Original Article

Impact of Diabetes Mellitus on Sexuality in a Developing Country Setting: A Case-Control Study in Calabar, Nigeria

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Abstract

Background: This study aimed to identify the unmet sexual health needs of the patients with diabetes seen in a tertiary healthcare facility in Nigeria. **Methods:** Case-control study design and random sampling method were utilized to recruit type 2 diabetic cases from the University of Calabar Teaching Hospital (UCTH), Calabar, Nigeria. Female Sexual Function Index (FSFI) and International Index for Erectile Function (IIEF) were used to assess sexual function. **Result:** There were 330 subjects with the mean age of 54.9 years. Among females, the FSFI score was lower among cases compared with controls (18.8 vs. 23.1, $P < 0.05$). Except for sexual interest, mean scores for all other domains of sexual function were also lower among cases ($P < 0.05$). Among males, there was no significant difference in overall mean IIEF score comparing cases and controls (40.0 vs. 41.7, $P > 0.05$). However, mean scores for desire and satisfaction was lower among cases compared with controls ($P < 0.05$). Older age, unmarried status, presence and duration of hypertension were associated with sexual dysfunction among females. The use of supplements was associated with sexual dysfunction among males ($P < 0.05$). **Conclusion:** Sexual dysfunction is common among diabetics with variation in affected domains in both genders in the study setting. These unmet sexual health needs focus to be addressed.

Keywords: *Calabar, diabetes mellitus, erection, Nigeria, sexual function*

Background

An estimated 425 million people globally have diabetes mellitus, which has remained a global public health problem without a definite cure.[1] In Africa, Nigeria has the highest number of people living with diabetes, with at least a twofold increase in its prevalence within the last two decades from 2.2% in 1997 to 5.8% in 2017.[2,3] Among other debilitating consequences, the often undiagnosed chronic disease significantly contributes to the onset and progression of sexual dysfunction. In both sexes, type 2 diabetic patients seen in primary care settings, have been found to have a high prevalence of sexual dysfunction, with a preponderance of erectile dysfunction in men and low sexual desire and lack of lubrication in women.[4] Other potential predictors include longer duration of diabetes, presence of hypertension, poor glycemic control, older age, and obesity.[5] This potentially frustrating psychosexual complication has tangible and intangible cost implications for the patients and health systems.[6] For instance, independent studies of erectile dysfunction in the USA[7] and female sexual dysfunction in the UK[8] reported annual cost estimates of $15 billion and ≤53 million, respectively.

Consequently, there is growing research interest in sexual dysfunction among the patients with diabetes. This includes female sexual dysfunction (FSD) characterized by the presence of loss of libido, the problem with arousal, orgasm, lubrication, and pain before, during, and after sexual intercourse. Previous studies have

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reported a high prevalence of FSD among the women with diabetes[9] Older age, being unmarried, menopause, and depression have been significantly associated with the presence of FSD ($P < 0.00$).[10-13] However, despite years of research interest in FSD among the women with diabetes, there is still scant literature in the subject area in the developing countries where female sexuality is rarely discussed freely. Even among the men with diabetes, the dynamics of sexual dysfunction has not been studied in the South-South region, which has one of the highest prevalence rates of diabetes and comorbid hypertension in Nigeria.[3]

Besides the paucity of literature on sexual dysfunction among the patients with diabetes in the study setting, there is a substantial limit to the interpretation of the few studies conducted in many developing countries.[14] Instruments used, do not usually provide a detailed assessment of the different components of sexual function. Also, assessment of predictors of sexual dysfunction is usually limited to sociodemographic characteristics, with the common exclusion of relevant clinical, laboratory, and health system factors. This study was therefore aimed at contributing to bridging current research gaps on sexual dysfunction among the patient with diabetes in a diverse multicultural developing country setting, where diabetes is a prevalent chronic disease. Finding will constitute the useful baseline for the region, as well as contribute to improvement in best practices for long-term management of sexual dysfunction among the vast majority of poor diabetics with little or no health insurance in the developing countries.[6,8]

