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Sexual Dysfunction among Women Living with Type 2 Diabetes Mellitus in a Nigerian Tertiary Hospital

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ABSTRACT: Diabetes mellitus is known to have multisystemic affectation including sexual dysfunction. The effect of diabetes on female sexual function is well documented globally but underreported in our study environment. Hence, this study attempted to fill this gap in knowledge by evaluating the sexual function of women living with diabetes in Uyo, Southern Nigeria. Methods: This was a crossectional descriptive study conducted in the Endocrinology Clinic of the University of Uyo Teaching Hospital. A total of 150 participants consisting of 100 diabetes patients and 50 controls were interviewed using the female sexual function Index questionnaire. They were physically examined and blood samples taken for laboratory investigations. Data obtained was analysed using descriptive/comparative statistics. Results: Among the diabetics, 62% had sexual dysfunction compared to 8% of the controls($p<0.001$).The diabetics had a median total sexual function score of 9.25(2.15-26.6), compared to 28.15(27.1-29) for the controls ($p < 0.001$). The diabetics with normal sexual function had a mean HBA1c of 7.08+/-0.27 compared to 8.37+/-0.73 for diabetics with abnormal sexual function($t=9.65, def=98, p<0.001$). The total sexual function score of diabetics was negatively related to glycated haemoglobin ($rho=-0.88, p<0.001$).). Diabetics with DM duration of 10 years and more were 2.87 times significantly more likely to have poor sexual function($p=0.02$; 95%CI 1.20-6.83). Glycated haemoglobin was shown to be a strong predictor of female sexual function(OR= 228.15, $p<0.001$). Conclusion:There is a high prevalence of female sexual dysfunction among diabetics. Prolonged duration of diabetes and poor glycaemic control are the most likely reasons for this finding.

KEYWORDS: Sexual dysfunction, Type 2 Diabetes Mellitus, Uyo, Women.

1. INTRODUCTION

Diabetes mellitus(DM) is a metabolic disorder characterized by chronic hyperglycaemia resulting from defects in insulin secretion, insulin action or both [1]. The metabolic derangements associated with diabetes mellitus involve abnormalities in the metabolism of carbohydrates, fats and proteins [1]. This chronic hyperglycaemia from diabetes if left uncontrolled will invariably lead to long term organ dysfunction and end organ failure involving the eyes, kidneys, heart, blood vessels and reproductive organs with resultant sexual dysfunction [2] .

The global diabetes mellitus prevalence in adults aged between 20-79 years in 2021 was estimated to be 10.5% (536.6 million) and is estimated to rise to 12.2%(783.2 million) by 2045[3]. Diabetes prevalence is similar in both sexes but however higher in persons between 75-99 years and those living in urban areas[3]. In Nigeria the current prevalence of diabetes mellitus among adults aged 20-69 years is about 5.77% [4]. The last time a nationwide population estimate of diabetes was conducted in Nigeria was in 1992.The reported prevalence then was 2.2%[5]. This statistics is of grave concern as diabetes is known to be a major cause of morbidity and mortality globally.

Sexual dysfunction is an important complication of diabetes mellitus and can be an early sign of the disease[6]. In women, the cause of sexual dysfunction in terms of aetiology can either be psychological or organic[7]. The organic causes can be either gynaecological or non gynaecological. Hormonal abnormality and autonomic neuropathies, often seen in diabetes mellitus, are common non gynaecological causes of sexual dysfunction [7]. Compared to the extensive studies on sexual dysfunction among men living with diabetes, substantially less is known regarding diabetic women [8,9]. However, recent studies have shown that

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diabetic women experience increased incidence of sexual dysfunction including reduced sex drive and arousal, vaginal dryness, difficulty in achieving orgasm and overall diminished sexual satisfaction [10].

Sexual dysfunction assessment by clinicians is usually by direct questioning hence requires standardized validated skill for the assessment of multiple domain of female sexual function to accurately achieve this [11]. The use of standardized validated skill is particularly necessary as only few women with sexual dysfunction seek help and clinicians are sometimes shy to openly ask women questions relating to optimal sexual function [11]. In the year 2000, Rosen et al developed the female sexual function index (FSFI) scale. This scale consists of 19 items in sex domains, and have been of immense use in initiating and promoting research in the field of female sexuality [12]. The FSFI has been shown to have good psychometric properties and has been used in the assessment of sexual function in women with diabetes, cancer, pelvic prolapse and other chronic illness [13,14].

