An Assessment Of Depression And Quality Of Life Among Adults With Diabetes Mellitus In The University Of Maiduguri Teaching Hospital

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Citation

A Ibrahim, B Mubi, B Omeiza, M Wakil, I Rabbebe, M Jidda, A Ogunlesi. *An Assessment Of Depression And Quality Of Life Among Adults With Diabetes Mellitus In The University Of Maiduguri Teaching Hospital*. The Internet Journal of Psychiatry. 2013 Volume 2 Number 1.

Abstract

Introduction

Diabetes Mellitus is a common medical condition that has a prevalence of 6.8% in Nigeria in 2000. Based on the WHO projections, the prevalence in sub-Saharan Africa will triple by the year 2030, thus, it constitutes a major public health problem. Meta-analyses have revealed that clinical depression is also twice commoner in individuals with diabetes than the non-diabetic ones and comorbidity between these conditions complicates the therapeutic process and negatively affects the health-related quality of life of the sufferers. This study assessed the occurrence of depression and its effect on the quality of life of patients with diabetes mellitus.

Methods

This study enrolled a representative sample of 350 diabetic individuals from the endocrinology clinic of the University of Maiduguri Teaching Hospital in Northeastern Nigeria. Diagnosis of depression was made based on data generated by the depressive disorder module of the Composite International Diagnostic Interview (CIDI) using ICD – 10 criteria while the health-related quality of life (HRQOL) was assessed with short version of the World Health Organization Quality of Life instrument (WHOQOL-BREF).

Results

The prevalence of clinical depression in the respondents was 8.33% and the significant independent predictor of the condition among the respondents was younger age [Odds Ratio (OR) = 2.41, p = 0.01, 95% C.I. = 1.25 – 4.64]. There were impairment of the HRQOL on all the domains but the findings were only statistically significant on the psychological and social relationships domain with the following outcomes (t = 2.316, p = 0.021, 95% C.I. = 1.46 – 17.99) and (t = 2.811, p = 0.009, 95% C.I. = 2.410 – 16.453) respectively.

Conclusion

Clinical depression is therefore, a relatively common comorbid condition among patients with diabetes mellitus that negatively affects the quality of HRQOL of these individuals. We therefore recommend the screening of vulnerable diabetic patients for this condition in order to optimize care and improve on the general outcome of managing this group of patients.

INTRODUCTION

Diabetes mellitus is a medical condition that is fast attaining a pandemic status mainly because of the global demographic transition. In Nigeria, for instance, the prevalence of diabetes among adults was 1.65% in 1985 but within the span of just a decade and a half, the rate astronomically rose to 6.8% in 2000 and the prevalence as projected for sub-Saharan Africa will triple by the year 2030, thus making it a major public health problem. 1, 2 The diabetes epidemic has its worse impact in countries that are socially and economically disadvantaged as it threatens the achievement of the Millennium Development Goals (MDGs) because of its linkage with infective conditions.3, 4 Moreso, diabetes is accompanied by serious life threatening acute complications

and by disabling multi-systemic long term complications.5

Meta-analyses and systematic literature reviews have revealed that individuals with diabetes mellitus have a two-fold increased risk of developing depression when compared to their non-diabetic counterparts. 6, 7, 8 There is also a bi-directional relationship between depression and diabetes mellitus as confirmed in a recent study by Golden et al that showed that patients treated for diabetes had higher odds of developing depressive disorder among individuals with elevated baseline depressive symptoms during the follow-up period.9, 10 Comorbidity between these two conditions has numerous clinical implications that include; poor glycaemic control due to the direct negative physiologic effects of depression on glucose metabolism, 11, 12 nonadherence to multiple self care regimens such as compliance to antidiabetic medications and other lifestyle modification modalities, 13, 14 and with about 1.5 fold increased risk of mortality. 15

The negative impact of depression on the quality of life of people with diabetes is shown to be high using both generic and disease specific instruments.16, 17 These findings notwithstanding, depression is still largely unrecognized by internists and generalists managing patients with medical conditions in Nigeria.18 The aims of this study were to: (i) determine the prevalence of depression among adult patients with diabetes mellitus (ii) to examine the correlates of depression among the subjects (iii) to assess the effect of depression on the quality of life of the respondents.

METHODS

This was a cross sectional study that enrolled 350 participants conducted at the endocrinology clinic of the University of Maiduguri Teaching Hospital (UMTH) in Northeast Nigeria. The inclusion criteria were: (i) consenting adults aged between 18 and 60 years with enough understanding of English Language (ii) who had been diagnosed with diabetes mellitus according to the World Health Organization (WHO) criteria for at least one year, (iii) without comorbid condition that could impair their capacity to respond. The exclusion criteria include: (i) those who refused to give their informed consent or who do not understand English language (ii) those outside the stipulated age bracket (iii) those with severe comorbid physical illness or cognitive impairment that affect their response.

