Prevalence of Sexual Dysfunction in Women with Type 1, 2 Diabetes and Thyroid Disorder: A Cross-Sectional Study in Taif City, Saudi Arabia

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Research Article

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Abstract

Background: Women with diabetes mellitus or thyroid disorders are at risk of sexual dysfunction. This study aimed to estimate the prevalence of female sexual dysfunction (FSD) in women with diabetes and/or thyroid disorders and the impact of disease control on the ASEX score.

Methods: A cross-sectional study for female patients who had a routine clinic visit were included. The Arizona Sexual Experience Scale (ASEX) was used to evaluate for FSD. Those with a total score of ≥ 19 or scored ≥ 5 on any item or ≥ 4 on three items were considered to have FSD.

Results: A total of 253 female patients with a mean age of 39.1 ± 7.3 years were included. Two-thirds of the participants have no FSD. More than half (57.7%) of the participants had a strong desire for sex, and about 20% of the participants were unsatisfied with their orgasm. Compared to those with no FSD, those with FSD had lower BMI (P = 0.375), more likely to have a master's degree or higher (P = 0.117), diabetes (P = 0.879), hypothyroidism (P = 0.625), diabetes-related microvascular and macrovascular complications (P = 0.049), higher HbA1c, fasting glucose, and TSH (P = 0.731, P = 0.161, and P = 0.561, respectively), lower total cholesterol and LDL (P = 0.368 and P = 0.339, respectively), and exercise more regularly (P = 0.929).

Conclusion: One-third (32.5%) of the study participants had a FSD. Those with type 1 diabetes had the highest ASEX scores. We detected non-significant negative correlations between total ASEX score and both BMI and TSH, as well as a non-significant positive correlation between total ASEX score and both HbA1c and fasting glucose value.

Introduction

Sexual functions are an important aspect of human life. Along with sleeping and eating, sexual functioning is one of the basic human drives. As such, sexual satisfaction and normal sexual functioning are significant factors in determining quality of life [(1)].

Many definitions of sexual dysfunctions have been described in the literature. However, all refer to either a sexual life not meeting the person's expectations or a disturbance in their normal sexual response during any part of intercourse that leads to less or no satisfaction. According to the Diagnostic and Statistical Manual of Mental Disorders (5th edition), there are three main categories of female sexual dysfunction (FSD): female sexual interest/arousal disorder, female orgasmic disorder, and genito-pelvic pain/penetration disorder [(2,3)].

Depression was found to be the most common cause for FSD in several published studies, not to mention that sexual dysfunction itself could lead to depression as well [(4)]. Also, antidepressant medications, such as serotonin reuptake inhibitors, affect sexual desire and function [(5)]. FSD was reported among women that suffer from migraine headaches as they express more pain during sexual intercourse [(6, 7)]. Several studies show a relation between FSD and poor control of headache [(6,8)].

Furthermore, chronic diseases, such as systemic hypertension, can contribute to sexual dysfunction due to vascularity impairment of many structures, including the genital area [9]. Also, DM and thyroid can potentially affect the quality of sexual life [10].

Diabetes will affect more than 70 million in the Middle East and North African region by 2040 [11]. Saudi Arabia also has one of the highest diabetes prevalence, estimated at 17.6% [11]. The consequences of diabetes result from its complications, including retinopathy, peripheral neuropathy, renal complications, stroke, and heart complications [12]. Diabetes has also been considered a risk factor for impaired sexual function in males and females [13].

The relation between diabetes and erectile dysfunction among men is well established [14]. However, few studies focus on FSD among diabetic women with a poor understanding of factors leading to FSD among diabetic women [15,16]. FSD is more commonly surrounded by social barriers, preventing the patient from discussing sexual problems with the physician and taking appropriate medical advice [17].

This study was motivated by the scarcity of studies on FSD in Saudi Arabia. Our study aims to add more information about FSD in the population of women from the Arab culture. We assess the prevalence of sexual dysfunction among women with diabetes mellitus and thyroid disorders and the relationships between DM complications, treatment modalities, and disease control.

