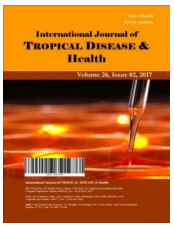

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Health-related Quality of Life in Primary Care Diabetes Mellitus Patients with Sexual Dysfunction in Uyo, South-South, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author IAU designed the study, managed the literature searches, wrote the protocol and wrote the first draft of the manuscript. Author JHE also managed the literature searches and performed the statistical analysis. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Sexual dysfunction complications of diabetes mellitus are major public health problems because of their effects on individuals, families, and communities. The objective of this study was to describe the effects of sexual dysfunction on health-related quality of life in primary care patients with diabetes mellitus in Uyo, South-south, Nigeria.
Methods: This was a prospective cross-sectional study conducted between January and December 2017. Using a systematic sampling techniques, 377 subjects aged 18 -69 years were recruited, data were collected with an interviewer-administered structured questionnaire.
Results: Of the 377 respondents, 176 (46.3%) had sexual dysfunction. The mean age of the respondents was 49.6 ± 5.6 year. The prevalence of sexual dysfunction based on IIEF domains among respondents were as follows: erectile dysfunction 149 (84.7%); impairment in sexual drive

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142 (80.7%); impairment in intercourse satisfaction 126(71.6%); impairment in overall satisfaction 106 (60.2%) and impairment in orgasm satisfaction 78 (44.3%). Respondents also reported impairment in their overall quality of life (p = 0.000); general health satisfaction (p<0.001); as well as physical health (p<0.001); psychological health (p=0.000) and social relationship domains (p=0.000) of their health-related quality of life-based on WHOQOL-Bréf.

Conclusion: Sexual dysfunction is one of the major complications of diabetes mellitus; its effect on health-related quality of life of those affected is often under-estimated. There is, therefore, need for primary care physicians to develop and execute interventions to address the sexual, social as well as psychological health needs of diabetic patient with sexual dysfunction.

Keywords: Sexual dysfunction; diabetes mellitus; health-related quality of life; primary care; south-south; Nigeria.

1. INTRODUCTION

The World Health Organization (WHO) defines sexual health as a state of physical, emotional, mental and social wellbeing in relation to sexuality and not merely the absence of disease, dysfunction or infirmity [1].

Sexual dysfunction is defined as the various ways in which an individual is unable to participate in a sexual relationship as he or she is supposed to [2].

Sexual and reproductive health and wellbeing are essential if people must have responsible, safe and satisfying sex live.

Health-related quality of life (HRQOL) refers to how health impacts on an individual's ability to function and his or her perceived wellbeing in physical, mental and social domains of life [3].

The World Health Organization Quality of Life (WHOQOL) study group defines quality of life as an individuals' perception of their position in life in the context of the culture and value system in which they live and in relation to the goals, expectations, standards, and concerns [4].

It is a broad ranging concept affected in a complex way by individual's physical health, psychological state, personal beliefs, social relationship and their relationship to salient features of the environment.

Sexual dysfunction substantially impacts an individual's quality of life and as a consequence, quality of life has become an important end point in the clinical research of sexual dysfunction [5].

Diabetes mellitus is a chronic metabolic disease caused by a variable combination of two pathogenic factors namely: insulin deficiency and insulin resistance thus leading to elevated levels of glucose (hyperglycemia) [6].

Elevated levels of glucose (hyperglycemia) produce the classical symptoms of polyuria (frequent urination), polydipsia (increased thirst) and polyphagia (increased hunger) [6].

Hyperglycaemia is its most easily measured laboratory marker and the liability to chronic degenerative disease in almost all body tissues is the hallmark of diabetes mellitus [7].

Diabetes mellitus is a global, clinical and family health problem. It is a multi-dimensional medical condition that requires the significant participation of patients and members of the family in the process of care [8].

It impacts significantly on every facet of quality of life of the affected persons and their families and places a huge burden on personal, family and national income [9].

The number of people living with diabetes mellitus has increased worldwide with an estimated value of about 28 million in 2010 [10].

In 2012 more than 371 million people had diabetes mellitus and this is expected to rise to 552 million by 2030 [10].