Studies in Nigeria have revealed a high prevalence of sexual dysfunction among female diabetics. A prevalence as high as 77.57% was reported in Lafia, North Central Nigeria among female diabetics attending the outpatient clinic [15]. Another study done at the Lagos University Teaching Hospital in South Western Nigeria, also showed that the prevalence of sexual dysfunction was as high as 88% among female diabetics [16]. In Enugu, South-East Nigeria, a prevalence of female sexual dysfunction of 53.3% was reported among diabetes patients [17].

There is paucity of data on the prevalence of sexual dysfunction among female diabetics in Uyo, South-South, Nigeria. This study therefore seek to fill the knowledge gap in our study environment.

2. METHODOLOGY

This was a crossectional descriptive study conducted in the Endocrinology, Diabetes and Metabolism Clinic of the University of Uyo Teaching Hospital (UUTH). The University of Uyo teaching hospital is located in Akwa-Ibom state, Southern Nigeria. It basically offers specialist care to inhabitants of Uyo, an urban settlement and capital of Akwa-Ibom state. It also receives referrals from surrounding cities, states in Nigeria and neighboring countries. The Endocrine clinic of UUTH is run twice weekly by a team of Consultants and a number of Specialist Senior registrars and Junior registrars. The first clinic is a specialist clinic that caters for persons living with diabetes mellitus while the other clinic focuses on other endocrine cases as well as general medical cases. An average of seventy patients are seen weekly in the diabetes clinic of UUTH. Patients from virtually all tribes in Nigeria are seen in UUTH. The study was conducted over a six months period, starting from June and terminating in November of 2019. A total of one hundred and fifty participants were recruited for the study after satisfying the inclusion criteria. One hundred of the participants were persons living with diabetes mellitus while the remaining fifty were recruited as controls for the study. Recruitment of diabetes patients was done consecutively on every clinic day. The first thirty patients in the clinic register were contacted and those who consented were enrolled for the study. These persons were given appointment to visit the diabetes clinic for the study proper. On the day of the study, while in the diabetes clinic, the patients biodata were recorded. The Female Sexual Function Index Questionaire was carefully administered and the findings duly recorded. The female sexual index is a known instrument assessing sexual function in women using 6 domains and 19 items. Individual items were assigned to six domains of female sexual functions namely desires, arousal, lubrication, orgasm, satisfaction and pain during sexual intercourse. Scores of the six domains were added to obtain the total scale scores. The maximum score obtainable is 36. Scores below 26 has been validated as cut-off for diagnosing female sexual dysfunction hence was adopted in this study. The Participants were examined and blood samples taken for fasting plasma glucose and glycated haemoglobin(HBA1c) after taking the necessary precautions. The recruitment of the diabetes patients was completed after the first three months. The controls were recruited from the members of staff of the hospital who were non-diabetic, over the last three months of the study, after giving their consent. They were assessed in the diabetes clinic like their diabetes counterparts. The findings were carefully entered into Excel spreadsheet. Data obtained was arranged into tables and charts and analyzed using the statistical package for the social sciences, version 20 (SPSS version 20). Data distribution for normality was done using the Pearson's test. Summary description of data was listed as mean, median, standard deviations, confidence intervals, proportions and tables. The comparison of categorical variables was determined using Chi square with the level of significance set at p values <0.05.

3. RESULTS

A: SOCIO-DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF PARTICIPANTS

Diabetics were significantly older than controls (52.57 versus 45.74; p<0.001) as shown in table 1. The median total sexual function score was significantly lower for diabetics than controls (9.25 versus 28.15; p<0.001). The mean HBA1c was significantly higher

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for diabetics than controls (7.96 versus 4.90; p<0.001). The median duration of diabetes mellitus was 9 years (interquartile range of 5-13 years).