Methods

This was a cross-sectional study of female patients who had routine clinic visits to Prince Mansour Diabetes Center or Al Hada Armed Forces Hospital, from January to November 2020 in Taif, Saudi Arabia. We included 18- to 50-year-old female patients with DM and/or thyroid patients, who are married and had recent (within 1 year) laboratory tests. We excluded those with end-stage renal disease, active psychiatric illness, and divorced/single. The questionnaire included the following items: personal data, physical activities, type of diabetes and thyroid disorder, DM complications, and medications. We also collected data about the height and weight of each patient, and their BMI was calculated. Laboratory data for our participants collected from the electronic medical record. We divided our participants according to high (> 15000 Saudi Riyals), moderate (15000–5000), and low monthly (< 5000 Saudi Riyals) income.

Three female physicians communicated with the female patients during the data collection. Also, we used a separate room in the clinic to obtain the data to ensure privacy. We briefly explained to patients about the data and scoring system before starting. Both verbal and written consent taken from participants before starting the interview, and their responses were completely confidential. Data collected through a questionnaire administered to each participant by one of the researchers through face-to-face interviews than by phone interview (due to COVID-19 lockdown).

The researchers used an Arabic validated version of the Arizona Sexual Experience Scale (ASEX) to screen FSD [18]. The ASEX consists of five questions to evaluate each of the following: the ability to reach

orgasm, arousal, sex drive, satisfaction with orgasm, and vaginal lubrication for females. The scores ranged from 5 to 30, participants with high scores representing higher levels of sexual dysfunction. Participants classified into sexual dysfunction if they have one of the following; total score of 19 or more, if the patient scored five or more on any of the five items, and if the patient scored four or more on three items.

Data coded, entered into a Microsoft Excel spreadsheet, and then imported to Statistical Package for Social Sciences (SPSS) version 23. The qualitative data presented as numbers and percentages. The quantitative data are given as means and standard deviation (mean ± SD). The Chi-square test was used to study the relationship between variables, and the t-test was used to compare means.

Results

A total of 253 female participants were included in the study, with a mean age of 39.1 ± 7.3 years, with a mean BMI in the obesity range (Table 1). Two-thirds of the participants had a bachelor's degree or higher, and one-fifth of the sample was earning a low income. The most common comorbidities were hypothyroidism, followed by type 2 diabetes, while the least prevalent were cardiac disease and stroke. Half of the sample are taking thyroxine, while one-fifth were taking cholecalciferol. The most commonly prescribed medication was oral hypoglycemic agents for those with type 2 diabetes with optimal glycemic control based on the mean HbA1c and fasting glucose. Majorities of the participants report ≥ 150 min of exercise per week.

Regarding the participant's response to the Arizona Sexual Experiences Scale (ASEX), sex drive was strong in 57.7% (Table 2). Also, two-thirds of the participants were easily aroused, had no problem with vaginal dryness during sexual intercourse, and achieved orgasm. Around 20% of the participants were unsatisfied with their orgasm.

Based on the ASEX questioner, two-thirds of the participants has no FSD (Table 3). Compared to those with no FSD, those with FSD had lower BMI (P = 0.375), were more likely to have a master's degree or higher (P = 0.117), diabetes (P = 0.879), hypothyroidism (P = 0.625), diabetes-related microvascular complications and stroke (P = 0.049), taking cholecalciferol (P = 0.222), higher HbA1c (P = 0.731), higher fasting glucose (P = 0.161), higher TSH level (P = 0.561), lower total cholesterol (P = 0.368), lower LDL level (P = 0.339), higher urinary microalbuminuria (P = 0.343), and exercise more regularly (P = 0.929).

Patients with diabetes and coexisting thyroid disorders were found to have high ASEX score (Fig.1).

Partial correlation adjusting for age, education, income, smoking, comorbidities, and exercise showed a non-significant negative correlation between total FSD score and both BMI (r -0.275, P 0.363) and TSH (r = -0.070, P = 0.820) and a non-significant positive correlation between total FSD score and both HbA1c (r = 0.309, P = 0.304) and the fasting blood glucose (r = 0.460, P = 0.114).