Ethical Consideration

Ethical clearance was obtained from the ethical review board of the University of Maiduguri Teaching Hospital. Written informed consent was also obtained from the study participants. In order to ensure confidentiality, codes were used for data entry and analysis.

Measurements

The following instruments were used for data collection:

An anonymous socio-demographic questionnaire designed by the author soliciting for the age, sex, occupational status of the respondents using the social class stratification by Borofka and Olatawura was used. This system classified individuals based on their occupations into: social class I, (Highly skilled professionals like Doctors, Lawyers, etc), social class II (Intermediate skilled professionals like, Technicians, nurses, etc), social class III (Low skilled respondents like junior clerks, drivers, junior military, etc), social class IV (Unskilled respondents like petty traders, messengers, etc) and social class V (Unemployed respondents). 19 Other critical information such as marital status, educational status, family history and past history of psychiatric illness were also incorporated. Clinical information such as duration of diabetes mellitus since diagnosis, and the documented index fasting blood glucose (FBG) level were obtained from the respondents' medical records.

The depressive disorder module of the Composite International Diagnostic Interview – World Mental Health Version 3.0 (CIDI – WMH 3.0) was used for collecting data on depression.The ICD-10 diagnostic criteria was used for the diagnosis of depression by matching the symptoms generated by the CIDI with those of the criteria by the authors. The degree of concordance between the depressive module of the CIDI and the clinician's diagnosis of depression using either the ICD-10 or the DSM-IV criteria have consistently shown acceptable degree of concordance with Kappa values (K) above 0.70 in both clinical and non-clinical samples. 20, 21 The world mental health survey conducted in Nigeria in 2004 used this instrument. The Ibadan centre of the African regional office (AFRO) of the World Health Organization (WHO) trained three of the investigators and granted permission for its use.

The World Health Organization Quality of Life BREF (WHOQOL-BREF) Scale was used for data collection on Health-related quality of life (HRQOL). This is a shorter version of the original WHOQOL-100 and consists of 26-items that are scored over 4 major domains, namely: physical, psychological, social relationships and environment. 22 The responses of the WHOQOL-BREF are scored in a Likert scale fashion from 1 to 5, with higher scores denoting higher Quality of Life and vice versa. The WHOQOL-BREF was chosen for this study because it contains domains of life function critical to HRQOL, and as a generic scale, provides information that is comparable across patient groups and populations with different languages and culture. In addition, because of its brevity, it takes a relatively shorter time to administer (about 6 minutes in this study) which makes it appropriate for use in busy clinics as obtained in this setting. However, the disadvantage is that the WHOQOL-BREF may not be suitable for specific patient population (in this case, patients with diabetes mellitus) hence diabetes-specific instrument would have been more appropriate. The generated raw scores were then converted to their actual values using the transformation equations as propounded by the WHOQOL group according to the domains and the summation of the domain scores yielded the global score.

Two of the investigators (with at least 5 years training in psychiatry each), trained in the use and scoring system of the instruments, and were certified proficient administered them to the participants. An estimation of their inter-rater reliability was calculated. In this process, the two investigators administered the CIDI to twenty (20) patients who did not form part of the main study. Their concurrence on the scores of the various items of the instrument was calculated using the Hall's method of 1974 23 and an acceptable value of 92.3% was obtained.

STATISTICAL ANALYSES

The SPSS version 16.0 was used for data analysis. The prevalence of depression was determined using descriptive statistics based on CIDI-generated ICD-10 diagnostic criteria. Bivariate analysis was used for the examination of all sociodemographic and clinical variables in the participants and factors found to be significant were subjected to logistic regression analysis for the determination of independent predictors of depression. The means of the various domain scores were used as their respective cut-off points. Subjects who scored below the respective means were classified as having poor QOL. Independent t-test was used for the comparison of means of the QOL scores across the various domains for the depressed and non-depressed respondents. Significance was computed at $P < 0.05$, two tailed.

RESULTS

The data of 288 respondents were analysed at the end of the study yielding a response rate of 82.29%. Those respondents whose outcomes were not computed consisted of 13 who refused granting consent, 11 due to severe comorbid physical illness (recovering from Cerebrovascular accident, severe hypertension, etc), 21 due to lack of understanding of English language and 17 due to incomplete information as result of missing data.

