

**ASSESSMENT OF THE PREVALENCE OF SEXUAL DYSFUNCTION  
AND ASSOCIATED FACTORS AMONG DIABETIC MEN ATTENDING  
FOLLOW UP CLINIC AT HAWASSA UNIVERSITY  
COMPREHENSIVE SPECIALIZED HOSPITAL, SIDAMA REGIONAL  
STATE, ETHIOPIA, 2023/24**

**TADELE KEGNU<sup>1\*</sup>, AKBERET SEMERE<sup>2</sup>, ASHAGRACHEW HAILE<sup>2</sup> &  
YEGZERU BELETE<sup>2</sup>**

<sup>1</sup>Department of Internal Medicine, College of Medicine and Health Sciences,  
Wachemo University, Hossana, Ethiopia.

<sup>2</sup>School of Medicine, College of Medicine and Health Sciences,  
Hawassa University, Hawassa, Ethiopia

<https://doi.org/10.37602/IJSSMR.2025.9112>

**ABSTRACT**

**Background:** Sexual dysfunction is a prevalent issue among adult males, leading to withdrawal from sexual relationships and various psychosocial challenges such as low self-esteem, depression, and anxiety. It can also result in decreased work productivity and negatively affect the quality of life for both the affected men and their female partners. Furthermore, sexual dysfunction can have significant economic repercussions for employers, as men experiencing this condition tend to have higher rates of absenteeism, presenteeism (working while impaired), and overall productivity loss compared to their counterparts without sexual dysfunction.

**Objectives:** This study aimed to evaluate the prevalence of sexual dysfunction and its associated factors in men with diabetes mellitus attending the follow-up clinic at Hawassa University Comprehensive Specialized Hospital.

**Methodology:** A cross-sectional study was conducted at Hawassa University Comprehensive Specialized Hospital, targeting a sample size of 204 men. Ultimately, 200 participants were interviewed, resulting in a response rate of 98%. The data were analysed using SPSS version 25, with results presented in frequency tables and cross-tabulations of selected variables. A binary logistic regression model was employed to identify factors linked to sexual dysfunction.

**Results:** The overall prevalence of sexual dysfunction among men with diabetes mellitus was found to be 71.5%. Significant associations were identified between sexual dysfunction and factors such as higher body mass index, being single, experiencing anxiety or depression, and physical inactivity.

**Conclusion:** Over two-thirds of men with diabetes report sexual dysfunction, a higher prevalence than in other studies. This finding underscores the necessity of incorporating the assessment and management of sexual dysfunction into standard medical care during diabetes follow-up appointments. Modifiable factors like depression, anxiety, physical inactivity, and high BMI should also be addressed.

**Keywords:** Sexual Dysfunction, Diabetes Mellitus, Hawassa, HUCSH

## 1.0 BACKGROUND

Diabetes mellitus is one of the most common chronic diseases globally; it is increasing rapidly in every part of the world, to the extent that it has now assumed epidemic proportions. The prevalence of diabetes is increasing worldwide. The International Diabetes Federation (IDF) estimates that 536.6 million people were living with diabetes in 2021, and this number is projected to increase by 46%, reaching 783.2 million by 2045 [1],[2]. Diabetes was responsible for around 6.7 million adult deaths in 2021. Diabetic prevalence is currently increasing more rapidly in low-income countries than in industrialized countries, where resources for diabetic management are low [3]. According to a 2022 IDF report, more than 80% of diabetics live in low- and middle-income countries [4]. The growth of DM in poor nations is being attributed to sedentary lives, expanding urbanized cultures, and associated changes in dietary and physical exercise habits [5].

Several behavioural and environmental factors have contributed to the rise in diabetes incidence in industrialized countries, including overweight (BMI  $\geq$  25 kg/m<sup>2</sup>), obesity (BMI,  $\geq$  30 kg/m<sup>2</sup>), physical inactivity, and increased caloric consumption; these have all been shown to be major risk factors for the development of type 2 diabetes, regardless of age and sex [6].

In the US, diabetes is the sixth leading cause of death for women and the fifth leading cause of death for men; it is also a leading cause of death in most developed countries [7]. Majority of people with diabetes die from diseases that are uniquely related to the condition – over 70% of people with diabetes die of cardiovascular disease (CVD), and 10%–20% die of renal failure [8].

Diabetes mellitus is associated with both macrovascular (including CVD) and microvascular (including retinopathy, nephropathy, and neuropathy) complications [9],[10]. People with diabetes are at a greater risk of developing CVDs, such as heart attack and stroke. The increased risk of CVD results, in part, from CVD risk factors that commonly accompany diabetes mellitus as type 2 diabetes is associated with clustered risk factors for coronary heart diseases (CHD) including hypertension, elevated low-density lipoprotein-cholesterol (LDL), and obesity [11],[12]. Diabetic patients also have elevated risk for sight loss, foot and leg amputation, and renal failure, due to microvascular complications, which cause damage to the nerves and blood vessels [13],[14].

Diabetes has been associated with sexual dysfunction both in men and in women [15],[16]. Diabetes is an established risk factor for sexual dysfunction in men; a threefold increased risk of erectile dysfunction (ED) was documented in diabetic compared with nondiabetic men [17]. Sexual dysfunction might occur in both sexes but the problem in men tends to be more associated with physical health including chronic disease and aging. Sexual dysfunction in men is categorized based on the sexual response cycle that includes hypoactive sexual desire, arousal disorder (erectile dysfunction (ED)), and orgasm disorder (premature, retrograde ejaculation, and anorgasmia). Patients with chronic disease(s) are more susceptible to developing SD related to physiological disruption, drugs side-effect, emotional disturbance, or the combination of those factors [6]. Among women, the evidence regarding the association

between diabetes and sexual dysfunction is less conclusive although most studies have reported a higher prevalence of female sexual dysfunction (FSD) in diabetic women as compared with nondiabetic women [18]–[20]

Studies evidenced that the age-adjusted risk of SD (ED) was doubled in diabetic men compared with those individuals without diabetes. Likewise, comorbid illnesses, for instance, hypertension increases the risk of developing SD; an estimated 40 to 80% of diabetic patients with HTN were reported to have SD associated with the effect of the illness itself, the drug side effect, and the psychological impact of chronic diseases. Moreover, patients with micro and macrovascular diabetic complications are also at higher risk of SD [21], [22].