Methods

The study design was case-control, with diabetic cases recruited from medical wards and out-patient clinics in UCTH Calabar, while age and sex-matched controls were non-diabetic normotensive civil servants and retirees. A systematic random sampling method was used to recruit both cases and controls. Ethical approval was obtained from the UCTH Research Ethics Committee before obtaining data from consenting adult subjects that were at least 18 years old. Subjects with type 1 diabetes and that were within 6 months of diagnosis of diabetes mellitus were excluded from the study. Also, those that had been sexually inactive for the last 6 months as well as those with a history of previous pelvic/perineal surgery such as prostatectomy, hemorrhoidectomy, and pelvic floor repairs were excluded. Subjects that were 75 years or older were also excluded from the study.

Validated and pretested Female Sexual Function Index (FSFI) and International Index for Erectile Function (IIEF) were used to assess sexual function for female and male subjects, respectively. The FSFI instrument comprised 0-5 Likert-scaled 19 items within six domains.[15] For each domain, individual items were summed up then multiplied by respective factors to obtain domain scores. Domain scores were summed to obtain total FSFI score ranging from 2 to 36, with the higher score indicating better degree of sexuality and vice versa.[15] Mean domain and total scores were compared between study groups using independent *t*-test. The 15-item IIEF instrument consist of 6, 2, 2, 3, and 2 Likert-scaled items in the erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction domains, respectively. Total score ranges from 5 to 75. Items are summed to obtain a domain and total scores, which are compared between study groups using independent *t*-test. The P value < 0.05 was considered statistically significant.

Results

The response rate was 95.4%, and complete data were obtained from 330 subjects comprising an equal proportion of diabetic cases and age/sex-matched normotensive non-diabetic controls. Male: female was 1:0.9 and the mean age was 54.9 ± 9.6 years ranging from 36 to 74 years. Approximately two-thirds (66.0%) of subjects were within 51-70 years old [Table 1]. Most subjects were married (80.9%), had at least a secondary level of education (88.8%), and never smoked (72.4%). Roman Catholic (41.2%) was the commonest religion. Compared with controls, cases had a significantly higher proportion of being widowed, having a lower level of education, previous smoking history, and consuming alcohol occasionally ($P = 0.00$, Table 1). Mean Body Mass Index (BMI) was 26.7 ± 4.7, ranging from 18.8 to 41.5 kg/m^2. Most subjects (61.2%) were either overweight or obese [Table 2]. Compared with controls, significantly higher proportion of cases were overweight and obese ($P = 0.00$). A total of 141 subjects (42.7%) were hypertensive, with mean duration of hypertension being 8.5 ± 3.6 years, ranging from 1 to 15 years. Mean systolic, diastolic, and mean arterial blood pressures were 131.7 ± 15.9, 81.4 ± 10.6, and 98.2 ± 11.6 mmHg, respectively.

Approximately a quarter (25.8%) and a third (34.2%) reported having sexual problems and being asked about their sexual life by their medical doctor, respectively. Admitting the presence of sexual problems and being asked about sexual life was proportionally commoner among cases compared with controls ($P < 0.05$). Fifty one subjects (15.5%) used supplements to

Table 1: Sociodemographic characteristics of subjects (*n*=330)