In Nigeria, however, the reported prevalence of diabetes mellitus is 4.7% [9].

Diabetes mellitus is a major cause of micro and macro vascular disease affecting almost every system in the body [6].

The pathogenesis of sexual dysfunction in diabetes mellitus is multifactorial and complex but is related to both organic and psychological factors [11].

Sexual dysfunction although not life-threatening has a significant impact on quality of life since sexual function is an important component of individuals' life and subjective wellbeing [5].

Sexual dysfunction affects quality of life of an individual including their sexual partners.

Reports indicate that sexual problems among diabetics are widespread and adversely affect the mood, well-being and inter-personal functioning of the individual [12].

A chronic disease such as diabetes mellitus with their complications may adversely affect mental adjustment and health of the couple, leading to dissatisfaction with marriage and marital relationships further compounding the effect of sexual dysfunction on quality of life of diabetic patient [12].

There has been increasing interest in research on health-related quality of life (HRQOL) in individuals with chronic illnesses in Nigeria [13,14].

There is, however, paucity of published reports on HRQOL among primary care diabetes mellitus patients in Uyo, South-south Nigeria.

It is hoped that findings from this study will assist primary care physicians to further appreciate the scope of care to be given to patients with this illness with a view to improving their quality of life.

2. SUBJECTS, MATERIALS, AND METHODS

2.1 Location of the Study

This study was carried out at the family medicine outpatient clinic of the University of Uyo Teaching Hospital (UUTH).

UUTH is located on the outskirts of Uyo, the capital of Akwa Ibom State of Nigeria.

Nigeria is divided into six geo-political zones as follows: North-East, North-West, North-Central, South-East, South-West, and South-South. Uyo is located in the South-South geopolitical zone.

UUTH is one of the tertiary and referral health institutions in the state and its environs, serving a population of approximately 3.9 million people [15].

2.2 Subjects

A total of 377 patients who attended the general out-patient family medicine clinic between January and December 2017 were recruited into the study. Sample size for this study was calculated using the formula $n=z^2pq/d^2$, where 'n' is the desired sample size, 'z' represents standard normal deviation set at 95% confidence level which corresponds to 1.96, 'p' is the reported prevalence of sexual dysfunction among diabetes mellitus patients in Nigeria (57.7%) [16] 'd' is the precision which at 95% confidence interval is 5%. The calculated sample size was 377.

About one thousand, one hundred and fifty male diabetes mellitus patients were expected to register for care during the period of the study. This followed unpublished report obtained from the health information department of UUTH. This projection arose from the record available following diabetes clinic attendance between January and December 2016.

Respondents included all newly registered male diabetes mellitus patients as well as those who returned for follow up care. Their case notes were marked to forestall duplication of entry. They were recruited using a systematic sampling method with a sampling interval of three. Numbers ranging from one to three were assigned to the first three respondents who met the inclusion criteria.

The first respondent was chosen by simple balloting which was done by randomly picking one of the numbers from a basket containing the assigned numbers. Thereafter, every third respondent was recruited for the study. Where, however, such a respondent did not consent to take part in the study, such a respondent was dropped, then the next respondent that met the inclusion criteria was recruited.

Inclusion criteria included all newly registered male diabetes mellitus patients as well as those who return for follow-up care. Exclusion criteria included all critically ill patients as well as those who needed emergency care. Those who declined consent to be enlisted were also excluded. Ethical approval for this study was obtained from the UUTH institutional review committee.

2.3 Methods

This was a prospective cross-sectional study conducted between January and December 2017. Three hundred and seventy –seven male diabetes mellitus patients aged between 18 and 69 years who attended the family medicine general outpatient clinic during the study period were recruited.

A structured and pre-tested interview-administered questionnaire was used to obtain information about socio-demographic profiles of the respondents. Respondents level of income was determined using the Nigerian National minimum wage Act passed by the Nigerian parliament [17].

The act stipulates a maximum basic monthly income of sixty thousand naira only for low-income earners; a maximum basic monthly income of one hundred and sixty-five thousand naira only for middle-income earners and a maximum income of two hundred and ninety-five thousand naira only for high-level income. At present, about four hundred naira exchanges for one American dollar. Sexual dysfunction was assessed using the international index of erectile function questionnaire (IIEF) [18].