Prevalence of depression and profiles of the respondents

Of the 288 respondents interviewed, twenty four (8.33%) met the ICD – 10 criteria for the diagnosis of clinical depression according to the CIDI – generated data. One hundred and sixty six (57.6%) were males while 42.4% were females. The age range was 38years (with a minimum of 22years – and maximum of 60 years) and a mean age and standard deviation of 40.32(+9.28) years. About three-fifth (59.4%) of the respondents were in the 22 – 40 years age bracket. About 43% had up to tertiary education with mean years of education of 7.44(+7.07) years. The mean (+SD) of duration of illness since diagnosis was 5.58(+4.63) years with over 60% of them living with the ailment for ≤ 5 years. Over two-third belonged to occupational classes III and IV and overwhelming majority (78.5%) were married. Just about one-third (28.8%) had their index Fasting Blood Glucose (FBG) levels at ≤ 6.0mmol/l. Further analysis revealed that 18(75%) of the depressed respondents had ≤ 12 years of education but this was not statistically significant ($\chi^2 = 3.481$, $p = 0.062$). Also majority of the depressed respondents, 19 (79.2%) had their fasting blood glucose levels above 6.0 mmol/l (which was indicative of poor glycaemic control) but this finding was not statistically significant ($\chi^2 = 0.801$, $p = 0.543$). The only statistically significant predictors of depression after bivariate analysis in this study were age and the occupational classes of the respondents as depicted by the following values, ($\chi^2 = 15.15$, $p = 0.001$) and ($\chi^2 = 9.89$, $p = 0.04$) respectively. These findings are findings are presented in Table I.

The prevalence and predictors of depression

Further logistic regression analysis revealed that only relatively younger age (22 – 59 years) was an independent predictor of depression [Odds Ratio (OR) = 2.41, p = 0.01, 95% C.I. = 1.25 – 4.64]. Though, lower occupational classes (namely: III, IV and IV) had a high odds as a factor predictive of depression, it was not statistically significant [OR = 1.60, p = 0.07, 95% C.I. = 0.97 – 2.65]. The findings are presented in Table II.

Table 1

Profiles of the diabetic respondent

Variable	Non-depressed Freq (%)	Depressed Freq (%)	Total Freq (%)	χ^2	P-value
Age					
22 – 40	161 (60.98)	10 (41.67)	171 (59.30)	15.145	**0.001****
41 – 59	94 (35.61)	9 (37.50)	103 (35.80)		
≥ 60	9 (3.41)	5 (20.83)	14 (4.90)		
Sex					
Male	154 (58.33)	12 (50.00)	166 (57.60)	0.626	0.429
Female	110 (41.67)	12 (50.00)	122 (42.40)		
Years of education					
≤ 12 years	146 (55.30)	18 (75.00)	164 (56.90)	3.481	0.062
> 12 years	118 (44.70)	6 (25.00)	124 (53.10)		
Occupation					
Class I	12 (4.54)	0 (0.00)	12 (4.20)	9.892	**0.042****
Class II	57 (21.59)	1 (4.17)	58 (20.10)		
Class III	61 (23.11)	9 (37.50)	70 (24.30)		
Class IV	118 (44.70)	10 (41.67)	128 (44.40)		
Class V	16 (6.06)	4 (16.66)	20 (6.90)		
Marital status					
Single	32 (12.12)	4 (16.66)	36 (12.50)	5.269	0.153
Married	211 (79.92)	15 (62.51)	226 (78.50)		
Widow	8 (3.03)	2 (8.33)	10 (3.40)		
Divorced	13 (4.93)	3 (12.50)	16 (5.60)		
Duration of Diabetes Mellitus since diagnosis					
≤ 5 years	160 (60.61)	12 (50.00)	172 (59.70)	1.029	0.310
> 5 years	104 (39.39)	12 (50.00)	116 (40.30)		
Index Fasting Blood Glucose (FBG) Levels					
≤ 6mmol/L	78 (29.55)	5 (20.83)	83 (28.82)	0.801	0.543
> 6mmol/L	186 (70.45)	19 (79.17)	205 (71.18)		

** Statistically significant findings

Table 2

Logistic regression analysis outcomes of significant factors associated with depression in the respondents

Variable	β- Coefficients	Standard Error (S.E.)	Wald	df	Odds Ratio	95% C.I.	P- value
Age Group	0.879	0.335	6.895	2	2.409	1.250 – 4.644	**0.009****
Occupation	0.471	0. 256	3.392	4	1.602	0.971 – 2.645	0.065