Variable	Diabetic case *n* (%)	Non-diabetic control *n* (%)	Total *n* (%)	Chi-square (*p*)
Sex				
Male	87 (52.7)	87 (52.7)	174 (52.7)	1.00
Female	78 (47.3)	78 (47.3)	156 (47.3)	
Age groups (in years)				
≤40	14 (8.5)	14 (8.5)	28 (8.5)	1.00
41-50	33 (20.0)	33 (20.0)	66 (20.0)	
51-50	72 (43.6)	72 (43.6)	144 (43.6)	
61-70	37 (22.4)	37 (22.4)	74 (22.4)	
>70	9 (5.5)	9 (5.5)	18 (5.5)	
Menopausal status (*n*=156)				
Non-menopausal	17 (21.8)	23 (29.5)	40 (25.6)	0.27
Menopausal	61 (78.2)	55 (70.5)	116 (74.4)	
Marital status				
Married	122 (73.9)	145 (87.9)	267 (80.9)	0.00
Single	7 (4.2)	7 (4.2)	14 (4.2)	
Divorced/separated	15 (9.1)	10 (6.1)	25 (7.6)	
Widowed	21 (12.7)	3 (1.8)	24 (7.3)	
Educational level				
Primary or less	33 (20.0)	4 (2.4)	37 (11.2)	0.00
At least secondary	132 (80.0)	161 (97.6)	293 (88.8)	
Religion				
Pentecostal	74 (44.8)	51 (30.9)	125 (37.9)	0.00
Orthodox	22 (13.3)	28 (17.0)	50 (15.2)	
Catholic	53 (32.1)	83 (50.3)	136 (41.2)	
Others	16 (9.7)	3 (1.8)	19 (5.8)	
Smoking status				
Yes (currently)	6 (3.6)	0 (0.0)	6 (1.8)	0.00
Smoked previously but stopped	57 (34.5)	28 (17.0)	85 (25.8)	
Never	102 (61.9)	137 (83.0)	239 (72.4)	
Consume alcohol				
Frequently	12 (7.3)	7 (4.2)	19 (5.8)	0.00
Occasionally	21 (12.7)	47 (28.5)	68 (20.6)	
Rarely	67 (40.6)	60 (36.4)	127 (38.5)	
Never	65 (39.4)	51 (30.9)	116 (35.2)	

enhance their sexual life, but there was no significant difference in proportion comparing cases and controls ($P > 0.05$, Table 2).

Table 3 compares mean scores of FSFI between female cases and controls for each item and domain of the female sexual function. Except for sexual desire and arousal, mean sum scores for all other domains of sexual function were significantly lower among cases compared with controls ($P < 0.05$). Overall FSFI score was also significantly lower among cases compared with controls ($P = 0.00$). Table 4 compares mean scores of IIEF between male cases and controls for each item and domain of the male sexual function. Mean scores for satisfaction were significantly lower among cases compared with controls. Each item, as well as mean sum score for erection, orgasm, desire, intercourse, and overall satisfaction were lower among cases compared with controls, but statistical significance was found only for desire and overall satisfaction scores ($P < 0.05$). There was no significant difference in overall mean total IIEF score comparing cases and controls ($P > 0.05$).

Table 5 assesses the relationship between sociodemographic characteristics and sexual function score among female (FSFI) and male (IIEF) cases. Among females, mean scores were significantly lower for those that were older than 50 years, unmarried, and reported having sexual problems ($P = 0.00$). Other characteristics including the level of education, religion, consumption of alcohol, and use of supplements, were not significantly associated with the FSFI ($P > 0.05$). Among males, mean scores were lower among those

Table 2: Anthropometric and clinical characteristics of subjects (*n*=330)

Variable	Diabetic case *n* (%)	Non-diabetic control *n* (%)	Total *n* (%)	*p*
BMI category				
Normal	41 (24.8)	87 (52.7)	128 (38.8)	0.00
Overweight	85 (51.5)	75 (45.5)	160 (48.5)	
Obese	39 (23.6)	3 (1.8)	42 (12.7)	
Comorbid hypertension				
Yes	141 (85.5)	0 (0.0)	141 (42.7)	0.00
No	24 (14.5)	165 (100)	189 (59.3)	
Have problem with sexual life				
Yes	59 (35.8)	26 (15.8)	85 (25.8)	0.00
No	106 (64.2)	139 (84.2)	245 (74.2)	
Doctor ever asked about sexual life				
Yes	90 (54.5)	23 (13.9)	113 (34.2)	0.00
No	75 (45.5)	142 (86.1)	217 (65.8)	
Use supplements to enhance sexual life				
Yes	30 (18.2)	21 (12.7)	51 (15.5)	0.17
No	135 (81.8)	144 (87.3)	279 (84.5)	

Table 3: Comparison of each component of FSFI scores among female subjects (*n*=156)