IIEF is a 15-item questionnaire that assesses five domains of sexual function namely: erectile dysfunction, intercourse satisfaction, sexual drive, orgasm satisfaction as well as overall satisfaction. Based on the scores on IIEF, the classification of sexual dysfunction were as follows: Erectile dysfunction: (range of scores: 1-30; dysfunction score: $\leq$ 25); intercourse satisfaction: (range of scores: 0 -15; dysfunction score: $\leq$ 10); sexual drive: (range of scores: 0-10; dysfunction score: $\leq$ 8); Orgasm satisfaction: (range of scores: 0 -10; dysfunction score: $\leq$ 8); overall satisfaction: (range of scores:2-10; dysfunction score: $\leq$ 8) [16].

Health-related quality of life was measured using the abridged version of the World Health Organization quality of life instrument (WHOQOL-Bréf) [19].

The WHOQOL-Bréf is a generic instrument developed in a wide range of languages for use in different cultural settings. It yields comparable scores across cultures.

The WHOQOL- Bréf consists of domains (or dimensions) and facets (or subdomains). The WHOQOL-Bréf produces the quality of life profile with 4-domains namely physical health, psychological health, social relationships and environment [20].

Two items are assessed separately and these are individual's overall perception of quality of life (QoL) as well as the overall perception of health. The four-main domain scores are scaled in a positive direction; higher scores denote higher QoL. The scores of items within each domain are used to calculate the domain scores.

After organizing the responses into the QOL, mean scores were generated from the possible scores in each domain. The raw score was then converted to transformed scores by multiplying the raw scores by 4 in order to make the domain score comparable with the scores used in the WHOQOL -100 [20].

The respondents' individual scores for each domain were then compared with the possible mean score. Since the domain scores are normally distributed, a score of mean minus one (-1) standard deviation (SD) is graded poor, while a score of the mean plus one (+1) standard deviation (SD) is graded good [20]. The instrument has been used in previous studies in Nigeria [21,22,23].

Diabetes mellitus was diagnosed based on the 2011 revised criteria by the expert committee on the diagnosis and classification of diabetes mellitus which recommends the diagnosis of diabetes based on two fasting plasma glucose (2FPG) levels of 126mgldl (7.0 mmql/L) or higher, or two 2-hour post prandial glucose readings of 200 mgldl (11.1mmql/L) or higher or glycosylated haemoglobin (Hb1C) of $\geq$ 6.4% [24].

2.4 Data Analysis

Statistical analysis was done using statistical package for social sciences (SPSS) version 18.0. Summary scores were generated for the WHOQOL-Bréf by organizing the items into facets which represent the domains covered by the questionnaire. Since the scores for each domain were normally distributed, the categorization of the levels of quality of life (QOL) for each domain was done using the value of +1 or-1standard deviation (SD). The categories of good and poor were cross-tabulated against the presence or absence of sexual dysfunction. Frequency distribution and cross-tabulation were generated, chi-square was used to compare

proportions. The corresponding p-values were used to determine the level of statistical significance. The P-value of 0.05 was used to determine the level of statistical significance.

3. RESULTS

A total of 377 respondents were recruited into the study. Of these, 61(16.2%) were between 18 and 29 years of age, 99(26.3%) were between 30 and 39 years of age; while 94(24.9%) were between 40 and 49 years, 86(22.8%) were aged 50-59 years while 37(9.8%) were aged between 60 and 69 years.

A total of 188(49.9%) respondents were married; 82(21.8%) respondents were single while 71(18.8%) respondents were widows. Table 1 shows the socio-demographic characteristics and number of male respondents with and without sexual dysfunction. Of the 377 respondents, 30(7.9%) had no formal education; 97(25.7%) had primary education; 138(36.6%) had secondary school level of education while 112(29.7%) had a post-secondary level of education.

Sixty-seven (17.8%) respondents were unemployed; 127(33.7%) respondents were skilled workers while 82(21.8%) respondents were professionals in various fields of human endeavour. One hundred and sixty-five (43.8%) respondents were low-level income earners; 156(41.4%) respondents were middle-income earners while 56 (14.8%) were high-level income earners.

