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Sexual dysfunction and distress in patients with depressive disorders at a tertiary care hospital in Riyadh, Saudi Arabia: a cross-sectional study

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Abstract

Introduction Sexual dysfunction and distress are common among depressed patients and significantly affect their quality of life. This study aims to determine the prevalence of sexual dysfunction and distress and identify potential associated factors.

Method This cross-sectional study was conducted at a tertiary care hospital in Riyadh, Saudi Arabia, with data collection from April to June, 2025. The study involved 258 participants with depression aged 18–65, recruited using a convenience sampling technique. The study tool consisted of a questionnaire we developed to assess sociodemographic and other factors and the validated Arabic versions of the Female Sexual Distress Scale–Revised (FSDS-R) to measure sexual distress and the Arizona Sexual Experiences Scale (ASEX) to evaluate sexual functioning.

Results The ASEX mean total score was 18.04 ± 6.4, with 45.74% of participants exhibiting sexual dysfunction. A statistically significant relation was found between sexual dysfunction and female sex ($p < 0.001$), lower monthly income ($p = 0.004$), history of chronic diseases ($p = 0.022$), taking medications for them ($p = 0.016$), and experiencing physical symptoms ($p = 0.001$). The FSDS-R mean total score was 20.62 ± 14.4, and 72.09% were deemed to be experiencing sexual distress. A statistically significant relation was found between experiencing sexual distress and marital status ($p = 0.008$), having other psychiatric disorders ($p = 0.048$), positive history of smoking cigarettes ($p = 0.010$) and its duration ($p = 0.024$), and positive history of chronic diseases ($p = 0.018$).

Conclusion The study highlights the concerning figures of sexual dysfunction and distress among patients with depression and that numerous factors could be associated with them. These findings underscore the need for a multidisciplinary approach involving teams from psychiatry, gynecology, and urology. The findings also reflect the need to screen for high-risk groups, such as those with other psychiatric and chronic medical illnesses. Moreover,

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the findings highlight the need for prevention, early detection, and effective intervention for sexual dysfunction and distress to mitigate their negative consequences.

Keywords Depression, Saudi Arabia, Sexual distress, Sexual dysfunction, Sexual health

Introduction

Sexual dysfunction refers to disturbances in sexual desire, arousal, orgasm, or pain during sexual activity [1]. These disorders are classified using criteria outlined in the International Classification of Diseases (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) [2, 3]. Globally, sexual dysfunction is highly prevalent in both sexes [4]. A global systematic review and meta-analysis reported that about half of women of reproductive age experience sexual dysfunction [5]. The most common dysfunctions in women are related to desire and arousal, whereas in men the most identified dysfunctions are premature ejaculation and erectile dysfunction [4]. Furthermore, a systematic review found that about 11% of European and Asian men experience premature ejaculation, and nearly one third experience erectile dysfunction [6]. In Saudi Arabia, Alhaizan et al. reported that at least half of Saudi women experience sexual dysfunction, with desire and arousal being the domains most affected, followed by orgasmic problems [7]. Additionally, a study of 924 Saudi men found that approximately one fifth experience erectile dysfunction [8]. The etiology of sexual dysfunction is multifactorial, with various physiological, psychological, and pharmacologic factors being implicated [9]. Nonetheless, sexual dysfunction has a profound impact on well-being, including psychological distress, diminished social functioning, and reduced life satisfaction [10].

Depression is a mood disorder characterized by persistent low mood, loss of interest or pleasure, among other symptoms such as somatic manifestations including appetite and sleep changes [3]. According to the World Health Organization, 5% of adults globally suffer from depression [11]. According to the Saudi National Mental Health Survey, the prevalence of major depressive disorder (MDD) in Saudi Arabia is 3.8% [12]. Moreover, depression significantly impairs physical, emotional, and social functioning [13].