There has been a global increase in male sexual disorders [23]. The magnitude of sexual problems was higher in East and Southeast Asia than in other regions of the world in which a bit lower than a third (31%) of men aged between 40 and 80 declared to experience SD. In East Asia, around 29.1 and 27.1% of victims claimed to have early ejaculation and ED forms of SD, respectively [24], [25]. ED is estimated to affect 152 million men worldwide [26]. The prevalence of erectile dysfunction among men with diabetes is over 50% in the United States, 35% to 78% in Mexico, 41% in The Netherlands, and 80% to 90% in Saudi Arabia [27]. The prevalence of erectile dysfunction has also been reported 35.8% in Italy [28], 64.6% in Japan [29], 65.4% in Korean [30], 38.9% in India [31].

Sexual dysfunction is prevalent in Sub-Saharan African countries. The prevalence of sexual dysfunction was 88% in a study conducted in Nigeria among 58 women with diabetes in case control study and 30 women without diabetes, which was higher than the control group [32]. According to studies, sexual dysfunction in women with diabetes mellitus ranges from 36.6% a cross-sectional study found in Kenya, with factors such as age, fasting blood glucose, hypertension, heart disease, depression, anxiety, and women's gender all playing a significant role [33]. Besides, one review in Africa found that the pooled prevalence of erectile dysfunction was 71.45% among diabetic patients [33]. Further, 12 million men are estimated to be affected by ED in Africa. In Nigeria in particular, more than three out of every 10 men have suffered from erectile dysfunction or another form of sexual dysfunction [23], [34].

In Ethiopia, 69.9–85.5% of diabetic men were indicated to have erectile dysfunction [35], [36]. Sexual dysfunction frequently occurs among DM patients. Studies reported the high prevalence, and earlier onset of sexual dysfunction among diabetic men when compared to non-diabetic [36],[37]. Similarly, the study conducted in northern Ethiopia showed the prevalence of erectile dysfunction among DM patients was 69% [35] and another study has documented low sexual desire, lack of sexual satisfaction, low vaginal lubrication and orgasmic dysfunction among women with DM [38].

In Ethiopia, SD is a common yet underappreciated complication of most NCDs [39]. However, there is missed opportunity to consider the interactive nature of different adversities that come together in the individual's life, which may lead to an underestimation of the event because of a culturally sensitive issue. In general, there is no well-documented, nationally representative Sexual dysfunction study data for men with diabetes in our country.

## 2.0 METHODOLOGY

## 2.1 Study area & setting

The Study was conducted at HUCSH, which is located in the Sidama Regional

State of Ethiopia. Hawassa, the capital of Sidama Regional state, is located 272 kms away from Addis Ababa. HUCSH is one of the federal hospitals in Ethiopia. This hospital offers healthcare management, surgical intervention, obstetric and gynaecological therapeutic interventions, paediatric, orthopaedic, and other vital services to a catchment population of over 18 million from Sidama regional state & neighbouring Oromia, Central Ethiopia and Somali region. There are several departments & units under it; one of which is Internal Medicine. There are a number of specialities and subspecialities under the department including Gastroenterology, Nephrology, Haematology, Pulmonology, Cardiology, Endocrinology & Neurology. Endocrinology clinic provides a follow up service for chronic illnesses including DM, thyroid disorders & significant others [94].

## 2.2 Study design & period

An institution-based prospective cross-sectional study was conducted from December 01, 2023 to November 30, 2024 among men with DM on follow up at HUCSH.

### Source population

- All men with diabetes mellitus attending chronic follow-up clinic at HUCSH.

### Study population

- The study population was a sample of men with diabetes mellitus who were on follow up during the study period in the diabetic clinics at HUCSH and who fulfilled eligibility criteria.

## 2.3 Inclusion and exclusion criteria

### Inclusion criteria

- All men with diabetes mellitus aged  $\geq 18$  years.

### Exclusion criteria

- Men with diabetes mellitus who were severely ill,
- Sexual disorder ascribed to a known etiology other than DM,
- Those with mental disorders or those who were disoriented,
- Those who were unable to communicate
- Repeated visit during study period and
- Those who were sexually inactive at the time of data collection

## Sample size and sampling procedure

The required sample size for the study was computed based on the formula for a single population proportion as follow:

$$n = \frac{Z^2 P (1-P)}{d^2}$$

d, Where

n=sample size required for the study

Z= standard normal distribution (Z=1.96) with confidence interval of 95% and  $\alpha=0.05$

P= the prevalence of sexual dysfunction among men with diabetes in previous study was 69.5 % [38]. Hence, P=0.695 was used.

d= Absolute precision or tolerable margin of error (d) =5%=0.05

$$n = \frac{(1.96)^2 \times 0.695 (1 - 0.695)}{(0.05)^2} = 326$$

Since the source population was less than 10,000, the final sample size was calculated as follows:

$n_f = \frac{n}{1+n/N}$ ;  $n_f$  represents the desired sample size; n is the estimated sample; N is an estimate of the total population

$$n_f = \frac{326}{1+326/430} = 185$$

With adjustment for 10% non-response rate, the final sample size was  $185 + 0.05(185)$ ; which equals to 204. Sampling method and technique

During the study period, a systematic sampling technique will be employed to choose the study population at diabetes outpatient unit. The first study subject was selected randomly from chronic follow up clinic and then every other diabetic male patient visiting referral clinic who fulfils inclusion criteria was selected & included in the study.