Variable (assessed within past 4 weeks)		Case Mean±SD	Control Mean±SD	*p*
Sexual desire				
1	How often did you feel sexual desire or interest?	3.06±1.19	3.05±1.33	0.95
2	How would you rate your level of sexual desire or interest?	2.94±1.16	2.68±1.10	0.16
Subtotal score for desire		6.00±1.23	5.73±1.54	0.28
Sexual arousal				
3	How often did you feel sexually aroused during sexual activity?	3.06±1.59	2.95±1.42	0.63
4	How would you rate your level of sexual arousal during sexual activity?	2.74±1.63	2.91±1.32	0.48
5	How confident were you about becoming sexually aroused during sex?	2.63±1.94	2.85±1.02	0.38
6	How often have you been satisfied with your arousal during sex?	2.62±1.89	2.99±1.42	0.17
Subtotal score for arousal		11.05±6.68	11.70±4.95	0.77
Sexual lubrication				
7	How often did you become lubricated during sexual activity?	2.40±1.73	3.09±1.52	0.01
8	How often difficult was it to become lubricated during sexual activity?	2.77±1.93	3.65±1.22	0.00
9	How often did you maintain lubrication till end of sexual activity?	2.59±1.85	2.79±1.11	0.40
10	How difficult was it to maintain lubrication till end of sexual activity?	2.73±1.99	3.58±1.25	0.00
Subtotal score for sexual lubrication		10.49±7.34	13.12±3.95	0.01
Sexual orgasm				
11	When you had sexual stimulation how often did you reach orgasm?	1.58±1.63	2.94±1.33	0.00
12	When you had sexual stimulation how difficult was it to reach orgasm?	2.14±1.86	3.94±1.22	0.00
13	How satisfied were you with your ability to reach orgasm during sex?	2.41±1.76	3.26±1.53	0.00
Subtotal score for sexual orgasm		6.13±4.88	10.13±3.54	0.00
Satisfaction with sexual relationship				
14	How satisfied were you with the emotional closeness with your sex partner?	2.81±1.93	3.99±0.99	0.00
15	How satisfied have you been with your sexual relationship with your partner?	2.90±1.04	3.15±1.23	0.16
16	How satisfied have you been with your overall sexual life?	2.86±0.99	2.87±1.36	0.95
Subtotal score for satisfaction with sexual relationship		8.56±3.66	10.01±3.32	0.01
Comfort during and after sexual activity				
17	How often did you experience pain during vaginal sex?	2.42±2.07	3.45±1.23	0.00
18	How often did you experience pain after vaginal sex?	2.28±2.02	3.47±1.29	0.00
19	How would you rate your level of discomfort/pain during and after vaginal sex?	2.45±1.95	3.50±1.14	0.00
Subtotal score for comfort during and after sexual activity		7.15±5.96	10.42±3.50	0.00
Total FSFI score		18.80±10.7	23.11±6.44	0.00

Table 4: Comparison of each component of IIEF scores among male subjects (*n*=174)

Variable (assessed within past 4 weeks)		Case Mean±SD	Control Mean±SD	*p*
Erectile function				
1	How often were you able to get an erection during sex?	3.38±1.91	3.48±1.41	0.69
2	How often were your erections hard enough for penetration?	3.07±1.54	3.10±2.00	0.90
3	How often were you able to penetrate your partner?	3.18±1.59	3.17±1.91	0.98
4	How often were you able to maintain erection after penetrating your partner?	2.86±1.53	3.45±1.99	0.03
5	How difficult was it to maintain an erection till end of sex?	3.45±1.46	3.41±2.02	0.90
15	How do you rate your confidence that you can get and keep an erection?	2.00±1.24	2.31±1.32	0.11
Subtotal score for erectile function		17.94±7.6	18.92±10.3	0.26
Orgasmic function				
9	How often did you ejaculate during sexual intercourse?	2.88±1.28	2.85±1.46	0.94
10	How often did you have feeling of orgasm during intercourse?	2.24±1.23	2.72±1.79	0.04
Subtotal score for orgasmic satisfaction		5.12±2.37	5.57±1.81	0.27
Sexual desire				
11. How often have you felt sexual desire?		1.86±1.14	2.55±1.08	0.00
12. How would you rate your level of sexual desire?		1.69±1.03	2.10±1.19	0.02
Subtotal score for sexual desire		3.55±2.06	4.65±2.20	0.00
Intercourse satisfaction				
6. How many times have you attempted sexual intercourse?		1.79±0.85	1.21±0.55	0.00
7. How often is sexual intercourse satisfactory to you?		3.10±1.48	3.41±1.46	0.17
8. How much have you enjoyed sexual intercourse?		3.10±1.48	3.55±1.04	0.02
Subtotal score for intercourse satisfaction		8.00±2.82	8.17±2.47	0.67
Overall satisfaction				
13	How satisfied have you been with your overall sexual intercourse?	2.24±1.23	2.28±1.47	0.87
14	How satisfied have you been with your sexual relationship with your partner?	2.24±1.08	2.72±1.21	0.01
Subtotal score for overall satisfaction		4.48±2.23	5.00±2.25	0.04
Total IIEF score		39.97±12.3	41.69±15.5	0.42