Sexual dysfunction is a common, yet often overlooked, symptom of depression and has a substantial influence on patients' quality of life and well-being [14]. In a prospective cohort study carried out in Zurich, Switzerland, 591 adult participants from the general population of Zurich were interviewed five times over a 15-year period. The results indicated that the prevalence of sexual problems in patients with depression was approximately twice that of controls [15]. In China, a post-hoc data analysis of a nationwide study published in 2023 included 273 adult patients diagnosed with MDD and treated with at least one antidepressant for 8–12 weeks [16]. The study investigated the prevalence and factors associated with sexual dysfunction in patients with MDD [16]. The authors found that sexual dysfunction was prevalent in 61.9% of the participants, with risk factors including being female, aged 45 years or above, having a low income, feeling sluggish, and experiencing somatic symptoms [16]. In Egypt, a 2022 cross-sectional study evaluated the risk of sexual dysfunction and quality of life among Egyptian women diagnosed with MDD [17]. The authors found that all women with MDD experienced sexual dysfunction, which was strongly linked to lower overall quality of life [17]. In Oman, a retrospective cross-sectional study investigated the prevalence of antidepressant-induced sexual dysfunction [18]. The authors reported that 39% of the participants experienced sexual dysfunction as a medication side effect, with paroxetine being the most common medication associated with these issues, while mirtazapine was associated with the least sexual side effects [18].

In Saudi Arabia, Turkistani et al. carried out a cross-sectional study evaluating sexual dysfunction in Saudi male patients with depression [19]. Turkistani et al. found that 62% of the participants experienced sexual dysfunction, with the most common manifestations being impaired sexual interest, erectile dysfunction, and ejaculatory dysfunction [19]. Risk factors included old age, marital difficulties, hypertension, diabetes, depression severity, and tricyclic antidepressant use [19]. Another cross-sectional study investigated the prevalence of sexual dysfunction among Arab males with psychiatric disorders living in Saudi Arabia [20]. The study involved married adult males attending a private mental health facility for follow-up and treatment [20]. It found that 43.4% of the participants were dissatisfied with their sexual function [20]. Premature ejaculation was the most common issue, especially in younger men, while other reported issues included low sexual desire, erectile problems, and orgasmic dysfunction [20]. Another cross-sectional study was conducted to examine the prevalence of sexual dysfunction among Arab females with psychiatric disorders living in Saudi Arabia [21]. The study involved a sample of married females attending a private mental health facility for follow-up and treatment, with the results showing that over one third of the women were dissatisfied with their sexual function [21]. The most common issues were low interest in sex, reduced genital sensation, difficulty reaching orgasm, decreased vaginal lubrication, and pain during sex [21]. Sexual dysfunction

can have a profound impact on an already compromised quality of life, interpersonal relationships, and the self-esteem of depressed patients [14].

Sexual dysfunction and sexual distress among patients with depression remain under-researched in Saudi Arabia. Moreover, previous Saudi studies have provided limited evaluation of the sociodemographic, medical, and psychiatric correlates of these outcomes [19–21]. This lack of detailed epidemiological evidence restricts the development of targeted screening strategies and culturally appropriate interventions for Saudi patients with depression and sexual health concerns. This study aims to assess the prevalence of sexual dysfunction and distress in adult patients who are suffering from depressive disorders at a tertiary care hospital in Riyadh, Saudi Arabia. The study also seeks to identify the potential associated factors contributing to sexual dysfunction and distress in this population. We hypothesize that sexual dysfunction and sexual distress are prevalent among patients with depression and that factors such as older age, female sex, lower income, and other psychiatric and medical comorbidities are associated with these outcomes, consistent with the literature [16, 19]. The results of our study could help in bridging the gap in knowledge in Saudi Arabia, encouraging routine screening of sexual dysfunction and distress among this group and early detection and intervention.

Methodology

Study setting, design, and participants

This quantitative cross-sectional study was conducted at King Khalid University Hospital (KKUH), Riyadh, Saudi Arabia. Our inclusion criteria included adults aged 18–65 and diagnosed with depression. More specifically, we included those diagnosed with MDD, persistent depressive disorder, and other specified and unspecified depressive disorders. Our exclusion criteria included those below the age of 18 or older than 65, those with communication barriers, those with secondary depression (i.e., due to medication, substances, or medical conditions), and those with other major psychiatric illnesses (such as bipolar affective disorder, schizophrenia, or schizoaffective disorder).