Discussion

Our study shows that around one-third of the sample has FSD based on the ASEX tool. Similar findings were reported in a recent study in Turkey [19]. Also, our study showed that patients with diabetes and thyroid dysfunction have the highest ASEX score. Previous studies nationally and regionally in patients with type 2 diabetes showed a higher prevalence of FSD [20,21]. The observed difference is likely related to the younger age, optimal glycemic control, and the FSD screening tool in our study. Also, we showed that both fasting glucose and HbA1c positively correlated with the ASEX score. Similar findings were reported in previous studies [22,23]. Patients with type 1 diabetes also had a higher ASEX score compared to others in our study. Similar findings were observed in the previously published case-control study [24].

Hypothyroid patients in our study had the lowest ASEX score. A previous study showed that patients with subclinical hypothyroidism had an increased risk of FSD [25]. The observed difference is likely related to the hypothyroidism control as we showed this in the mean TSH level and the negative correlation between ASEX and TSH in our study. The observed increased ASEX score in our patients with hyperthyroidism was demonstrated in a previous study and likely explained by hormonal changes other than TSH and depression [26].

We showed that FSD patients have a lower BMI. This is opposite to what has been reported in a previous study, where BMI was negatively correlated with sexual dysfunction [27,28]. This might be explained by our study population, where the low mean BMI might indicate poorly controlled underlying disease among the participants.

Our study included few patients who are actively smoking, but we did not identify a relationship with the score. Similar findings were observed between smoking and FSD in previous studies [29,30]. LDL and total cholesterol in our patients with FSD were lower than those without FSD. This was also observed in a recently published study were hyperlipidemia increased FSD risk [31,32]. Also, our patients with positive urinary microalbuminuria were more likely to have FSD. Similar findings were reported in previous studies in patients with chronic kidney disease [33,34].

The strengths of our study include its novelty and the collection of comprehensive clinical and biochemical data. Limitations include the small sample size and that only a single center was included.

Conclusion

One-third (32.5%) of the patients have FSD based on the ASEX score. Type 1 diabetes has the highest ASEX score. The non-significant negative correlation between total ASEX score and both BMI and TSH and a non-significant positive correlation between total ASEX score and both HbA1c and fasting blood glucose. It seems that FSD commonly prevalent among patients with thyroid disease and diabetes and increase awareness among health care provider is highly recommended to address this issue.

Abbreviations

DM: Diabetes mellitus

FSD: Female sexual dysfunctions

ASEX: Arizona Sexual Experience Scale

BMI: Body Mass Index

TSH: Thyroid stimulating hormone

HbA1C: Hemoglobin A1C

LDL: Low density lipoprotein.

Declarations

Ethics approval and consent to participate

The study was approved by the Ethical Committee (IRB) of Al Hada Armed Forces Hospital, Taif, Saudi Arabia (reference number: 2020-444). All procedures were in accordance with the ethical standards of the Regional research committee and with the Declaration of Helsinki 1964 and it later amendments. After explaining the study's purposes, both written and verbal consent were obtained from all participants and women were informed that their participation were voluntary, confidential, and anonymous.

Consent for publication

Not applicable.

Availability of data and materials:

The datasets used in this study are available from the corresponding

author upon request.

Competing interests

The authors have no conflicts of interest to declare.

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Authors' contributions:

[KA][1] has made a significant contribution to the conception and design of the study, facilitate data collection. [RA]and [AA], collected the data, assisted with proposal development and manuscript write. [NA] collected data and assisted in manuscript. [KA][2] led the writing of the manuscript, contributed to the data analysis, and finalized the first draft of manuscript. He Also, has made a substantial intellectual contribution to the revision of the paper. All authors read and approved the final version of manuscript.

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Tables

Table 1. Baseline characteristics of the whole cohort.

Baseline characteristics (N= 253**)**	
Mean age (yrs)	39.1±7.3
Weight (kg)	75.9±16.6
Body mass index (BMI) (kg/m^2)	31.75±15.2
High school or less (%)	34.4
Master's degree or higher (%)	34.0
High income (%)	11.9
Low income (%)	21.3
Active smoker (%)	2.4
Former smoker (%)	1.2
Mean ASEX score (points)	14.6±5.3
Comorbidities and complications	
Type II diabetes (%)	24.7
Type I diabetes (%)	11.8
Hypothyroidism (%)	58.5
Hyperthyroidism (%)	9.9
Retinopathy (%)	7.1
Neuropathy (%)	5.5
Retinopathy and Neuropathy (%)	2.4
Cardiac disease (%)	0.4
Stroke (%)	0.8
Medications	
Statin (%)	15.8
Cholecalciferol (%)	22.4
Carbimazole (%)	4.7
Thyroxine (%)	52.2
Management of Diabetes	
Oral hypoglycemic agents only (%)	18.4
Insulin only (%)	9.8