** Statistically significant finding

Comparison of the HRQOL of the non-depressed and depressed respondents

After controlling for potential confounding variables such as age, sex, occupational class, and duration of illness, patients with comorbid depression had lower mean scores across all the domains and the global scores indicating poorer HRQOL. The F values for the Levene's test for equality of variance were all above 0.1 except on the social relationship domain which was 0.014. The mean differences between the non-depressed and the depressed respondents were 4.59, 9.73, 9.43, 3.71 and 26.18 across the physical, psychological, social relationships, and environmental domains as well as the global scores respectively. Although, the depressed respondents had consistently rated their quality of life poorer than their non-depressed counterparts, the differences were only statistically significant on the psychological and social relationship domains (t = 2.316, p = 0.021, 95% C.I. = 1.46 – 17.99) and (t = 2.811, p = 0.009, 95% C.I. = 2.410 – 16.453) respectively. The findings on the physical and environmental domains as well as the Global outcome were (t = 1.080, p = 0.28, 95% C.I. = 3.766 – 12.958), (t = 1.030, p = 0.304, 95% C.I. = 3.384 – 10.809) and (t = 1.844, p = 0.066, 95% C.I. = 1.768 – 54.132) respectively. These findings are presented in Table III.

Table 3

T-test analysis comparing the mean quality of life scores of the non-depressed and the depressed respondents

	Mean (SD)							
Domain	General	Non-depressed	Depressed	Mean Diff	Levene's F	T	95% C.I	P-value
Physical	55.17 (19.94)	55.55 (19.71)	50.96 (22.39)	4.59	2.52	1.080	3.766 - 12.958	0.280
Psychological	52.46 (19.84)	53.27 (19.61)	43.54 (20.64)	9.73	0.62	2.316	1.460 – 17.990	**0.021****
Soc Relations	50.35 (16.91)	51.14 (16.83)	41.71 (15.64)	9.43	0.041	2.811	2.410 – 16.453	**0.009****
Environmental	46.03 (16.91)	46.34 (16.41)	42.62 (21.80)	3.71	7.42	1.030	3.384 – 10.809	0.304
Global	203.62 (66.88)	205.81 (66.03)	179.62 (72.85)	26.18	1.04	0.066	1.768 – 54.132	0.066

** Statistically significant findings

DISCUSSION

The point prevalence of depression among the diabetic respondents in this study was 8.33% which translates to every one out of 12 subjects included in the study had clinical depression. This rate is relatively close to the value of 9.3% reported by Moussavi et al among diabetics in a worldwide survey that evaluated the effect of depression either alone or comorbid with other chronic conditions on the general wellbeing of the subjects. 24 This is close to the range of 8.5% - 27.3% reported by Gavard et al in a systematic review of 20 studies that evaluated the prevalence of depression among diabetics. 25 It is, however, significantly higher than both the life-time and 12-months estimates for major depression of 3.1% and 1.1% respectively found among adult Nigerians based on the results of the Nigerian survey of mental health and wellbeing conducted by Gureje et al. 26 This is inconsonance with the outcome of meta-analyses conducted that have consistently

shown that depression is about twice or more commoner in diabetics than in the general population. Some of the reasons that could be adduced for the apparent higher rate of depression among diabetics than the general adult population include: (i) the psychological stress associated with living with a chronic condition that entails lifestyle modifications and probable lifelong adherence to medications and (ii) the occurrence of complications which could act as additional psychostressors.

It is on the other hand; lower than the rates of 30% and 19.4% reported among diabetics by James et al and Agbir et al in other parts of the Nigeria. 27, 28 This discrepancy could be due to the differences in the selection of subjects between this study that excluded patients with comorbid medical conditions that could independently predispose to depression while the ones cited earlier included such categories of patients. The other possible reasons might be the smaller sample sizes (≤ 200 subjects) used in the other studies as well as the different diagnostic tools used and different cut-off thresholds for the diagnosis of depression. This finding is also worth comparing with studies with lower rates of 6.1% and 3.8% reported by Eaton et al and Zhang et al respectively among diabetics in Europe and North America. 29, 30 However, differences in disease perception and economic factors such as the affordability of antidiabetic medications and other lifestyle modification modalities between the subjects in Nigeria and those in the other study settings could account for the variations.

Of all the variables studied for possible association with the diagnosis of depression in the diabetic respondents, only relatively younger age (22 – 59years) was found to be an independent predictor of depression. The relatively younger diabetic respondents have over 2.4 greater odds of developing clinical depression than the older patients. This finding contrasts that of studies conducted in the same environment by James et al and Agbir et al which did not find any significant correlation between age and the diagnosis of depression in diabetics. 27, 28 It is however, in tandem with the finding by Gregory et al that reported a significant relationship between depression and young age. 31 Plausible explanations that could be advanced for this association may be that young diabetics are likely to be caught in their prime by the burden of restrictions imposed on them by the various therapeutic techniques and possibly by the effect of impairments resulting from longstanding complications of diabetes mellitus (e.g. sexual dysfunction) in a sexually active population (the mean age of the respondents was 40.32 years), which could be psychologically distressing.