The size of the target population, which was 505, was based on information obtained from the hospital's information technology (IT) department, which identified individuals who had been diagnosed with depression and met our inclusion and exclusion criteria. After obtaining the list of potential participants from the hospital's IT department, we reviewed their medical charts, more specifically the psychiatric notes, to ensure the accuracy of their diagnosis, to ensure they met the inclusion and exclusion criteria, and to verify that they were still actively followed in the study setting while the study was taking place. Based on this target population estimate, we calculated the required sample size using Raosoft's online sample size calculator, with a 5% margin of error and 95% confidence level. The required sample size was 219. We also added an additional 20% to account for non-respondents. Thus, the final estimated required sample size was 262 participants. Participants were recruited using the convenience sampling technique. The study tool (an online electronic survey) was sent to the participants via WhatsApp or email after we contacted them by phone to explain the research and invite them to participate. Data collection took place between April and June, 2025.

Study instrument

The study tool consisted of a questionnaire that we developed to gather information on sociodemographic factors and other associated variables. Additionally, the study tool included the Arabic version of the Female Sexual Distress Scale–Revised (FSDS-R) and the Arabic version of the Arizona Sexual Experience Scale (ASEX).

The questionnaire that we developed included four sections (Supplementary Materials). The first section was the sociodemographic section, which collected data about the participants' age, sex, marital status, employment status, and income. The second section was the psychiatric-related section, which included questions about the participants' psychiatric history, psychotropic medications, and substance use. The third section was the medical-related section, which covered the participants' height and weight, history of chronic illnesses, physical activity, and medications used. The final section was the sexual health section, which included questions about the participants' sexual performance, sexual satisfaction, history of sexual dysfunction, and any treatments used.

The FSDS-R, an extended version of the original FSDS, is a validated tool for assessing distress associated with sexual dysfunction. It consists of 13 items, each rated on a 5-point Likert scale: 0 (Never), 1 (Rarely), 2 (Occasionally), 3 (Frequently), and 4 (Always). The total scores are obtained by summing all items, with higher scores indicating greater sexual distress. A score ≥ 11 suggests the presence of clinically significant sexual distress, while lower scores indicate minimal or no distress [22]. Validated in 2008, the FSDS-R exhibits a Cronbach's alpha > 0.86, indicating high internal consistency [22]. The Arabic version of the FSDS-R was validated by Attaky (2023) among 100 Arabic women with female sexual interest/arousal disorder and 100 controls [23]. As found by the author, the Arabic version of the scale demonstrated good internal consistency, with a Cronbach's α of 0.82 for the complete scale and 0.78–0.92 for its subscales [23]. In our study, we used the Arabic version of FSDS-R, and we obtained permission to use it from its author.

Table 1 Sociodemographic, medical, and psychiatric data of the participants

Item	Number of patients (*N* = 258)
Age (years)	
18–25	50 (19.38%)
26–35	43 (16.67%)
36–45	58 (22.48%)
46–55	59 (22.87%)
56–65	48 (18.6%)
BMI (kg/m^2)	28.99 ± 6.5
Sex	
Male	61 (23.64%)
Female	197 (76.36%)
Marital status	
Single	87 (33.72%)
Married	139 (53.88%)
Divorced/Separated	22 (8.53%)
Widowed	10 (3.88%)
Duration of marriage (years) (*n* = 139)	
1–5	11 (4.26%)
6–10	14 (5.43%)
11–15	16 (6.2%)
> 15	98 (37.98%)
Employment status	
Unemployed	163 (63.18%)
Employed	95 (36.82%)
Monthly income (SR)	
< 10,000	176 (68.22%)
10,000–25,000	64 (24.81%)
> 25,000	18 (6.98%)
Duration of depression diagnosis (years)	
< 1	18 (6.98%)
1–5	109 (42.25%)
6–10	50 (19.38%)
≥ 11	81 (31.4%)
Having other psychiatric disorders	133 (51.55%)
Type of other psychiatric disorders (*n* = 133)*	
Anxiety	122 (47.29%)
BPD	7 (2.71%)
OCD	6 (2.33%)
ADHD	3 (1.16%)
Sleep disorder	1 (0.39%)
PTSD	1 (0.39%)
Eating disorder	1 (0.39%)
Other	5 (1.94%)
Taking any psychiatric medications regularly	194 (75.19%)
Type of psychiatric medications taken (*n* = 194)*	
Antidepressants and anti-anxiety medications (e.g., escitalopram, fluoxetine, sertraline)	185 (71.71%)
Antipsychotics (e.g., quetiapine, risperidone, aripiprazole)	31 (12.02%)
Other	30 (11.63%)
Positive history of smoking cigarettes	56 (21.71%)
Duration of smoking (years) (*n* = 56)	
< 1	19 (7.36%)
1–5	18 (6.98%)
6–10	9 (3.49%)

