et al*., [10], revealed that depressive symptoms - assessed with Hopkins Symptoms Checklist 90 (SCL-90) - persisted (persistence was defined as p<50% decrease in SCL-90 score) in 59.9% of the intervention group compared to 68.3% of the usual care group at the 12-month follow-up [11].

Recent studies demonstrated there is no common genetic factors linked to the positive association between depression and Type 2 diabetics mellitus (DM2) [12, 13]. However, various environmental factors (epigenetic factors) may activate common pathways which aggravate the occurrence of both depression and diabetes. For example low socioeconomic status, poor sleep, physical inactivity and diet increase the odds for developing Type 2 diabetes mellitus [14], and also common risk factors for depression [15]. In other words, chronic stress leads to disturbance and activation of hypothalamus-pituitary-adrenal axis (HPA axis) resulting in excess cortisol that disrupts neurogenesis in the hippocampus [16], a region involved in depression as well as DM2 [17]. Furthermore, chronic stress induces dysfunction of immune responses with consequent out-pouring of inflammatory cytokines which negatively interact with pancreatic β-cells, increase insulin insensitivity, thereby promoting the appearance of DM2 [18, 19].

As regards causation, the relationship between diabetes mellitus and depression is bidirectional. However, the tendency of depression leading to development of diabetes mellitus appears to be stronger, with relative risk of 1.6 [20], while the direction of diabetes mellitus predisposing to depression has the relative risk of 1.2 [20, 21]. Risk factors associated with the presence of depression in patients with diabetes include female sex, younger age, not having a spouse, poor social support, lower education, low socioeconomic status, poor glycemic control, presence of diabetic complications, presence of medical comorbidity, physical impairment and previous history of depression [22-26]. However, in Jos, Nigeria Agbir *et al*., 2010 [7], reported no association between depression and age, educational attainment, employment status, place of residence and monthly income; but there was an association with sex, marital status and poor relationships with spouse.

This study was aimed at creating awareness about the rate of depression among type 2 diabetes patients and the associated risk factors in ESUTH Enugu.

METHODOLOGY

Procedure

It was a cross-sectional study of consecutive attendees of type 2 diabetes mellitus patients who came for their routine follow-up visit between January and March 2025 at the out-patient department of Enugu State University Teaching Hospital (ESUT), who gave consent to participate in the study. They were interviewed with clinical and sociodemographic questionnaire to obtain information about their age, gender and employment status, HbA1c levels, duration of illness, age at diagnosis, comorbidity, complications of diabetes e.t.c. Patient`s Health Questionnaire-9 (PHQ-9) was used to assess for the presence and severity of depression among the participants.

Data collected was entered into the Statistical Package for Social Science (SPSS) version 20 and subsequently analyzed to find the mean, standard deviation; and establish associations using Chi-Square test, T-test.

PHQ-9 Questionnaire

This is a self administered questionnaire, and a depression module that scores each of the nine Diagnostic and Statistical Manual of Mental Disorders version IV (DSM-IV) criteria ``0`` (not at all) to ``3`` (nearly every day). The total scores of 5, 10, 15 and 20 are cut-off points for mild, moderate, moderately severe and severe depression respectively. Adewuya *et al*., [27], has validated the use of PHQ-9 in Nigeria and found internal consistency of questions within PHQ-9 to be 0.85, concurrent validity with BDI (r= 0.67, P=0.0001). It also had good (r= 0.89, P= 0.001) test-retest reliability.

RESULTS

Table 1: Female participants constituted the majority (69%), and most of them were retired civil servants. Complications from diabetes and participants having comorbid conditions were prevalent. The mean age of the participants was 59.4 years, and the diabetes has lasted an average of 8years among the participants.

Table 2: About 16% of the participants were depressed, and majority of them (82%) were females. Majority of those with complications of diabetes

(73.5%), and 59.6% of participants with comorbid conditions were not found to be depressed. But all the depressed participants had one complication of diabetes or the other. Also majority of early onset diabetes were not depressed. However, these findings were not statistically significant. As regards the duration of illness (diabetes), age at onset of diabetes and their HbA1c status, no statistically significant difference was found between the depressed and non-depressed diabetes.

Table 1: Clinical and sociodemographic variables of the participants

Variables	Frequency (N)	Percentage (%)
Gender: Male	53	31
Female	118	69
Employment: Yes	75	43.9
No	96	56.1
Occupation: Civil servant	30	17.5
Trading	32	18.5
Farming	13	7.6
Artisan	6	3.5
Retired	70	40.9
Others	20	11.7
Complications: Yes	153	89.5
No	18	10.5
Comorbidity: Yes	126	73.7
No	45	26.3
Age (Years): Mean ± SD = 59.4 ± 11.6		
Range (years) = 23 - 82		
Age at diagnosis (Years): Mean ± SD = 51.4 ± 12.3		
Range (Years) = 16 - 79		
Duration of illness (Years): Mean ± SD = 8.0 ± 6.5		
Range (Years) = 0.1 - 37		
HbA1c (%): Mean ± SD = 9.0 ± 2.7		
Range (%) = 4 – 14.1		