that were older than 50 years, unmarried, had primary or less level of education, but these differences were not statistically significant ($P > 0.05$). Less frequent consumption of alcohol, admitting having sexual problems, and never being asked about sexual life by a doctor, were significantly associated with lower sexual function scores ($P < 0.05$). The use of supplement was associated with a lower mean score, though this difference was marginally significant ($P = 0.05$).

Table 6 assesses the relationship between clinical and laboratory parameters and sexual function scores among female (FSFI) and male (IIEF) cases. Significantly lower sexual function scores were obtained for cases with comorbid hypertension, but statistical significance was found only among females ($P < 0.05$). Among females, the BMI, duration of diabetes, duration of hypertension, levels of systemic blood pressure, HbA1c, total cholesterol, and LDL cholesterol were indirectly correlated with the FSFI scores, but statistical significance was found only for the duration of diabetes, hypertension, and blood pressure. Among males, only (BMI) and duration of hypertension were significantly indirectly correlated with the IIEF score ($P < 0.00$).

Discussion

This study was aimed at comparing the sexual function of the patients with diabetes and their age/sex-matched controls. The women with diabetes compared with non-diabetic controls had significantly lower levels of sexual function in all domains except desire and arousal [Table 3]. This finding is in tune with a report from a similar study in Egypt,[16] Iran,[11] Turkey,[17] China,[18] and Southeast Nigeria,[12] where the women with diabetes compared with controls had significantly lower levels of sexual function in all domains ($P < 0.05$). Diabetes-mediated alteration in vascularization network, lamina propria, and expression of androgen receptors in the vagina may account for significantly lower levels of lubrication, orgasm, and pain domains of sexual function.[19] Sexual desire and arousal may be more dependent on the psychological state of individuals, enabling environmental ambience, partner relationship, and skills for initiating sex. However, a similar study in Malaysia[20] and Boston, MA, USA[21] found no significant difference in orgasmic function comparing diabetic and non-diabetic women. Sociocultural difference, especially in individual and societal perception towards female sexuality, may account for these findings.[22]

Table 5: Relationship between sociodemographic characteristics and sexual function score for cases (*n*=165)

Variable	Female FSFI Score Mean±SD (*n*=78)	Male IIEF Score Mean±SD (*n*=87)
Age group (in years)		
≤50	23.9±9.7	44.83±14.83
>50	17.6±8.6	40.87±15.64
p	0.00	0.34
Marital status		
Married	22.8±9.0	42.78±14.34
Unmarried	10.3±9.2	37.50±19.11
p	0.00	0.20
Menopausal status (n=156)		
Non-menopausal	21.3±4.6	-
Menopausal	18.5±6.4	-
p	0.01	
Educational level		
Primary or none	19.3±9.2	38.50±17.67
At least secondary	18.6±11.3	42.20±15.16
p	0.79	0.45
Religion		
Pentecostal	19.1±9.5	40.50±15.28
Orthodox	22.7±10.7	31.00±18.73
Catholic	16.0±8.6	46.33±12.44
Others	17.8±7.9	37.13±14.53
p	0.09	0.09
Consume alcohol		
Never	17.1±11.3	39.00±16.33
Rarely	19.6±10.5	34.57±17.28
Sometimes	-	43.21±15.01
Frequently	-	51.50±2.15
p	0.34	0.02
Have problems with sex		
Yes	8.5±5.5	29.27±15.40
No	24.0±8.8	49.28±9.53
p	0.00	0.00
Doctor ever asked about sexual life		
Yes	17.1±9.8	45.79±8.59
No	21.5±11.8	37.87±19.19
p	0.08	0.02
Supplement enhancement		
Yes	23.0±8.3	36.38±15.50
No	18.5±10.9	43.71±15.10
p	0.32	0.05