Table 1 (continued)

Item	Number of patients (*N* = 258)
> 10	10 (3.88%)
Current smoking	33 (12.79%)
Using any drugs or illegal substances (such as alcohol, marijuana, steroids)	24 (9.3%)
Having chronic diseases	86 (33.33%)
Type of chronic diseases (*n* = 86)*	
DM	49 (18.99%)
HTN	49 (18.99%)
Cardiovascular diseases	13 (5.04%)
Urinary tract diseases and infertility and fertility disorders	9 (3.49%)
Other	36 (13.95%)
Taking any medications regularly to treat chronic diseases	79 (30.62%)
Experiencing any physical symptoms (such as difficulty breathing, pain) that affect your sexual activity	47 (18.22%)
To what extent do these physical symptoms affect your sexual activity? (*n* = 47)	
Rarely	5 (1.94%)
Occasionally	26 (10.08%)
Frequently	6 (2.33%)
Always	10 (3.88%)
Exercise frequency	
I do not exercise	130 (50.39%)
< 50 min/week	69 (26.74%)
50–100 min/week	27 (10.47%)
101–150 min/week	18 (6.98%)
> 150 min/week	14 (5.43%)

Numerical data are presented as mean ± *SD*, and categorical data are presented as frequency (%)

* More than one answer was allowed

BMI: Body Mass Index, BPD: Borderline Personality Disorder, OCD: Obsessive-Compulsive Disorder, ADHD: Attention-Deficit Hyperactivity Disorder, PTSD: Post-Traumatic Stress Disorder, DM: Diabetes Mellitus, HTN: Hypertension

The ASEX is a validated tool for assessing sexual function. It consists of five items assessing sex drive, sexual arousal, vaginal lubrication/penile erection, ability to reach orgasm, and satisfaction from orgasm. Each item is rated on a 6-point Likert scale. The total scores range from 5 to 30, with higher scores indicating greater sexual dysfunction [24]. The ASEX was validated in 2000, demonstrating excellent reliability, with a Cronbach's alpha of 0.91 and strong test–retest reliability [24]. An Arabic version tested with Tunisian patients with schizophrenia showed good internal consistency (α = 0.82), and a single factor was confirmed as accounting for 83.7% of the variance [25]. In our study, we used the Arabic version of the ASEX, and we obtained permission to use it from its authors.

Confidentiality and ethical considerations The study was approved by the Institutional Review Board (IRB) at the College of Medicine, King Saud University, Riyadh, Saudi Arabia (research project no. E-24-9468), and was conducted in accordance with the Declaration of Helsinki. All participants in the study agreed to participate voluntarily, and their information was kept strictly confidential.

Statistical analysis Numerical data are presented as the mean and standard deviation (*SD*). Categorical data are presented as frequencies and percentages. For participants who reported no sexual activity in the past week ($n = 172$), items 4 (ability to reach orgasm) and 5 (satisfaction from orgasm) were not administered, consistent with the Arabic ASEX instructions. For these participants, items 4 and 5 were imputed using the mean of their responses to items 1, 2, and 3, a within-scale mean imputation approach. Total ASEX scores were subsequently calculated for all 258 participants. The chi-square test was used to examine associations between two categorical variables. Fisher's exact test was applied when any expected cell frequency fell below five. Univariate logistic regression was performed to assess the association of each independent variable with sexual dysfunction (following ASEX) and sexual distress (following FSDS-R). Clinically relevant variables were entered simultaneously into a multivariable logistic regression model using the Enter method to identify independent predictors while adjusting for potential confounders. Results are reported as odds ratios (ORs) with 95% confidence intervals (CIs). A two-tailed p-value < 0.05 was considered statistically

significant. All analyses were conducted using SPSS version 28 (IBM Corp., Armonk, NY, USA).