## 2.4 Variables

### Dependent variable

- Sexual dysfunction

### Independent variables

- Socio-demographic information- age, marital status, monthly income, educational status, occupational status and place of residence
- Clinical factors-types of diabetes, duration of diabetes, additional/chronic disease, antidiabetic medication, DM complications, body mass index, fasting blood sugar

- Behavioural and lifestyle factors-Alcohol, smoking, body mass index, and physical activity
- Psychosocial factor-stressful life event

## Operational definitions

- Sexual dysfunction – explained by a total score below the cut off points (47) from 70 for all 14-items of change in the sexual functioning questioner (CSFQ) [95].
- Sexual dissatisfaction- scoring less than 5 from CSFQ item 14 [40].
- Sexual desire disorder - scoring less than 20 from the sum of CSFQ-14- (items 2 through 6) [40].
- Arousal/Excitement dysfunction- explained by a score less than 14 from the sum of CSFQ-14- (items 7 through 9) [40].
- Anorgasmia – explained by score less than 14 from the sum of CSFQ-14- (items-11 through 13) [40].
- Sexual pain disorder - explained by score less than 5 from the CSFQ –14- (item ten) [40].
- Comorbid illness- existence of additional chronic illnesses, including hypertension, cardiac disease, dyslipidaemia, psychosis, renal disease, HIV, cancer, asthma, and multiple sclerosis [41].
- Diabetic complications- the existence of macrovascular diabetic complications, microvascular diabetic complications (retinopathy, neuropathy, and nephropathy), and diabetic foot ulcer [42].
- Poor glycemic control- current fasting blood glucose level greater than 130mg/dl or most recent HgA1c >9.0% reflecting poor glycemic control [42].
- Anxiety- a score of 8 or more based on a 14-item Likert scale is used to classify a subject as suffering from anxiety [43].
- Depression- a score of 8 or more based on a 14-item Likert scale is used to classify a subject as suffering from depression [43].
- Nutritional status- Underweight: BMI<18.5kg/m<sup>2</sup>; normal: 18.5–24.9kg/m<sup>2</sup>; overweight: 25–29.9 kg/m<sup>2</sup>; and obese: BMI > 30 kg/m<sup>2</sup> [44].

The data was collected through a face-to-face interviewer-administered questionnaire. Changes in Sexual Functioning Questionnaire (CSFQ-14) adapted from reliability and construct validity of the changes in sexual functioning questionnaire short-form (CSFQ-14) [40] was used to measure SD. The tool has fourteen items to assess the existence of SD. Hospital anxiety depression scale (HADS) based on 14-item Likert scale was utilized to assess for psychological factors [45].

Moreover, clinical information such as type of diabetes, glycemic control, the existence of diabetic complications, the medication regimen that the patient was taking, duration of diagnosis, comorbid illness, and medication-related data were also taken using semi-structured questionnaire.

## 2.5 Data collection procedures

Data collection was carried out in separate rooms from each individual by both faces to face interviews and reviewing the patient's medical charts using Amharic version of pre-tested questionnaire. Training was provided to data collectors and supervisors for two days on sampling procedures, ethical issues, confidentiality and related issues. Daily supervision and reviewing of the collected data were done by the investigator. For the sake of maintaining confidentiality during data collection, the names and addresses of the patients were not recorded in the data collection checklist

## 2.6 Data quality control

Validated, structured questionnaires, and pre-tested questionnaires were used to collect information. The English version of the instrument was translated to the Amharic local language by experienced health professionals and retranslated back to English to check for consistency. Structured questionnaires were pretested among 5% of the respondents at nearby Hospital to assess the applicability, ease of use, comprehension, relevance, and understandability of the study. During data collection, data collectors, supervisors, and eventually the investigators checked the questionnaire for completeness on a daily basis, and any incomplete data was discarded.

## 2.7 Data processing, analysis, interpretation, and presentation

The collected data was checked for consistency, coding errors, completeness, accuracy, clarity, and missing values before being entered into the statistical package for social science (SPSS) version 25. All continuous independent variables were categorized as either categorical or continuous. The statistical assumptions of factor analysis were checked. All eligible factor scores were computed using the regression-based method to generate one variable with the response variable. The outcome variable was dichotomized and coded as '0' and '1', representing those who have no SD and those who have SD, respectively.

Descriptive statistics like frequency, percentage, and measure of central tendency with their corresponding measure of dispersion were used to describe demographic and other variables. Tables, graphs, and texts were used to present the findings. Furthermore, binary logistic regression analysis was applied to identify factors associated with SD. Those variables with a p-value  $\leq 0.25$  in the bivariable analysis were entered into the multivariable logistic regression model to control the possible effects of confounders and identify the significant factors. The strength of the association was presented by an odds ratio of 95% CI. The variables that have independent correlations with SD were identified based on the adjusted ratio (AOR) and p-value with its corresponding 95% CI.

## 2.8 Ethical consideration

Ethical clearance was obtained from the institutional review board of the College of Medicine and Health sciences of Hawassa University. Since the study did not use any invasive procedure and biological samples of respondents, oral consent was taken after participants were informed about the risk, benefit, and their right to withdraw from the study at any time during the interview process. Moreover, all information taken from the respondents were kept confidential and the entire data collected was only used for the purpose of this study.

**3.0 RESULTS**

**3.1 Socio-demographic characteristics**

Among 204 planned samples, 200(98%) were successfully involved in the study. Majority of the respondents, 67 (33.5%), were in the age range of 31 and 40 years old. Out of the total respondents, 151 (75.5) were married, 100 (50) had attended college & above education, 126 (63%) were urban residents, 61 (30.5) were farmers & 75 (37.5) had an average monthly income of 6000-9999ETB (Table 1).

**Table 1: Socio-demographic characteristics of respondents, HUCSH, Sidama Regional state, Ethiopia, 2023/4 (N=200)**

Variables	Category	n (%)
Age in years	18-30	44 (22)
	31-40	67 (33.5)
	41-50	53 (26.5)
	≥ 50	36 (18)
Place of residence	Urban	126 (63)
	Rural	74 (37)
Marital status	Single	48 (24)
	Married	151 (75.5)
	Widowed	1 (0.5)
Educational status	Cannot write and read	3 (1.5)
	Can write and read	29 (14.5)
	Completed secondary school (9-12)	68 (34)
	College and above	100 (50)
Occupation	Farmer	61 (30.5)
	Government employee	44 (22)
	Private	86 (43)
	Others*	9 (4.5)
Monthly family income (ETB)	<1000	15 (7.5)
	1,000-2999	13 (6.5)
	3000-5999	55 (27.5)
	6000-9999	75 (37.5)
	≥10000	42 (21)

Key: ETB: Ethiopian birr

\*Merchants, students

**3.2 Baseline and clinical characteristics**

Out of the 200 respondents, 143(71.5%) had type II diabetes mellitus, 121 (60.5%) had diabetes for more than 5 years & 141 (70.5) were taking oral hypoglycemic drugs. Nearly One-thirds (32.5%) of the respondents were found to have comorbid disease conditions and cardiovascular

disorder (hypertension) was the most common comorbidity among the study participants. Out of the total respondents, 58 (29%) had a history of alcohol use, 22(11%) had khat use and 15(7.5%) had tobacco use. Majority (81.5%) of the participants had a normal BMI. Seventy-nine (39.5%) of the respondents had poor glycemic control (FBS > 130 mg/dL and /or HgA1c>9%). More than half (51.5%) of study participants were engaged in guidelines recommended physical activity (Table 2).