Oral hypoglycemic agents and insulin (%)	7.5
Laboratory data	
Fasting glucose (mmol/L)	7.8±4.1
HbA1c (%)	7.1±1.9
TSH (mIU/L)	1.6±2.5
Total cholesterol (mmol/L)	3.3±2.5
LDL (mmol/L)	2.0±1.6
HDL (mmol/L)	0.8±0.6
Triglyceride(mmol/L)	0.9±0.9
Serum creatinine (mmol/L)	49.4±28.9
Urine microalbumin to creatinine ratio(mg/mmol)	38.9±78.7
Lifestyle habits	
Sedentary lifestyle (%)	14.6
Exercise < 150 min / week	18.5
Exercise 150-300 min / week	53.1
Exercise >300 min / week	13.8

Table 2. Arizona Sexual Experiences Scale (ASEX) response.

How strong is your sex drive	
Extremely strong (%)	5.1
Very strong (%)	11.9
Somewhat strong (%)	40.7
Somewhat weak (%)	26.5
Very weak (%)	6.7
No sex drive (%)	9.1
How are you sexually aroused	
Extremely easy (%)	9.9
Very easy (%)	18.2
Somewhat easy (%)	41.5
Somewhat difficult (%)	19.0
Very difficult (%)	4.7
Never aroused (%)	6.7
How easily does your vagina become moist or wet duringsex	
Extremely easy (%)	10.3
Very easy (%)	17.9
Somewhat easy (%)	38.5
Somewhat difficult (%)	22.6
Very difficult (%)	4.8
Never (%)	6.0
How easily can you reach anorgasm	
Extremely easily (%)	10.7
Very easily (%)	19.0
Somewhat easily (%)	38.0
Somewhat difficult (%)	20.5
Very difficult (%)	4.9
Never reach (%)	6.8
Are your orgasms satisfying	

Extremely satisfying (%)	22.0
Very satisfying (%)	20.0
Somewhat satisfying (%)	24.7
Somewhat unsatisfying (%)	12.2
Very unsatisfying (%)	4.7
Cannot reachorgasm (%)	5.1

Table 3. Baseline characteristics based on the ASEX score.

Baseline characteristic	No Female Sexual Dysfunction	Female Sexual Dysfunction	P value
Number of participants (%)	67.5	32.5	n/a
Mean age (yrs)	39.2±7.4	39.2±7.2	0.996
Weight (kg)	76.5±16.6	75.0±16.8	0.497
Body mass index (BMI) (kg/m^2)	32.4±17.6	30.5±8.5	0.375
High school or less (%)	38.8	25.6	0.117
Master's degree or higher (%)	31.8	37.8	
High income (%)	13.5	8.5	0.219
Low income (%)	22.9	17.1	
Active smoker (%)	3.5	0.0	0.231
Former smoker (%)	1.2	1.2	
Mean ASEX score (points)	11.9±3.0	20.2±4.4	<0.001
Comorbidities and complications			
Type II diabetes (%)	24.1	26.8	0.879
Type I diabetes (%)	11.8	12.2	
Hypothyroidism (%)	57.6	61.0	0.625
Hyperthyroidism (%)	11.2	7.3	
Retinopathy (%)	4.7	12.2	0.049
Neuropathy (%)	5.3	6.1	
Retinopathy and Neuropathy (%)	1.8	3.7	
Cardiac disease (%)	0.6	0.0	
Stroke (%)	0.0	2.4	
Medications			
Statin (%)	15.8	15.8	0.739
Cholecalciferol (%)	20.0	28.0	0.222
Carbimazole (%)	6.5	1.2	0.396
Thyroxine (%)	52.9	52.4	
Management modalities			