Results

We contacted and invited a total of 363 people to participate in the study. Of these, 323 started the survey, and 258 completed it. The response rate was therefore 89%, and the completion rate was 79.9%. Table 1 presents the sociodemographic, medical, and psychiatric data of the participants. A total of 258 participants were included, 23.64% of whom were male and 76.36% were female. The mean age was estimated from grouped age data using class midpoints. The estimated mean (*SD*) age was 41.3 (13.6) years. About 22% of participants belonged to the 36–45 age group and 22.87% belonged to the 46–55 age group. The mean body mass index (BMI) was 28.99 ± 6.5 kg/m^2. Most participants (53.88%) were married (37.98% had been married for > 15 years). Unemployed participants constituted 63.18% of the sample, and 68.22% had a monthly income < 10,000 SR. The largest group was diagnosed with depression 1–5 years ago, accounting for 42.25%. Moreover, 51.55% were diagnosed with other psychiatric disorders such as anxiety (47.29%). Over two thirds (75.19%) were taking psychiatric medications on a regular basis (71.7% were taking antidepressants and anti-anxiety medications). Furthermore, 21.71% had a history of smoking cigarettes, and 12.79% were smokers at the time of the study. Additionally, 9.3% were consuming other drugs or illegal substances (such as alcohol, marijuana, steroids). One third of the participants had a history of chronic diseases such as diabetes mellitus (DM) and hypertension (HTN) (18.99% each), and 30.62% were taking medications for these medical conditions. Physical symptoms (difficulty breathing, pain, etc.) that affect sexual activity were reported by 18.22% of the participants. About half of participants (50.39%) were not exercising at all, while 26.74% were exercising < 50 min/week.

Table 2 Sexual health data of the participants

Item	Number of patients (*N* = 258)
Do you feel confident about having sex?	
Not at all	90 (34.88%)
Yes, to some extent	117 (45.35%)
Yes, very much	51 (19.77%)
How satisfied are you with your current relationship?	
Unsatisfied	91 (35.27%)
Not sure	84 (32.56%)
Satisfied	83 (32.17%)
How much do cultural beliefs influence your sexual activity (such as feeling ashamed to talk about sex with your partner)?	
Never	81 (31.4%)
Rarely	44 (17.05%)
Occasionally	71 (27.52%)
Frequently	35 (13.57%)
Always	27 (10.47%)
Have you ever consulted a doctor about difficulties with sexual activity?	
No	225 (87.21%)
Yes	33 (12.79%)
Have you ever received any therapeutic interventions for difficulties related to sexual activity?	
No	238 (92.25%)
Yes	20 (7.75%)
Type of intervention (*n* = 20)*	
Drug treatment (such as pills, injections)	15 (5.81%)
Psychotherapy sessions	6 (2.33%)
Herbal products/honey	3 (1.16%)
Do you think that difficulties with sexual activity are related to the medications you regularly take (psychiatric or non-psychiatric)? (*n* = 20)	
No	6 (2.33%)
Yes	14 (5.43%)
Do you masturbate?	
No	190 (73.64%)
Yes	68 (26.36%)

Numerical data are presented as mean ± *SD*, and categorical data are presented as frequency (%)

* More than one answer was allowed

Table 2 presents the sexual health data of the participants. Among them, 34.88% were not confident about having sex at all, while 45.35% were confident to some extent. Satisfaction with the relationship was expressed by 32.17%, and 27.52% reported that cultural beliefs occasionally influenced their sexual activity. Only 12.79% had consulted a doctor about difficulties with their sexual activity, 7.75% received therapeutic interventions for those difficulties, and 5.43% thought that difficulties with sexual activity were related to the medications they were regularly taking (psychiatric or non-psychiatric). Notably, 26.36% had a history of masturbation.