**Table 2: Baseline, behavioral, life style and clinical characteristics of respondents, HUCSH, Sidama Regional state, Ethiopia, 2023/4 (N=200)**

Variables	Category	n (%)
BMI (Kg/m <sup>2</sup> )	Normal (18.5-24.9)	163 (81.5)
	Over weight (25-29.9)	37 (18.5)
History of chewing khat	(Yes) vs (in last 3 months)	22 (11) vs 5 (2.5)
	No	178 (89) vs 195 (97.5)
History of drinking alcohol	(Yes) vs in last 3 months	58 (29) vs 25 (12.5)
	No	142 (71) vs 175 (87.5)
History of using tobacco	(Yes) vs in last 3 months	15 (7.5) vs 2 (1)
	No	185 (92.5) vs 198 (99)
Duration of Diabetes (in years)	<5	79 (39)
	≥5	121 (60.5)
Type of Diabetes (DM)	Type I DM	57 (28.5)
	Type II DM	143 (71.5)
Current fasting blood sugar (FBS) or HgA1c level	FBS ≤130mg/dl or HgA1c ≤ 9%	121 (60.5)
	FBS >130mg/dl or HgA1c > 9%	79 (39.5)
Medication(s)	Combined insulin	49 (24.5)
	Oral hypoglycaemic	141 (70.5)
	Insulin and oral	10 (5)
Comorbidity	Yes	65 (32.5)
	No	135 (67.5)
Common comorbid conditions (n=65)	Cardiovascular disease	62 (95.5)
	Respiratory disease	1 (1.5)
	Renal disease	2 (3)
Diabetic complication	Yes	33 (16.5)
	No	167 (84.5)
Diabetic complications (n=13)	Diabetic retinopathy	6 (18.2)
	Diabetic nephropathy	9 (27.3)
	Diabetic neuropathy	15 (45.5)
	Others**	3(9)
Physical activity	Yes	103 (51.5)
	No	97 (48.5)

**Key:** BMI: body mass index, DM: diabetes mellitus, HgA1c: glycosylated hemoglobin

\*\* Cardiovascular

About 16.5% of the participants had DM related complications and the most common complication was diabetic neuropathy (45.5%) (as shown in Figure 1).

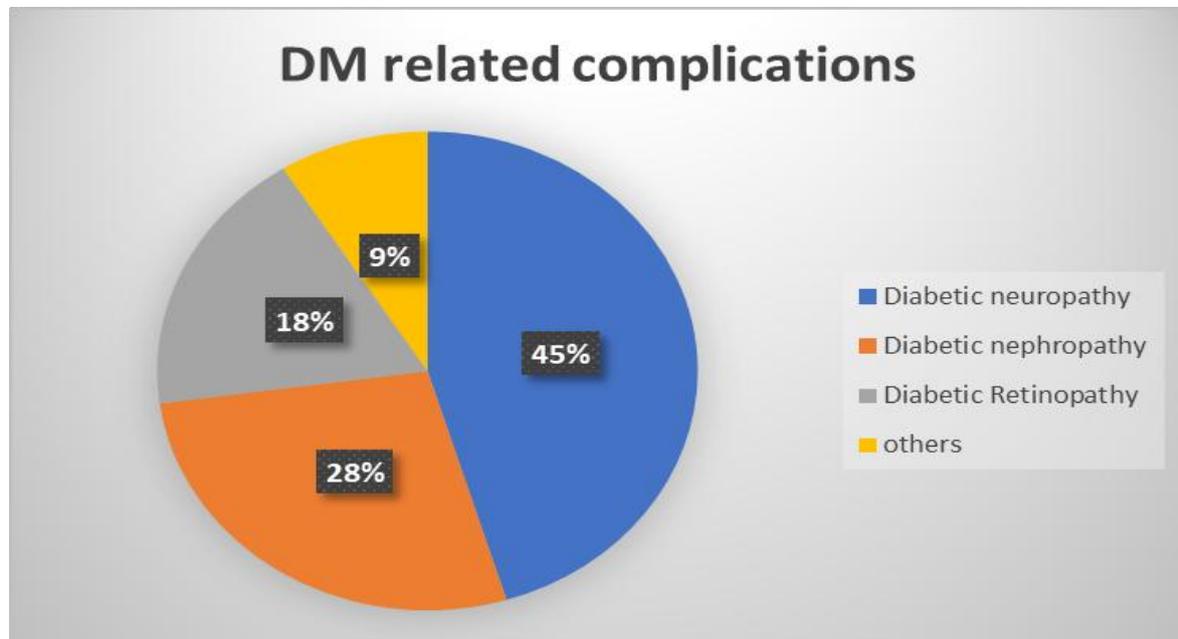
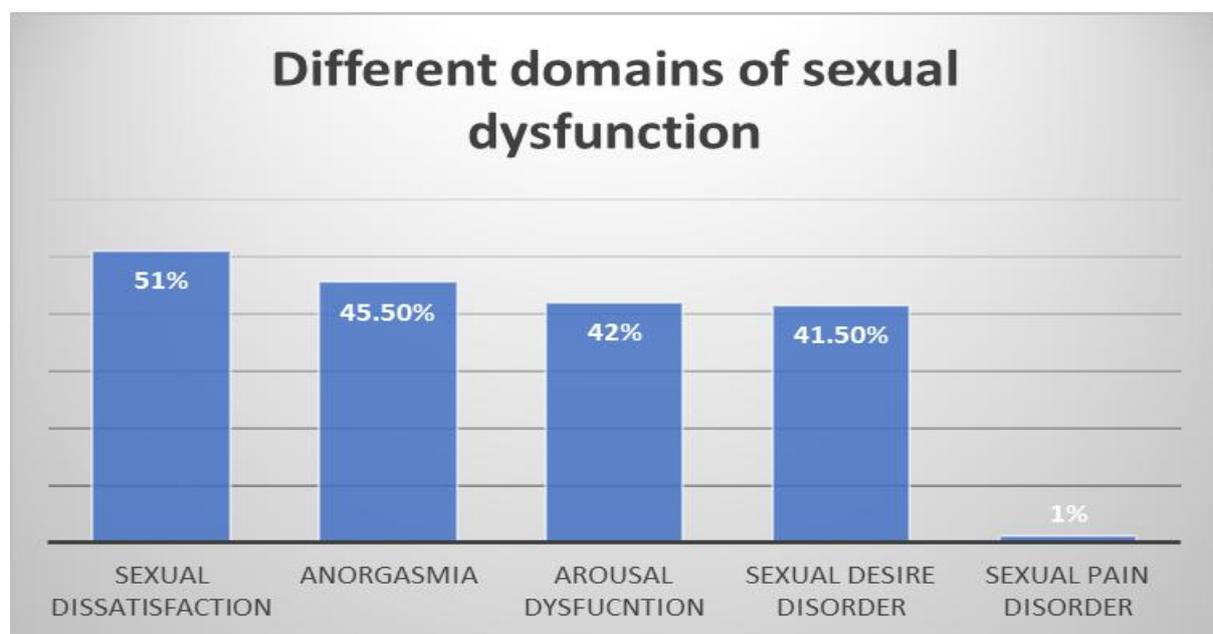