Table 1: Socio-demographic and Clinical Characteristics of Respondents

Variables	Study Groups		Total n (%)	Statistical tests and P Values
	Diabetics (n =100)	Controls (n=50)		
Age (in years)	52.57+/-12.02	45.74+/-3.95	50.29+/-10.56	t=3.91,def=148,p=0.0001*
Total sexual function score (median(IQR)	9.25(2.15-26.6)	28.15(27.1-29)	25.9 (5-28.5)	P<0.001*+
HbA1c(Mean+/-SD)	7.96+/-0.86	4.90+/-0.37	6.94+/-1.62	t=23.91,df=148,P<0.001*
Duration of DM (median(IQR)	9 (5-13)			

*=statistically significant IQR=Interquartile range, SD= standard deviation, +=Wilcoxon rank-sum test

B. PREVALENCE OF SEXUAL DYSFUNCTION AMONG DIABETICS

Using the Female sexual Function Index questionnaire, the diabetes patients were evaluated to determine their sexual function. Out of the 100 patients assessed, 68(68%) had abnormal sexual function while 32(32%) had normal sexual function. This is summarized in figure 1.

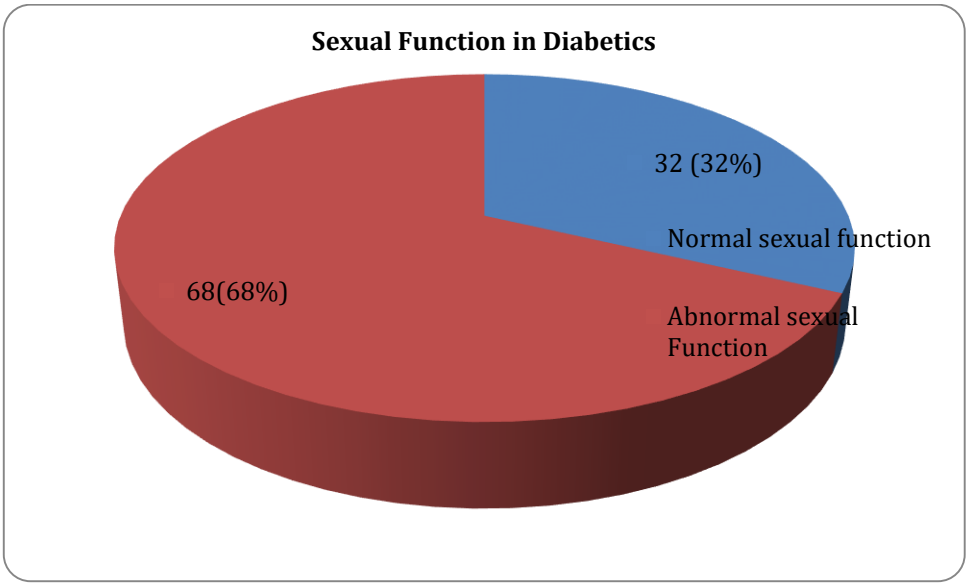

Fig.1

C. ASSOCIATION BETWEEN GLYCAEMIC CONTROL AND SEXUAL FUNCTION OF DIABETICS

The relationship between glycaemic control (HBA1c) and the sexual function of diabetics is shown in table 2. The mean HBA1c of the diabetes Patients with normal sexual function was significantly lower than the mean HBA1c of diabetics with abnormal sexual function (7.08 versus 7.95, p<0.001).

Table 2: Association between HBA1c and sexual function of diabetics

Variables	Sexual Function in diabetics		Total n (%)	Statistical tests and P Values
	Normal (n=32)	Abnormal (n=68)		
HBA1c (mean+/-SD)	7.08+/-0.27	8.37+/-0.73	7.95+/-0.86	t=9.65,def=98,p<0.001

def=degree of freedom.