The ASEX results are presented in Table 3. The mean scores were as follows: sex drive, 3.74 ± 1.47; arousal, 3.53 ± 1.49; penile erection/vaginal lubrication, 3.46 ± 1.41; ability to reach orgasm, 3.6 ± 1.38; and satisfaction from orgasm, 3.71 ± 1.37. The mean total score was 18.04 ± 6.4, with 45.74% evidencing sexual dysfunction. Sexual dysfunction is defined as (1) a total ASEX score ≥ 19; (2) any item with a score ≥ 5; or (3) any three items with a score ≥ 4 (Figs. 1 and 2).

In terms of the FSDS-R, the predominant feeling among participants was distress about sex life (mean score 1.89 ± 1.32), followed by being unhappy about their sexual relationship (1.86 ± 1.4), guilt about sexual difficulties (1.74 ± 1.35), dissatisfaction with sex life (1.69 ± 1.41), frustration with sexual problems (1.66 ± 1.39), and stress

Table 3 Results from the Arizona Sexual Experience Scale (ASEX)

Item	Number of patients (*N* = 258)
How strong is your sex drive?	
Extremely strong	19 (7.36%)
Very strong	25 (9.69%)
Somewhat strong	80 (31.01%)
Somewhat weak	65 (25.19%)
Very weak	19 (7.36%)
Absent	50 (19.38%)
Score	3.74 ± 1.47
How easily are you sexually aroused?	
Extremely easily	26 (10.08%)
Very easily	31 (12.02%)
Somewhat easily	86 (33.33%)
Somewhat difficult	50 (19.38%)
Very difficult	25 (9.69%)
Never	40 (15.5%)
Score	3.53 ± 1.49
For men: Can you easily get and keep an erection? For women: How easily does your vagina become moist?	
Extremely easily	25 (9.69%)
Very easily	28 (10.85%)
Somewhat easily	95 (36.82%)
Somewhat difficult	56 (21.71%)
Very difficult	21 (8.14%)
Never	33 (12.79%)
Score	3.46 ± 1.41
Have you had sexual activity in the past week?	
No	172 (66.67%)
Yes	86 (33.33%)
	(*n* = 86)
How easily can you reach orgasm?	
Extremely easily	15 (17.44%)
Very easily	20 (23.26%)
Somewhat easily	21 (24.42%)
Somewhat difficult	20 (23.26%)
Very difficult	9 (10.47%)
Never	1 (1.16%)
Score	3.6 ± 1.38
Are your orgasms satisfying?	
Extremely satisfying	13 (15.12%)
Very satisfying	13 (15.12%)
Somewhat satisfying	23 (26.74%)
Somewhat unsatisfying	21 (24.42%)
Extremely unsatisfying	12 (13.95%)
Never achieve orgasm	4 (4.65%)
Score	3.71 ± 1.37
Total score	18.04 ± 6.4
Sexual dysfunction*	
No	140 (54.26%)
Yes	118 (45.74%)

Numerical data are presented as mean ± *SD*, and categorical data are presented as frequency (%). The "Have you had sexual activity in the past week?" question was an administrative branching item. Items 4 and 5 were completed by the 86 sexually active participants; for the remaining 172 participants, items 4 and 5 were imputed using the mean of items 1–3

* Sexual dysfunction is defined as (1) a total ASEX score ≥ 19; (2) any item with a score ≥ 5; or (3) any three items with a score ≥ 4