Figure 1: DM related complications among respondents, HUCSH, Sidama Regional state, Ethiopia, 2023/4 (N=200)

### 3.3 Prevalence of sexual dysfunctions (SD) and Anxiety/Depressions

The prevalence of sexual dysfunction among study participants was 74.5%. The most frequently reported domains of sexual dysfunction were sexual dissatisfaction (51%), anorgasmia (45.5%), and arousal/excitement dysfunction (42%) (as shown in Figure 2).



**Figure 2: Prevalence of different domains of sexual dysfunctions among male patients with diabetes, HUCSH, Sidama Regional state, Ethiopia, 2023/4 (N=200)**

**3.4 Predictors of sexual dysfunction**

The independent variables were analysed individually with the outcome (sexual dysfunction). Based on bivariate binary logistic regression analyses, marital status, physical activity, comorbidities, tobacco use, BMI& presence of depression had a p-value of  $\leq 0.25$ ; hence, they were candidates for a multivariable model. In the multivariate binary logistic regression, overweight (OR=6.4, 95% CI: 1.67-24.47), being single (OR=9.8, 95% CI: 1.10-90.10), physical activity (OR=0.3, 95% CI: 0.15-0.75) and the presence of depressed or anxiety (OR=5.8, 95% CI: 1.56-21.57) were significantly associated ( $p < 0.05$ ) with sexual dysfunction (Table 3).

**Table 3: Factors associated with sexual dysfunction among male diabetic patients, HUCSH, Sidama Regional state, Ethiopia, 2023/4 (N=200)**

Key: \*Statistically significant at P-value < 0.05

Variables	Category	SD		P-value	Adjusted OR (95% CI)	P-value
		Yes	No			
HADS score	$\geq 8$	80	2	0.10	5.8 (1.56-21.57)	<b>0.00*</b>
	<8**	69	49			
Physical activity	Yes**	77	26	0.16	0.3 (0.15-0.75)	<b>0.00*</b>
	No	72	25			
Comorbidity	Yes	54	11	0.06	0.69 (0.28-1.70)	0.42
	No**	95	40			
Previous history of tobacco use	Yes	12	3	0.14	0.95 (0.23-3.95)	0.95
	No**	137	48			
BMI (Kg/m <sup>2</sup> )	18.5-24.9**	115	48	0.19	6.4 (1.67-24.47)	<b>0.00*</b>
	25-29.9	34	3			
Marital status	Single	27	21	0.01	9.8 (1.10-90.10)	<b>0.04*</b>
	Married	121	30	0.82	3.2 (0.38-27.28)	0.28
	Widowed	1	0	0.06		0.98

\*\* Reference

OR: odd ratio, CI: confidence interval, SD: sexual dysfunction

**4.0 DISCUSSION**

This study revealed that the prevalence of sexual dysfunction among diabetic male patients was 71.5%. This is consistent with global estimates, which suggest that 50-75% of diabetic men experience some form of sexual dysfunction, primarily erectile dysfunction (100). However, this finding is higher compared with a systematic review and meta-analysis of six studies that revealed the prevalence of sexual dysfunction in Ethiopia [2]. The prevalence of this study was also lower than studies found in Nigeria at 88% [32] and Iran at 88% [46]. This variation might be due to differences in the sociocultural related factors of study participants, sample size and the tool used to measure sexual dysfunction in different studies. The high prevalence of sexual disorders amongst DM patients could be due to prolonged hyperglycemia that causes impairment of sexual functions by causing atherosclerosis, diabetic neuropathy, diabetes-induced endothelial dysfunction and endocrinological changes [47]. Yet, the high prevalence of sexual dysfunction in this study might be due to lack of control for some medical, psychological and drug-related factors that can affect sexual function.

This study revealed that over 41% of study participants experienced anxiety and/or depressive disorders as a significant contributing factor to sexual dysfunction. This is consistent with existing literature that highlights the psychological burdens associated with chronic illnesses, particularly diabetes, which is known to affect both physical and mental well-being [103]. Anxiety and depression can lead to diminished libido, impaired erectile function, and overall dissatisfaction with sexual experiences, creating a vicious cycle that further exacerbates these mental health conditions [104].

In this study, a single marital status was a significant predictor of sexual dysfunction among diabetic men. This is consistent with existing literature both in Ethiopia and globally. In Ethiopia, studies have shown that social support and intimate relationships play crucial roles in the overall well-being of individuals, including those with chronic conditions like diabetes. The lack of a partner may lead to increased stress and anxiety, which are known contributors to sexual dysfunction [105]. Globally, research indicates that marital status is closely linked to sexual health outcomes, with married individuals often reporting higher levels of sexual satisfaction and functioning compared to their single counterparts [106]. This disparity may be attributed to the emotional and psychological benefits of companionship, which can mitigate the effects of chronic illnesses such as diabetes.