Table 2 shows the prevalence of sexual dysfunction among respondents.

One hundred and seventy-six (46.3%) respondents reported the presence of sexual dysfunction. Of these, 149(84.7%) had erectile dysfunction; 126 (71.6%) respondents had difficulty with intercourse satisfaction; 142(80.7%) reported impairment with sexual drive, 78(44.3%) had an impairment with orgasm satisfaction. One hundred and six (60.2%) respondents reported impairment in overall sexual dysfunction. There were, however, multiple responses.

Table 3 shows the quality of life rating among respondents with and without sexual dysfunction.

A total of 131(34.7%) respondents with sexual dysfunction reported statistically significant poor overall quality of life (QoL) compared to 89 (23.6%) respondents without sexual dysfunction (p= 0.000).

One hundred and fifty-four (40.8%) respondents with sexual dysfunction reported poor general health satisfaction compared to 59 (15.6%) respondents without sexual dysfunction. This was also statistically significant (P = 0.000).

One hundred and fifty (39.8%) respondents with sexual dysfunction reported poor satisfaction with physical health compared to 142(37.7%) respondents without sexual dysfunction. This was statistically significant (P < 0.001).With regard to psychological health, 144(38.2%) respondents with sexual dysfunction were graded poor while 79 (21.0%) respondents without sexual dysfunction were graded poor. This was statistically significant (p= 0.000). One hundred and thirty-five (35.8%) respondents with sexual dysfunction were graded poor compared to 68 (18.0%) respondents without sexual dysfunction in the social relationship domain quality of life rating. This was statistically significant (p=0.000).

4. DISCUSSION

The mean age of respondents in this study was 49.6 ± 5.6 years with a range of 18 to 69 years. This was comparable to the mean age of 48.0 years reported by another study involving diabetic men in Benin City South-South Nigeria [16]. This finding goes to reinforce the fact that sexual dysfunction is a natural complication of diabetes mellitus although advancing age can also be implicated

The prevalence of sexual dysfunction among respondents in this study was 46.3%. This was lower than 57.7% earlier reported among diabetic patients in Nigeria as well as 69.3% reported among male diabetes mellitus patients in Ghana [16, 25].

The difference in the prevalence of sexual dysfunction among the different workers might be due to the differences in the study design as well as the study subjects, but it is important to note that sexual dysfunction is a frequent complication of diabetes mellitus arising from the interplay of autonomic neuropathy, vasculopathy, endocrinopathy and psychogenic factors.

Table 1. Social demographic characteristics of respondents

Variables	Respondents		
	With sexual dysfunction (n=176[%])	Without sexual dysfunction (n= 201[%])	Total (n=377[%])
Age in years			
Up to 29	12[(3.2]	49 [13.0]	61 [16.2]
30- – 39	61 [16.2]	38 [10.1]	99 [26.3]
40 – 49	34 [9.0]	60 [15.4]	94 ([24.9]
50 – 59	46 [12.2]	40 [10.6]	86 [22.8]
60- 69	23 [6.1]	14 [3.7]	37 [9.8]
Marital Status			
Single	45 [11.9]	37 [9.8]	82 [21.8]
Married	84 [22.3]	104 [27.6]	188 [49.9]
Divorced/Separated	16 [4.2]	20 [5.3]	36 [9.5]
Widowed	31 [8.2]	40 [10.6]	71 [18.8]
Educational Level			
No formal Education	19 [5.0]	11 [2.9]	30 [7.9]
Primary	36 [9.5]	61 [16.2]	97 [25.7]
Secondary	55 [14.6]	83 [22.0]	138 [36.6]
Post-Secondary	66 [17.5]	46 [12.2]	112 [29.7]
Occupation			
Unemployed	21[5.6]	46 [12.2]	67 [17.8]
Unskilled	69 [18.3]	32 [8.5]	101 [26.8]
Skilled	56 [14.9]	71 [18.8]	127 (33.7]
Professional	30 [8.0]	52 [13.8]	82 [21.8]
Income level			
Low	78 [20.7]	87 [23.1]	165 [43.8]
Middle	64 [17.0]	92 [24.4]	156 [41.4]
High	34 [9.0]	22 [5.8]	56 [14.8]