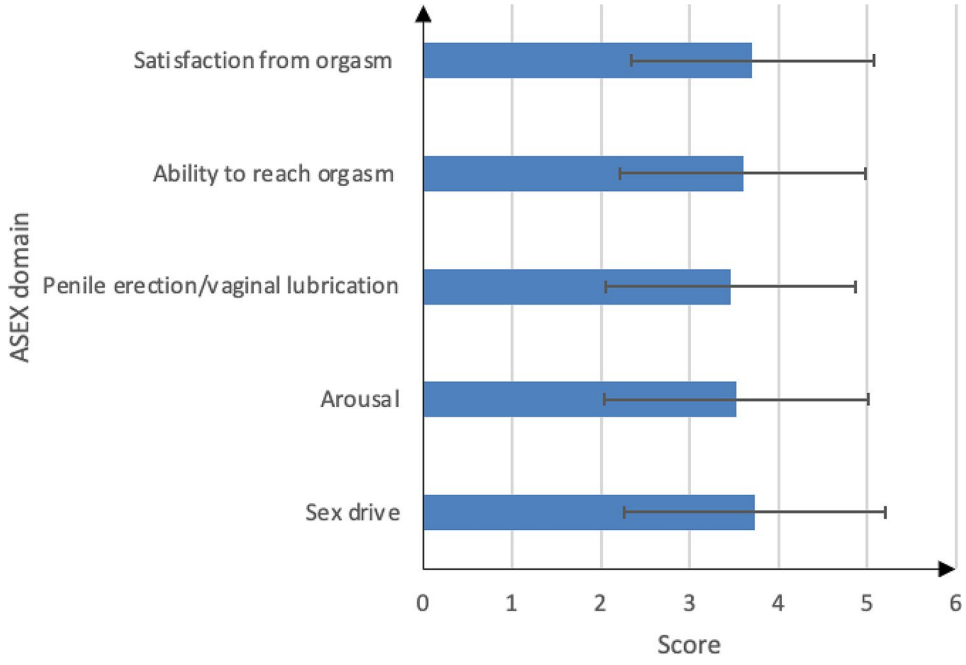

Fig. 1 Scores for individual ASEX domains

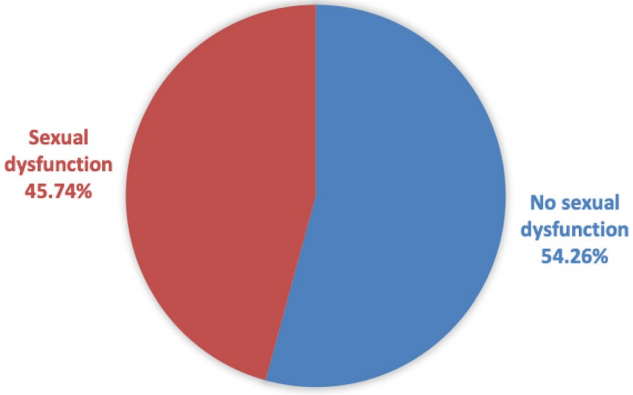

Fig. 2 Distribution of participants according to sexual dysfunction (ASEX)

about sex (1.57 ± 1.34). The mean total FSDS-R score was 20.62 ± 14.4, and 72.09% were deemed to be experiencing sexual distress. Table 4; Fig. 3 illustrate these findings.

As shown in Table 5, a statistically significant bivariate association was found between ASEX-defined sexual dysfunction and older age ($p = 0.004$). Furthermore, a statistically significant relation was observed between sexual dysfunction of patients according to ASEX and being female ($p < 0.001$) and lower monthly income ($p = 0.004$). Sexual dysfunction was also associated with negative history of smoking cigarettes ($p = 0.045$), positive history of chronic diseases ($p = 0.022$), taking medications regularly for them ($p = 0.016$), and experiencing physical symptoms, such as difficulty breathing or pain ($p = 0.001$).

Table 6 presents the relation between sociodemographic, medical, and psychiatric data and sexual distress of the participants. A statistically significant relation was found between experiencing sexual distress and marital status ($p = 0.008$), having other psychiatric disorders ($p = 0.048$), positive history of smoking cigarettes ($p = 0.010$), duration of smoking ($p = 0.024$), current smoking status ($p = 0.010$), and positive history of chronic diseases ($p = 0.018$).

In the univariate logistic regression analysis, females showed significantly higher odds of sexual dysfunction than males (OR = 3.75, 95%CI: 1.94–7.26, $p < 0.001$). Participants with a monthly income of 10,000–25,000 SR exhibited significantly lower odds of sexual dysfunction than those with < 10,000 SR (OR = 0.36, 95%CI: 0.19–0.66, $p = 0.001$). Those with a history of smoking cigarettes had significantly lower odds than others (OR = 0.53, 95%CI: 0.29–0.99, $p = 0.047$). Moreover, participants with history of chronic diseases, taking medications regularly to treat them, and experiencing physical symptoms (difficulty breathing, pain, etc.) showed significantly higher odds of sexual dysfunction than those with no chronic diseases (OR = 1.84, 95%CI: 1.09–3.11, $p = 0.022$), not taking medications for them (OR = 1.92, 95%CI: 1.12–3.28, $p = 0.017$), and not experiencing any physical symptoms (OR = 3.1, 95%CI: 1.58–6.07, $p = 0.001$), respectively.