This study also revealed that overweight individuals were 6.4 times more likely to experience sexual dysfunction than those with normal BMI. This correlation can be attributed to various physiological and psychological factors, including hormonal imbalances, reduced blood flow, and increased levels of anxiety and depression often associated with obesity. A study conducted in Ethiopia found that overweight and obese diabetic patients reported higher incidences of sexual dysfunction, highlighting the need for targeted interventions in this population (105). Another global study supports these findings, demonstrating that obesity can negatively impact sexual health across diverse populations (106). These insights underscore the importance of addressing weight management in diabetes care, as improving body weight may not only enhance overall health but also improve sexual function and quality of life for affected individuals. As such, healthcare providers should incorporate weight management strategies into their treatment plans for diabetic patients to mitigate the risk of sexual dysfunction and promote holistic well-being.

Physically active participants, on the other hand, had a lower probability of suffering sexual dysfunction (AOR = 0.3, 95%CI: 0.15-0.75). The adjusted odds ratio (AOR = 0.3, 95% CI: 0.15-0.75) indicates a significantly lower probability of sexual dysfunction among physically active participants, underscoring the protective effects of regular exercise. This is consistent with research conducted in Ethiopia, which demonstrated that lifestyle modifications, including increased physical activity, can improve not only glycemic control but also overall quality of life for diabetic patients (9). Globally, studies have shown that physical inactivity is a modifiable risk factor for sexual dysfunction, as it contributes to various physiological changes such as obesity and cardiovascular issues, which are prevalent in diabetic populations [106]. By promoting physical activity as part of diabetes management, healthcare providers can potentially enhance sexual health outcomes, highlighting the importance of comprehensive lifestyle interventions in this demographic.

The finding that the majority (33.5%) of respondents with diabetes mellitus were in the age range of 31-40 years highlights a critical demographic trend that warrants attention. This age group is often characterized by significant life transitions, including career development, family formation, and increased responsibilities, which can contribute to stress and lifestyle changes that may adversely affect health. The prevalence of diabetes in this age bracket suggests that early intervention and education are crucial, as individuals may not yet recognize the long-term implications of their condition. Additionally, the psychological and social pressures faced by men in this age group could exacerbate both the physical and emotional challenges associated with diabetes, potentially leading to issues such as sexual dysfunction [107]. Therefore, targeted health promotion strategies that address the unique needs of younger diabetic men are essential for improving their overall health outcomes and quality of life.

## 5.0 LIMITATIONS OF THE STUDY

The primary limitation of this research is its cross-sectional design, which restricts the ability to determine clear cause-and-effect relationships. Additionally, the study lacked follow-up, leaving out important aspects such as long-term outcomes after discharge, adherence to medication, lifestyle recommendations, patient quality of life, and economic implications. Lastly, the study was conducted in a single location, which may not accurately reflect practices across Ethiopia, especially in more remote and rural areas.

## 6.0 CONCLUSION AND RECOMMENDATION

This study highlights a significant prevalence of sexual dysfunction among individuals with diabetes, revealing that multiple factors contribute to these challenges. Key influences include body mass index (BMI), psychological issues such as anxiety and depression, and social aspects like marital status.

The findings stress the urgent need for healthcare providers to routinely assess sexual dysfunction in diabetes care. Clinicians should foster a supportive environment that encourages patients to discuss their sexual health openly. Regular inquiries into the sexual history of men with diabetes should be standard practice during follow-up appointments, as this is crucial for comprehensive patient care.

Healthcare providers must also deliver tailored interventions for those experiencing sexual dysfunction, which may include medical treatments, counselling, or referrals to specialists. Education is essential; thus, efforts should be made to inform patients about the benefits of regular physical activity and adherence to medication, as these lifestyle changes can improve overall health and help alleviate symptoms of sexual dysfunction.

Additionally, timely management of diabetes-related comorbidities is vital for reducing risk factors associated with sexual health issues. A proactive approach to comprehensive care can enhance both sexual health outcomes and the overall quality of life for diabetic patients.

In light of these findings, it is crucial for the Ethiopian Ministry of Health to prioritize diabetes within its public health agenda, allocating resources for education, screening, and treatment initiatives that address the intertwined issues of diabetes and sexual health.

Finally, further research is essential, focusing on larger sample sizes and incorporating laboratory parameters such as HbA1c levels and serum testosterone. This broader research scope will deepen our understanding of the risk factors for sexual dysfunction in diabetic patients and support the development of targeted interventions.

In summary, addressing sexual dysfunction in patients with diabetes is a vital aspect of comprehensive diabetes care. By prioritizing this issue, healthcare providers can significantly improve patient outcomes and promote a more holistic approach to managing chronic diseases.

## 6.1 Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

## ABBREVIATIONS

AIDS-Acquired Immune Deficiency Syndrome  
BMI-Body Mass Index  
CHD-Coronary Heart Disease  
CKD-Chronic Kidney Disease  
CSFQ- Change in the Sexual Functioning questioner  
CVD-Cardiovascular Disease  
ED-Erectile Dysfunction  
ETB-Ethiopian Birr  
FSD-Female Sexual Dysfunction  
HIV-Human Immune deficiency Virus  
HUCSH-Hawassa University Comprehensive Specialized Hospital  
IDF- International Diabetes Federation  
LDL-Low Density Lipoprotein  
NCDs- Non-Communicable Diseases  
NO-Nitric Oxide  
SD-Sexual Dysfunction