Table 6: Relationship between clinical parameters and sexual function score among cases (*n*=165)

Variable	Female FSFI Score (*n*=78)	Male IIEFScore (*n*=87)
Comorbid hypertension		
Yes (Mean±SD)	16.4±10.5	40.67±20.17
No (Mean±SD)	28.7±4.29	41.81±15.00
p	0.00	0.84
BMI		
Correlation coefficient (*p*)	−0.11 (0.33)	−0.27 (0.01)
Duration of diabetes		
Correlation coefficient (*p*)	−0.61 (0.00)	−0.05 (0.62)
Duration of hypertension		
Correlation coefficient (*p*)	−0.47 (0.00)	−0.60 (0.00)
Systolic blood pressure		
Correlation coefficient (*p*)	−0.17 (0.09)	0.07 (0.54)
Diastolic blood pressure		
Correlation coefficient (*p*)	−0.19 (0.10)	0.03 (0.81)
Mean blood pressure		
Correlation coefficient (*p*)	−0.22 (0.06)	0.05 (0.67)
Fasting blood sugar		
Correlation coefficient (*p*)	0.07 (0.55)	0.20 (0.06)
HbA1c level		
Correlation coefficient (*p*)	−0.14 (0.21)	0.16 (0.15)
Total cholesterol		
Correlation coefficient (*p*)	−0.33 (0.00)	−0.18 (0.09)
HDL cholesterol		
Correlation coefficient (*p*)	0.21 (0.07)	0.12 (0.28)
LDL cholesterol		
Correlation coefficient (*p*)	−0.27 (0.02)	0.02 (0.85)
Triglycerides		
Correlation coefficient (*p*)	−0.20 (0.07)	−0.29 (0.01)

Among men in this study, there was no significant difference in the level of sexual function comparing cases and controls for all domains except sexual desire [Table 4]. This finding is at variance with reports from the systematic review where most studies found a significantly lower level of sexual function among diabetic compared with non-diabetic subjects.[14] Ethnic difference in perception towards human sexuality may account for these findings.[23] Diabetes-mediated erectile dysfunction is thought to be caused by endothelial dysfunction and damage to smooth muscle tissues of corpus carvenosa.[24] Significantly lower levels of sexual desire among cases compared with controls may be associated with depressive states commonly found among the patients with diabetes.[25] Though desire is usually the initial stage of sexual activities, cases in this study were not found to be significantly affected by succeeding stages assessed within the erectile function, orgasm, intercourse, and overall satisfaction domains. Counseling with an emphasis on improved partner relationship and skills may be a key to restore sexual desire among the patients with diabetes. in the study setting. Low daily dose of 5 mg taladafil has also been found to effectively improve sexual function among the men with diabetes.[26]

The older and unmarried cases compared with controls in this study, had lower sexual function scores, though statistical significance was found only for females [Table 5]. The effect of increasing age on

sexual function among diabetics has been reported in several studies.[27] Aging is thought to be associated with changes in estrogen and vaginal dryness in women, as well as testosterone and neurovascular perfusion of erectile tissues in men, which may worsen sexual function among diabetics.[28] Improved physical exercise, psychotherapy, use of vaginal creams, supplements, and phosphodiesterase inhibitors are the various remedies used with varying degrees of long-term success.[27,29] Owing to sociocultural peculiarities of the study setting, unmarried status especially among older adult diabetics, may influence the frequency and/or regularity of sexual activity. This finding suggests that the potential benefit of healthy partner relationship in reducing the psychological impact of diabetes on sexual functioning may be missed by unmarried cases.[30] Also, compared with non-menopausal women, lower FSFI scores among menopausal subjects, suggests significant adverse effects of estrogen deficiency on sexual function in the study setting. The effect of estrogen deficiency may, however, be modified by several factors, including quality of partner relationship, as well as knowledge and access to preventive maternal health care.[31] Findings from a review of studies on menopause suggest better sexual function among women in developed compare with developing countries. This difference may be due to better knowledge and access to maternal healthcare among women in developed countries.[31]