Table 2. Prevalence of sexual dysfunction among respondents based on IIEF domains

Variables	Frequency [%] *
Sexual dysfunction	176 [46.3]
No sexual dysfunction	201 [53.7]
Domains of sexual dysfunction	
Erectile dysfunction	149 [84.7]
Intercourse satisfaction	126 [71.6]
Sexual Drive	142 [80.7]
Orgasm satisfaction	78 [44.3]
Overall satisfaction	106 [60.2]

* *multiple responses given*

Primary care physicians need to be fully conversant with these so as to be able to holistically address the health care needs of their diabetic primary care patient. It is also important to note that diabetes mellitus may not be the only reason for the presence of sexual dysfunction among respondents in the study judging from the diverse background of the respondents in terms of the level of education, occupational status, and income levels. The role of these factors as a cause of sexual dysfunction among diabetes mellitus patients need to be further explored. Respondents in this study reported various degrees of impairment in the different domains of sexual function assessment. Erectile dysfunction was the most prevalent sexual dysfunction reported by respondents. It was reported by 84.7% respondents. This was lower than 98.0% reported by another study [16].

Impairment in the sexual drive was reported by one hundred and forty-two (80.7%) respondents. This is higher than 25.0% reported by another study [16]. The presence of a normal sexual desire and the inability to physically act on that desire would naturally lead to disorders in interpersonal relationships, problems with partners as well as an increase in mental stress thus further compounding the care of such a patient.

Table 3. Quality of life (QOL) rating among respondents with and without sexual dysfunction

Variable	Subjects		X^2	P-value
Domains	**With sexual dysfunction (n=176[%])**	**Without sexual dysfunction (n=201[%])**		
Overall quality of life				
Good	45[11.9]	112 [29.7]	35.07	0.000*
Poor	131 [34.7]	89 [28.6]		
General health satisfaction				
Good	22 [5.8]	142 [37.7]	129.09	0.000*
Poor	154 [40.8]	59 [15.6]		
Domain 1 (Physical health)				
Good	26 [6.9]	59 [15.6]	11.423	0.001*
Poor	150 [39.8]	142 [37.7]		
Domain 2 (Psychological health)				
Good	32 [8.5]	122 [32.4]	70.19	0.000*
Poor	144 [38.2]	79 [21.0]		
Domain 3 (Social relationship)				
Good	41 [10.9]	133 [35.3]	69.40	0.000*
Poor	135 [35.8]	68 [18.0]		
Domain 4 (Environmental health)				
Good	28 [7.4]	46 [12.2]	2.89	0.093
Poor	148 [39.3]	155 [41.1]		

**statistically significant*

Finding from this study shows that sexual dysfunction significantly impacts the quality of life of diabetic male patients recruited for this study.

Diabetes mellitus respondents with sexual dysfunction reported significant impairment in their overall quality of life as well as general health satisfaction. These are in agreement with other studies which also showed that erectile dysfunction resulting from complications of diabetes mellitus is associated with a decline in quality of life of affected individuals leading to depression, anxiety, increased level of conflict and defect in satisfaction with relationships [26, 27].

Respondents with sexual dysfunction also reported significant negative impact on physical, psychological and social domains of their health-related quality of life.

This also agrees with previous reports which showed that erectile dysfunction, a form of sexual dysfunction causes impairment in functional status, lower sexual self-efficacy as well as greater depression and anxiety among those that are affected [22,28,29,30].

5. CONCLUSION

In conclusion, findings from this study show that sexual dysfunction is a frequent complication of diabetes mellitus. Its negative effect on health-related quality of life of primary care patients shows that sexual dysfunction is a serious family health problem among diabetic patients.

Findings from this study should assist primary care physicians to develop and execute interventions to address the sexual, social as well as psychological health needs of diabetic patients with sexual dysfunction.

6. LIMITATION OF THE STUDY

The major limitation of this study was that it was difficult to characterize the respondents regarding the type of diabetes mellitus as to type 1 or type 2 since such facility was not present. Moreover, this was a hospital-based study as such the result may not be generalized to the general population.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee

has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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