## REFERENCES

1. H. Sun et al., "IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045.," *Diabetes Res. Clin. Pract.*, vol. 183, p. 109119, Jan. 2022, doi: 10.1016/j.diabres.2021.109119.
2. K. Ogurtsova et al., "IDF diabetes Atlas: Global estimates of undiagnosed diabetes in adults for 2021.," *Diabetes Res. Clin. Pract.*, vol. 183, p. 109118, Jan. 2022, doi: 10.1016/j.diabres.2021.109118.
3. N. H. Cho et al., "IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045.," *Diabetes Res. Clin. Pract.*, vol. 138, pp. 271–281, Apr. 2018, doi: 10.1016/j.diabres.2018.02.023.
4. Mineral Commodities Ltd, "Annual Report," *Miner. Commod. Ltd ACN 008 478 653*, no. April, p. 134, 2022, [Online]. Available: [www.moh.gov.my](http://www.moh.gov.my)
5. W. Animaw and Y. Seyoum, "Increasing prevalence of diabetes mellitus in a developing country and its related factors.," *PLoS One*, vol. 12, no. 11, p. e0187670, 2017, doi: 10.1371/journal.pone.0187670.
6. P. G. Kopelman, "Obesity as a medical problem.," *Nature*, vol. 404, no. 6778, pp. 635–643, Apr. 2000, doi: 10.1038/35007508.
7. A. S. Go et al., "heart disease and stroke statistics--2013 update: a report from the American Heart Association.," *Circulation*, vol. 127, no. 1, pp. e6–e245, Jan. 2013, doi: 10.1161/CIR.0b013e31828124ad.
8. B. Kozak, International Diabetes Federation (IDF) highlights growing global impact of diabetes in 5th edition of the Diabetes Atlas. 2012. [Online]. Available: <https://diabetesatlas.org/atlas/tenth-edition/%0Ahttps://diabetesatlas.org/data/en/world/>
9. C. Campos, "Chronic hyperglycemia and glucose toxicity: pathology and clinical sequelae.," *Postgrad. Med.*, vol. 124, no. 6, pp. 90–97, Nov. 2012, doi: 10.3810/pgm.2012.11.2615.
10. S. Rahman, T. Rahman, A. A.-S. Ismail, and A. R. A. Rashid, "Diabetes-associated macrovasculopathy: pathophysiology and pathogenesis.," *Diabetes. Obes. Metab.*, vol. 9, no. 6, pp. 767–780, Nov. 2007, doi: 10.1111/j.1463-1326.2006.00655.x.
11. C. S. Fox et al., "Increasing cardiovascular disease burden due to diabetes mellitus: the Framingham Heart Study.," *Circulation*, vol. 115, no. 12, pp. 1544–1550, Mar. 2007, doi: 10.1161/CIRCULATIONAHA.106.658948.
12. S. R. Preis et al., "Trends in cardiovascular disease risk factors in individuals with and without diabetes mellitus in the Framingham Heart Study.," *Circulation*, vol. 120, no. 3, pp. 212–220, Jul. 2009, doi: 10.1161/CIRCULATIONAHA.108.846519.
13. D. M. Nathan et al., "The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus.," *N. Engl. J. Med.*, vol. 329, no. 14, pp. 977–986, Sep. 1993, doi: 10.1056/NEJM199309303291401.
14. I. M. Stratton et al., "Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study.," *BMJ*, vol. 321, no. 7258, pp. 405–412, Aug. 2000, doi: 10.1136/bmj.321.7258.405.
15. H. A. Feldman, I. Goldstein, D. G. Hatzichristou, R. J. Krane, and J. B. McKinlay, "Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study.," *J. Urol.*, vol. 151, no. 1, pp. 54–61, Jan. 1994, doi: 10.1016/s0022-5347(17)34871-1.

16. C.-C. Lu, B.-P. Jiann, C.-C. Sun, H.-C. Lam, C.-H. Chu, and J.-K. Lee, "Association of glycemic control with risk of erectile dysfunction in men with type 2 diabetes," *J. Sex. Med.*, vol. 6, no. 6, pp. 1719–1728, Jun. 2009, doi: 10.1111/j.1743-6109.2009.01219.x.
17. F. Giugliano, M. Maiorino, G. Bellastella, M. Gicchino, D. Giugliano, and K. Esposito, "Determinants of erectile dysfunction in type 2 diabetes," *Int. J. Impot. Res.*, vol. 22, no. 3, pp. 204–209, 2010, doi: 10.1038/ijir.2010.1.
18. P. Enzlin et al., "Sexual dysfunction in women with type 1 diabetes: long-term findings from the DCCT/ EDIC study cohort," *Diabetes Care*, vol. 32, no. 5, pp. 780–785, May 2009, doi: 10.2337/dc08-1164.
19. R. M. Abu Ali, R. M. Al Hajeri, Y. S. Khader, N. S. Shegem, and K. M. Ajlouni, "Sexual dysfunction in Jordanian diabetic women," *Diabetes Care*, vol. 31, no. 8, pp. 1580–1581, Aug. 2008, doi: 10.2337/dc08-0081.
20. A. Salonia et al., "Sexual function and endocrine profile in fertile women with type 1 diabetes," *Diabetes Care*, vol. 29, no. 2, pp. 312–316, Feb. 2006, doi: 10.2337/diacare.29.02.06.dc05-1067.
21. E. Selvin, A. L. Burnett, and E. A. Platz, "Prevalence and risk factors for erectile dysfunction in the US," *Am. J. Med.*, vol. 120, no. 2, pp. 151–157, Feb. 2007, doi: 10.1016/j.amjmed.2006.06.010.
22. F. A. Giuliano, A. Leriche, E. O. Jaudinot, and A. S. de Gendre, "Prevalence of erectile dysfunction among 7689 patients with diabetes or hypertension, or both," *Urology*, vol. 64, no. 6, pp. 1196–1201, Dec. 2004, doi: 10.1016/j.urology.2004.08.059.
23. E. O. Laumann et al., "Sexual problems among women and men aged 40-80 y: prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors," *Int. J. Impot. Res.*, vol. 17, no. 1, pp. 39–57, 2005, doi: 10.1038/sj.ijir.3901250.
24. D. M. Lee, J. Nazroo, D. B. O'Connor, M. Blake, and N. Pendleton, "Sexual Health and Well-being Among Older Men and Women in England: Findings from the English Longitudinal Study of Ageing," *Arch. Sex. Behav.*, vol. 45, no. 1, pp. 133–144, Jan. 2016, doi: 10.1007/s10508-014-0465-1.
25. F. Lotti and M. Maggi, "Sexual dysfunction and male infertility," *Nat. Rev. Urol.*, vol. 15, no. 5, pp. 287–307, May 2018, doi: 10.1038/nrurol.2018.20.
26. M. H. Blanker et al., "Erectile and ejaculatory dysfunction in a community-based sample of men 50 to 78 years old: prevalence, concern, and relation to sexual activity," *Urology*, vol. 57, no. 4, pp. 763–768, Apr. 2001, doi: 10.1016/s0090-4295(00)01091-8.
27. F. Sharifi, M. Asghari, Y. Jaber, O. Salehi, and F. Mirzamohammadi, "Independent Predictors of Erectile Dysfunction in Type 2 Diabetes Mellitus: Is It True What They Say about Risk Factors?" *ISRN Endocrinol.*, vol. 2012, p. 502353, 2012, doi: 10.5402/2012/502353.
28. D. Fedele et al., "Erectile dysfunction in diabetic subjects in Italy. Gruppo Italiano Studio Deficit Erettile nei Diabetici," *Diabetes Care*, vol. 21, no. 11, pp. 1973–1977, Nov. 1998, doi: 10.2337/diacare.21.11.1973.
29. H. Minami et al., "Physical activity and prevalence of erectile dysfunction in Japanese patients with type 2 diabetes mellitus: The Dogo Study," *J. Diabetes Investig.*, vol. 9, no. 1, pp. 193–198, Jan. 2018, doi: 10.1111/jdi.12660.