Oral hypoglycemic agents only (%)	16.5	23.2	0.211
Insulin only (%)	8.2	13.4	
Oral hypoglycemic agents and insulin (%)	8.8	4.9	
Laboratory data			
Fasting glucose (mmol/L)	7.4+4.1	8.8+4.0	0.161
HbA1c (%)	7.1+1.9	7.3+2.1	0.731
TSH (mIU/L)	1.5+2.5	1.7+2.4	0.561
Total cholesterol (mmol/L)	3.4+2.4	3.0+2.6	0.368
LDL (mmol/L)	2.1+1.6	1.8+1.7	0.339
HDL (mmol/L)	0.8+0.6	0.7+0.6	0.328
Triglyceride(mmol/L)	0.9+0.8	0.9+1.0	0.883
Serum creatinine (mmol/L)	49.3+27.2	49.6+32.3	0.962
Urine microalbumin to creatinine ratio (mg/mmol)	30.0+56.3	53.9+107.2	0.343
Lifestyle habits			
Sedentary lifestyle (%)	15.5	12.1	0.929
Exercise < 150 min / week	18.6	18.2	
Exercise 150-300 min / week	51.5	57.6	
Exercise >300 min / week	14.4	12.1	

Figures

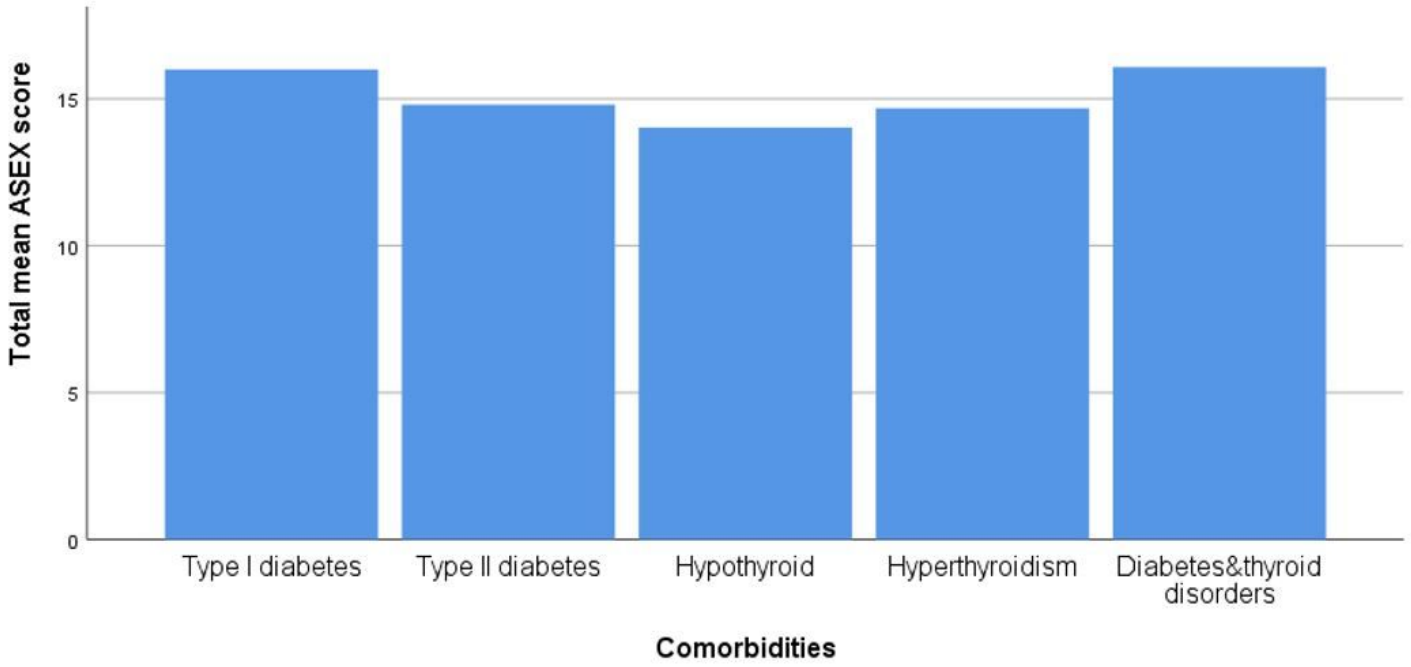

Figure 1

Total mean ASEX score according to the comorbidities.