Subject's admission to having problems with sexual life in this study was significantly associated with lower sexual function for both males and females [Table 5]. This finding has implications for improved clinical practice and counseling. For instance, it suggests that simple inquiry of client's challenges with sex may be a potentially sensitive and specific tool for the overall assessment of their sexuality. Unfortunately, such key discussion is rarely initiated in most clinic sessions,[32] as also indicated in this study where two-thirds (65.8%) of subjects were never asked about their sexual life [Table 2]. Owing to busy diabetic clinic sessions in many resource-limited settings, healthcare providers may be tempted to prioritize glycemic control and clinical management over the sexual wellbeing of their patients.[33] However, such negligence of duty by healthcare providers may be contributing significantly to the high burden of sexual dysfunction, and potential depression and low quality of life among the patients with diabetes in developing country settings.[33]

Among male cases, the use of supplements for enhancement of sexuality was found to be marginally associated with reduced sexual function. This paradoxical association suggests the inefficacy of locally available supplements, which may not be addressing the multifactorial etiologic basis for sexual dysfunction among the men with diabetes.[28] Tachyphylaxis accruing from long-term non-prescription use, and high prevalence of patronage of fake/adulterated medications in Nigeria, may account for inefficacy of supplements found in this study.[34] Unfortunately, this study is limited by non-assessment of specific supplements used by each subject, for better evaluation of rationale for their apparent inefficacies. Also, subjects may be having product marketing-based undue high expectations of efficacy of supplements, leading to an equally high degree of disappointment when they fail.[34] Consequently, use of supplements for enhancement of sexual function may be causing more harm than good for the patients with diabetes in the study setting.

In this study, the presence and duration of hypertension and diabetes had a significant adverse impact on sexuality among females. Among males, only the duration of hypertension had a significant adverse impact on their sexuality [Table 6]. Development of complications over time, and potentially increasing pill burden leading to depression, may be contributing to impairment of sexuality among the patients with diabetes.[35] Also, BMI was indirectly correlated with sexual function, but statistical significance was found only among males. Obesity has been reported to be associated with erectile dysfunction, based on endothelial dysfunction, potentially impairing perfusion of erectile tissue, and reduction in testosterone levels.[36] Despite these findings, this study is limited by a lack of assessment of other potential causes of sexual dysfunction, including the previous history of sexual abuse, partner relationship[37] and other forms of comorbid medical conditions.[38] Also, the IIEF instrument used for assessment of ED in men is limited by the inability to ascertain organic etiology which may require penile duplex Doppler ultrasonography which was not done.[39] This may have caused overrepresentation of ED, especially if a significant proportion had had psychogenic rather than organic forms of the disease. Nevertheless, these findings provide a useful baseline of a pattern of sexual dysfunction among the patients with diabetes in a developing country region with a high burden of diabetes and hypertension.[3]

Conclusion

This study found a high degree of sexual dysfunction among diabetic compared with the non-diabetic patients, especially among women in the study setting. An effective multi-disciplinary team comprising diabetologist, urologist, gynecologist, and psychiatrist is required to address this challenge of the impact of

diabetes on sexual function of patients. During each clinic consultation, healthcare providers should endeavor to privately enquire about their client's sexual life, with recognition of domains of sexual function that may be affected towards the provision of more effective diabetes care services in developing countries. More comprehensive clinical clerkship should be done for the identification of potential multifactorial risk factors for sexual dysfunction among diabetic and non-diabetic adults. Spouses of patients may also be involved in counseling sessions for the best clinical outcome.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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