In addition to the age group of the respondents, lower occupational class would also have been a contributory factor as four-fifth of the depressed respondents belonged to classes III, IV, and V and the occupational class had an odd ratio of 1.5 on logistic regression. The linkage, though not statistically significant, between lower occupational classes and the diagnosis of depression in the respondents could be attributed to socioeconomic reasons, as there is a linear correlation between the occupational classes of individuals and their economic powers. Since in Nigeria, majority of the patients directly bear the costs of health care, it is possible that those in the lower occupational ranks may experience more financial burden which could add to their adversities. Similar outcome was documented by James et al in Southern Nigeria among diabetics where they reported a negative correlation between income and the diagnosis of depression. A related finding, though not statistically significant, was the fact that about three-fourth of the depressed respondents had less than 12 years of education and since years of education has a direct relationship with an individual's occupational placement, that finding is expected.

In this study, there was no statistically significant relationship between depression and sex, duration of diabetes mellitus and the index fasting blood glucose levels as opposed to what obtained in studies by Palinkas et al and Lustman et al. 32, 12 The sample size effect could probably be adduced as the reason for these findings as: (i) there were more males than females (58% and 42%), (ii) about 60% of the respondents had the ailment for less than 5 years which would dilute the effect of the findings from those with greater than 5 years duration, and (iii) though 80% of the depressed respondents had their FBG 6.0mmol/L, this category constituted more than 70% of the total sample population and it may therefore be due to over representation of this group of patients rather than a real finding. Kruse et al did not also find a significant relationship between depression and FBG levels among diabetics in a community survey in Germany. 33

In terms of the quality of life outcomes of the respondents on all the domains and the global score, a comparative analysis of the mean scores revealed that the depressed respondents scored lower than their non-depressed counterparts which were indicative of poorer quality of life. The outcomes here

were consistent with those of previous studies conducted by Schram et al and Issa et al. 15, 16 The results, however, were only statistically significant on the psychological and social relationships domains as indicated in Table III.

The psychological domain rates cognitive areas such as enjoying life, feelings of life to be meaningful, ability to concentrate, satisfaction with self, and negative feelings such as blue mood, despair, etc. Here, the depressed respondents rated their quality of life worse than the non-depressed ones as evidenced by their lower mean QOL score and there was a statistically significant difference. The reason adducible for this, is because depression as a clinical entity, is usually associated with negative cognition and negative self-perception that were all assessed in this domain, hence, the depressed diabetics fared poorer than the non-depressed ones did.

The social relationships domain, on the other hand, assesses important areas of functioning such as interpersonal relationships, sex life and support from friends. Here, the depressed respondents also fared poorer than the non-depressed ones and there was a statistically significant difference in their mean QOL scores. This could be due to the fact that interpersonal relationships, for instance, is impaired in depressed individuals because of the negative cognitions and sexual dysfunction, particularly in males, could be a complication of diabetes or could be part of the psychopathology associated with depression. Hence, the finding could be logical.

Some of the limitations of this study are; (i) contributions of complications of diabetes and other life events were not assessed independently with respect to the development of depression and their impact on the HRQOL of the respondents, and (ii) because of the cross-sectional nature of the study, causal relationships could not be established between some of the identified variables and the diagnosis of depression.

CONCLUSION

Because of the relatively high prevalence of depression among patients with diabetes and its negative impact on their HRQOL, the authors, hereby recommend the routine screening of patients, particularly those with recognized vulnerability factors (such as younger ones and of lower occupational classes) for depressive disorders. We also recommend the strengthening of consultation-liaison psychiatric services between the internists and the psychiatrists in order to optimize patient care.

ACKNOWLEDGEMENTS

The authors express their profound gratitude to Prof Oye Gureje, who is the Coordinator of the African Regional Office (AFRO) in Ibadan-Nigeria of the World survey of mental health and wellbeing initiative of the WHO, for teaching us how to use the CIDI and granting the permission to use the instrument. We also acknowledge Ms Dolores Campanario of the department of knowledge management and sharing and the entire HSI team of the WHO for granting us the copyright permission to translate and use the WHOQOL-BREF. The entire staff members of the Endocrinology clinic of the University of Maiduguri Teaching Hospital are also deeply appreciated for their kind support. Finally, we remain eternally grateful to the study participants.

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