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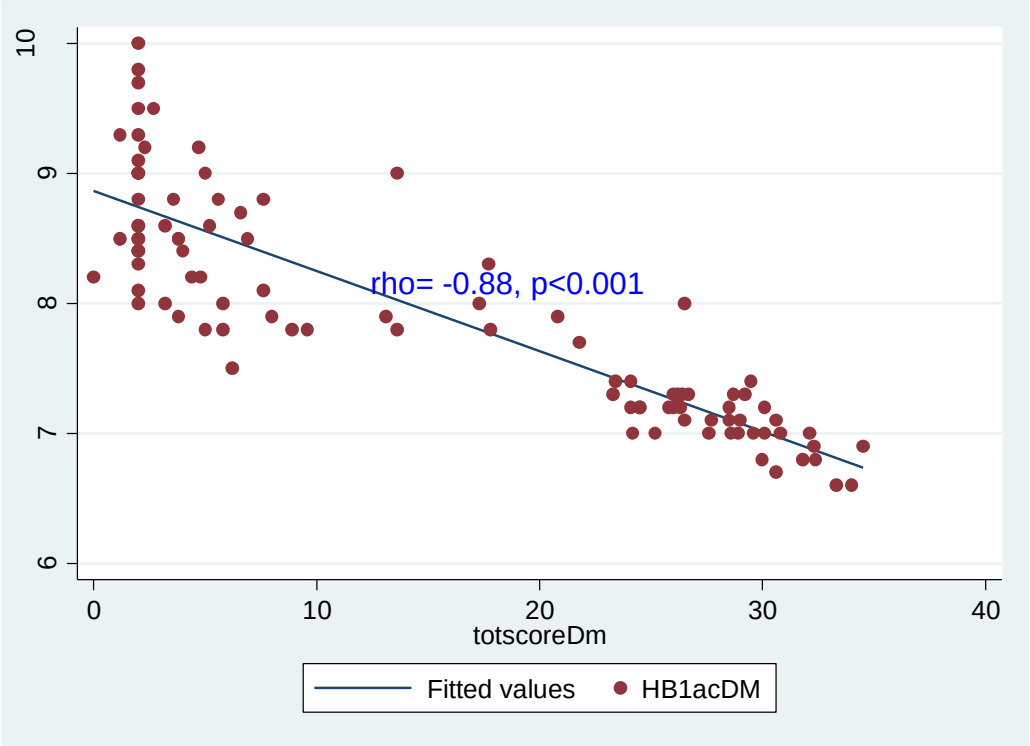
D. Relationship between total sexual function score of diabetics and their glycaemic control. Shown in Fig. 2 is a strong negative relationship between total sexual function score and glycaemic control represented by HBA1c and this relationship was statistically significant(rho=-0.88,p<0.001). This implies that the higher the HBA1c score, the lower the total sexual function score.



E. The association between some selected factors and female sexual function among diabetics is shown in table 3. Age group of respondents was significantly associated with female sexual functions of diabetic respondents. Abnormal female sexual function was commoner among persons older than fifty years compared to participants younger than fifty years (p<0.001). There was a significant association between duration of diabetes and female sexual functions of diabetic respondents (p=0.02). In addition, the mean HBA1c was significantly higher in diabetics with abnormal sexual functions than in diabetics with normal sexual function (8.37 versus 7.08, p<0.001)

Table 3: Association between selected factors and Female Sexual Function among Diabetics

Variables	Normal sexual Function (n=32;32%)	Abnormal Sexual Function (n=68;68%)	Total N=100(%)	Statistical test and P value
Age Group				
Less than 52	22 (52.38)	20(47.62)	42 (100.00)	χ^2=13.82
52 and above	10 (17.24)	48 (82.76)	58(100.00)	P<0.001*
Diabetic duration(in years)				
Less than 9	20 (44.44)	25 (55.56)	45 (100.00)	χ^2=5.82
9 and above	12 (21.82)	43 (78.18)	55 (100.00)	P=0.02*
HBA1c (mean+/-SD)	7.08+/-0.27	8.37+/-0.73	7.96+/-0.86	t=0.96.def=98,p<0.001*

*=significant p value , SD=Standard deviation, t=students t test, def=degree of freedom.

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F. The likely predictors of poor female sexual function among diabetics is shown in table 4. At the univariate level, age group 50 and above were 5.28 times significantly more likely to have poor sexual function compared to those less than 50 years(OR=5.28,P<0.001, 95%CI 2.12-13.13). Diabetics with DM duration of 10 years and more were 2.87 times significantly more likely to have poor sexual function compared to those whose duration of diabetes were less than 10 years(OR=2.87,P=0.02, 95%CI 1.20-6.83). For every one unit increase in HBA1c, there was a 220 times significantly more likelihood of having poor sexual function. At the multivariate level, only increasing HBA1c values significantly predicted poor female sexual function.