30. N. H. Cho et al., "Prevalence of erectile dysfunction in Korean men with Type 2 diabetes mellitus.," *Diabet. Med.*, vol. 23, no. 2, pp. 198–203, Feb. 2006, doi: 10.1111/j.1464-5491.2005.01789.x.
31. A. Dan, K. Chakraborty, M. Mondal, R. Neogi, S. Chatterjee, and M. Makhal, "Erectile dysfunction in patients with diabetes mellitus: its magnitude, predictors and their bio-psycho-social interaction: a study from a developing country.," *Asian J. Psychiatr.*, vol. 7, no. 1, pp. 58–65, Feb. 2014, doi: 10.1016/j.ajp.2013.10.012.
32. K. Ekoru et al., "Type 2 diabetes complications and comorbidity in Sub-Saharan Africans," *EClinicalMedicine*, vol. 16, pp. 30–41, 2019, doi: <https://doi.org/10.1016/j.eclinm.2019.09.001>.
33. W. S. Shiferaw, T. Y. Akalu, and Y. A. Aynalem, "Prevalence of Erectile Dysfunction in Patients with Diabetes Mellitus and Its Association with Body Mass Index and Glycated Hemoglobin in Africa: A Systematic Review and Meta-Analysis.," *Int. J. Endocrinol.*, vol. 2020, p. 5148370, 2020, doi: 10.1155/2020/5148370.
34. E. O. Amoo, A. K. Omideyi, T. O. Fadayomi, M. P. Ajayi, G. A. Oni, and A. E. Idowu, "Male reproductive health challenges: appraisal of wives coping strategies," *Reprod. Health*, vol. 14, no. 1, p. 90, 2017, doi: 10.1186/s12978-017-0341-2.
35. A. Seid, H. Gerensea, S. Tarko, Y. Zenebe, and R. Mezemir, "Prevalence and determinants of erectile dysfunction among diabetic patients attending in hospitals of central and northwestern zone of Tigray, northern Ethiopia: a cross-sectional study.," *BMC Endocr. Disord.*, vol. 17, no. 1, p. 16, Mar. 2017, doi: 10.1186/s12902-017-0167-5.
36. B. Walle, K. R. Lebeta, Y. D. Fita, and H. G. Abdissa, "Prevalence of erectile dysfunction and associated factors among diabetic men attending the diabetic clinic at Felege Hiwot Referral Hospital, Bahir Dar, North West Ethiopia, 2016.," *BMC Res. Notes*, vol. 11, no. 1, p. 130, Feb. 2018, doi: 10.1186/s13104-018-3211-2.
37. E. Getie Mekonnen, H. Y. Yeshita, and A. Bishaw Geremew, "Sexual dysfunction among men with diabetes mellitus attending chronic out-patient department at the three hospitals of Northwest Amhara region, Ethiopia: Prevalence and associated factors.," *PLoS One*, vol. 16, no. 8, p. e0256015, 2021, doi: 10.1371/journal.pone.0256015.
38. F. Arrellano-Valdez, M. Urrutia-Osorio, C. Arroyo, and E. Soto-Vega, "A comprehensive review of urologic complications in patients with diabetes.," *Springerplus*, vol. 3, p. 549, 2014, doi: 10.1186/2193-1801-3-549.
39. A. E. Abosetugn and S. S. Yehualashet, "Estimate the burden of sexual dysfunction due to non-communicable diseases in Ethiopia: Systematic review and meta-analysis.," *PLoS One*, vol. 16, no. 10, p. e0258938, 2021, doi: 10.1371/journal.pone.0258938.
40. A. Keller, E. L. McGarvey, and A. H. Clayton, "Reliability and construct validity of the Changes in Sexual Functioning Questionnaire short-form (CSFQ-14).," *J. Sex Marital Ther.*, vol. 32, no. 1, pp. 43–52, 2006, doi: 10.1080/00926230500232909.
41. N. Muturi, "Alcohol consumption and reproductive health risks in rural Central Kenya.," *Sex. Reprod. Healthc. Off. J. Swedish Assoc. Midwives*, vol. 5, no. 2, pp. 41–46, Jun. 2014, doi: 10.1016/j.srhc.2014.01.002.
42. J. H. Romeo, A. D. Seftel, Z. T. Madhun, and D. C. Aron, "Sexual function in men with diabetes type 2: association with glycemic control.," *J. Urol.*, vol. 163, no. 3, pp. 788–791, Mar. 2000.

43. M. Hansson, J. Chotai, A. Nordstöm, and O. Bodlund, "Comparison of two self-rating scales to detect depression: HADS and PHQ-9.," *Br. J. Gen. Pract. J. R. Coll. Gen. Pract.*, vol. 59, no. 566, pp. e283-8, Sep. 2009, doi: 10.3399/bjgp09X454070.
44. "Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults--The Evidence Report. National Institutes of Health.," *Obes. Res.*, vol. 6 Suppl 2, pp. 51S-209S, Sep. 1998.
45. A. S. Zigmond and R. P. Snaith, "The hospital anxiety and depression scale.," *Acta Psychiatr. Scand.*, vol. 67, no. 6, pp. 361-370, Jun. 1983, doi: 10.1111/j.1600-0447.1983.tb09716.x.
46. M. Ziaei-Rad, M. Vahdaninia, and A. Montazeri, "Sexual dysfunctions in patients with diabetes: a study from Iran.," *Reprod. Biol. Endocrinol.*, vol. 8, p. 50, May 2010, doi: 10.1186/1477-7827-8-50.
47. C. Rochester-Eyeguokan and L. Meade, "A Practical Approach to Managing Hypoactive Sexual Desire Disorder in Women with Diabetes.," *Diabetes Ther. Res. Treat. Educ. diabetes Relat. Disord.*, vol. 8, no. 5, pp. 991-998, Oct. 2017, doi: 10.1007/s13300-017-0313-0.