Table 2: Association of the variables among depressed and non-depressed participants

Variables	Non-Depressed N (%)	Depressed N (%)	X^2	t	p	Df
Gender						
Male	48 (28.1)	5 (2.9)	2.0	-	0.16	1
Female	95(55.6)	23 (13.5)				
Complications						
Yes	125 (73.5)	28 (16.5)	2.5	-	0.11	1
No	17 (10)	0 (0)				
Comorbidity						
Yes	102 (59.6)	24 (14.0)	2.8	-	0.18	1
No	41 (24.0)	4 (2.3)				
Employment						
Yes	68 (39.8)	7 (4.1)	4.0	-	0.05	1
No	75 (43.9)	21 (12.3)				
Illness (DM) onset						
Early onset	40 (23.4)	10 (5.8)	0.36	-	0.55	1
Usual onset	103 (60.2)	18 (10.5)				
Duration of illness (DM) (Yrs) N(Mean ± SD)	143(7.9±6.5)	28(8.7±6.4)	-	-0.06	0.54	169
HbA1c N(Mean ± SD)	50(9.1±2.8)	11(9.0±2.6)	-	0.09	0.93	59
Age(yrs)N(Mean ± SD)	143(59.7±11.2)	28(57.9±13.7)	-	0.73	0.47	169
Age (yrs) at diagnosis (DM) N(Mean ± SD)	143(51.8±12.1)	28(49.3±13.2)	-	0.99	0.32	169

Early onset = those diagnosed DM < 45 years of age.
Usual onset = those diagnosed DM ≥ 45 years of age.

DISCUSSION

The mean age of the participants and the duration of illness (diabetes mellitus) obtained from this study are quite similar to what has been reported by another Nigerian study [28]. The age at diagnosis of diabetes mellitus obtained from this study also falls within normal age range (45-64 years) of occurrence of diabetes as reported in literature [29]. A plethora of health and lifestyle factors that affect the progression of diabetes has made many people suffer diabetes without knowing it; and has led to a wide range of discrepancy between age of onset of diabetes and the age at diagnosis of diabetes mellitus.

The rate of occurrence of depression among the participants of this study was 16.4%, which is similar to what has been reported in Jos, Nigeria using Halmiton Depression rating Scale [7]. But depending on the sample size, study instrument and the diagnostic criteria used, varied prevalence of depression among type 2 diabetic patients ranging from 11.6% to 92% has been reported [8]. Depression appears to increase the risk of developing diabetic mellitus by 23% in younger adults [30]. A stronger association exists between patients with depression in their forties who are on oral hypoglycaemic agent, compared to same group of patients in their seventies [31]. However, in contrast to this report, we found in this study together with Saydah *et al*., [32], that there is no difference in the incidence of diabetes mellitus among those who have high depressive symptoms compared to persons with no depressive symptoms. In the same vein, even though that it has been reported that the prevalence of depression is higher among females with diabetes, this research did not find any association between development of depression among the participants and gender.

In contrast to the finding of this study, a meta-analysis demonstrated a clinically significant relationship between depression and several diabetic complications like retinopathy, nephropathy, neuropathy, sexual dysfunction and macrovascular complications [33]. By common knowledge, we know that presence of comorbidity and complications of diabetes, the burden of illness increases and would worsen the symptoms of depression. With increased severity of depression, tendency of having more complications of diabetes escalates as the patient would engage unhealthy behaviours such as poor drug compliance, sedentary lifestyle, obesity and drug abuse. However, depression was consistently related to increased severity of diabetic complications with a similar effect seen for both type1 and type 2 diabetic mellitus [33]. Bearing in mind that type 1 and type 2 diabetes mellitus differ in terms of their etiologies and course of disease process, the consistent impact of depression on diabetic symptoms and complications imply a common pathway responsible for the link between depression and diabetes severity. These common pathways may be genetic and personality factors which may explain why in this study, we could not find significant association between diabetes and depression risk factors. Carnethon *et al*., [34], also reported in a population based study of older adults, that the association between depression and diabetes mellitus was not fully explained by existing risk factors. On the other hand, one may also infer that the diabetic risk factors explored in this study were not exhaustive, just as Ezeme *et al.*, [35], found that the presence of somatic symptoms and poor state of health were the most worrying disturbances of diabetes associated with depression which were not included among the risk factors in this study. More so, if the study participants have not been properly educated about the consequences or implications of the occurrence of complications and comorbidities, they may not bother much about them, hence the study demonstrating no statistically significant association between them and manifestation of depression.

So, it can be inferred that the major predisposing factors to depression in diabetics may be due to intrinsic factors like the genetic and personality risk factors. A more elaborate study involving genetic and personality risks factors may be needed.

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