Table 4: Predictors of Poor Female Sexual Function among Diabetics

Variable	Univariate Models			Multivariate Models		
	Crude OR	P value	95%CI	Adjusted OR	P value	95%CI
Age group (in years)						
Less than 50	Ref			Ref		
50 and above	5.28	<0.001*	2.12-13.13	3.08	0.16	0.65-14.65
Diabetic duration						
Less than 10	Ref					
10 and above	2.87	0.02*	1.20-6.83	0.50	0.41	0.10-2.61
HBA1c (mean+/-SD)	220.13	<0.001*	18.63-2600.28	228.15	<0.001*	17.95-2898.75

4. DISCUSSION

This study set out to determine the prevalence of female sexual dysfunction among women living with diabetes as well as the relationship between female sexual function and indices such as age , duration of diabetes and glycated haemoglobin.

Patients with type 2 diabetes mellitus recruited in this study, were significantly older than the controls. This age disparity is because the incidence of type 2 DM is known to affect older people more when compared to young individuals [18]. The control population were hospital employees in active service below the official retirement age of 60yrs hence were expected to be younger.

The prevalence of female sexual dysfunction was much higher among the diabetics compared to the controls. This result is not different from findings from similar studies done outside Nigeria [7,10] and within Nigeria [16]. Similarly, Patients with type 2 DM had significantly lower median total sexual function score compared to the controls who had higher scores. This finding is consistent with what has been reported in similar studies [19,20,21,22]. Neurovascular disorders caused by diabetes can lead to structural and functional changes in the female reproductive system leading to disruptions in female sexual response [23]. This is the most likely explanation for the significantly reduced median sexual function score among the women living with diabetes.

The mean HBA1c was significantly higher among diabetics with subnormal sexual function compared to those with normal sexual function who had lower HBA1c suggestive of a better glycaemic control. Shaker et al, reported similar findings among women living with diabetes in Iran [23]. Conversely, Exposito et al [27], reported no association between HBA1c and female sexual function in Italy. Poorly controlled glycaemia is known to adversely affect sexual function in women[24,25,26]. The autonomic dysfunction resulting from prolonged suboptimal glycaemic control is a contributor to this finding [27] .

There is also a significant association between the duration of diabetes and the female sexual function of the diabetic Patients. Female sexual function was significantly worse in those with a longer duration(greater than 10yrs) of diabetes. Duration of diabetes especially when greater than 10 years is known to further accelerate the onset and progression of the chronic complications of diabetes including sexual dysfunction. This finding has been corroborated by findings from similar studies[27,30]. In Italy, Exposito et al did not find any association between duration of diabetes and female sexual function [27].

Older age (after 50 years) was significantly associated with poor sexual function in our study. The older study participants had poorer sexual function compared to the younger participants who had better sexual function. This finding is consistent with reports from other studies[27,28,29]. Aging is known to be associated with reduced estrogen levels and vagina dryness in women. These two factors can subsequently worsen sexual function [29].

Poor glycaemic control following multivariate analysis was found to be a strong predictor of female sexual dysfunction. This finding is expected, knowing the role played by poor glycaemic control in the aetiopathogenesis of the chronic complications of

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DM [30]. Similar findings have been reported by other researchers [26]. Improved glycaemic control has been shown to help mitigate the chronic complications of diabetes[30].

5. CONCLUSION

This study has shown that sexual dysfunction is commoner among Nigerian women living with type 2 diabetes compared to the non-diabetic population. Poor glycaemic control as well as diabetes duration longer than ten years has been shown to significantly contribute to the high prevalence of sexual dysfunction among women with diabetes mellitus.

6. RECOMMENDATIONS

Glycaemic control should be improved to mitigate the untoward effect of poor glycaemic control on sexual function. A follow up study to determine the effect of improved glycaemic control on sexual function is recommended.

DISCLOSURE

The authors declare that they have no competing interests

AUTHOR CONTRIBUTION

The authors played the roles assigned to their names below:
Dr Samuel Onung – Study design, conceptualization, initial write up and review of final draft
Dr Kingsley Akhimienho – Initial write up and review of final draft
Dr Collins Amadi – Adequate laboratory sampling and precision, review of final draft
Dr Ekanem Anyiekere – Data analysis and interpretation, review of final draft
Dr Ikwo Ekuma – Administered questionnaire and collected blood samples
Dr Asukpong Eso – Administered Questionaire and collected blood samples

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