Table 7 presents the logistic regression analysis for factors associated with sexual dysfunction according to the ASEX score. Although age showed a statistically significant bivariate association with sexual dysfunction ($p = 0.004$), driven by a higher proportion of dysfunction in the 46–55 age group, no individual age category reached statistical significance in either the univariate

Table 4 Results from the Female Sexual Distress Scale–Revised (FSDS-R)

Item	Number of patients (*N* = 258)
How often did you feel:	
Distressed about your sex life	
Never	58 (22.48%)
Rarely	32 (12.4%)
Occasionally	84 (32.56%)
Frequently	49 (18.99%)
Always	35 (13.57%)
Score	1.89 ± 1.32
Unhappy about your sexual relationship	
Never	66 (25.58%)
Rarely	36 (13.95%)
Occasionally	63 (24.42%)
Frequently	55 (21.32%)
Always	38 (14.73%)
Score	1.86 ± 1.4
Guilty about sexual difficulties	
Never	69 (26.74%)
Rarely	38 (14.73%)
Occasionally	71 (27.52%)
Frequently	50 (19.38%)
Always	30 (11.63%)
Score	1.74 ± 1.35
Frustrated by your sexual problems	
Never	76 (29.46%)
Rarely	45 (17.44%)
Occasionally	62 (24.03%)
Frequently	41 (15.89%)
Always	34 (13.18%)
Score	1.66 ± 1.39
Stressed about sex	
Never	82 (31.78%)
Rarely	40 (15.5%)
Occasionally	67 (25.97%)
Frequently	45 (17.44%)
Always	24 (9.3%)
Score	1.57 ± 1.34
Inferior because of sexual problems	
Never	94 (36.43%)
Rarely	51 (19.77%)
Occasionally	50 (19.38%)
Frequently	42 (16.28%)
Always	21 (8.14%)
Score	1.4 ± 1.34
Worried about sex	
Never	82 (31.78%)
Rarely	47 (18.22%)
Occasionally	61 (23.64%)
Frequently	43 (16.67%)
Always	25 (9.69%)
Score	1.54 ± 1.34
Sexually inadequate	
Never	80 (31.01%)

Table 4 (continued)

Item	Number of patients (*N* = 258)
Rarely	54 (20.93%)
Occasionally	63 (24.42%)
Frequently	31 (12.02%)
Always	30 (11.63%)
Score	1.52 ± 1.35
Regrets about your sexuality	
Never	82 (31.78%)
Rarely	51 (19.77%)
Occasionally	61 (23.64%)
Frequently	41 (15.89%)
Always	23 (8.91%)
Score	1.5 ± 1.32
Embarrassed about sexual problems	
Never	89 (34.5%)
Rarely	58 (22.48%)
Occasionally	58 (22.48%)
Frequently	30 (11.63%)
Always	23 (8.91%)
Score	1.38 ± 1.3
Dissatisfied with your sex life	
Never	76 (29.46%)
Rarely	46 (17.83%)
Occasionally	52 (20.16%)
Frequently	51 (19.77%)
Always	33 (12.79%)
Score	1.69 ± 1.41
Angry about your sex life	
Never	91 (35.27%)
Rarely	46 (17.83%)
Occasionally	57 (22.09%)
Frequently	38 (14.73%)
Always	26 (10.08%)
Score	1.47 ± 1.36
Bothered by low sexual desire	
Never	86 (33.33%)
Rarely	51 (19.77%)
Occasionally	73 (28.29%)
Frequently	26 (10.08%)
Always	22 (8.53%)
Score	1.41 ± 1.28
Total score	20.62 ± 14.4
Sexual distress	
No	72 (27.91%)
Yes	186 (72.09%)

Numerical data are presented as mean ± *SD*, and categorical data are presented as frequency (%)

or multivariable logistic regression models. In the multivariable logistic regression analysis, females showed significantly higher odds of sexual dysfunction than males (OR = 3.55, 95%CI: 1.61–7.8, $p = 0.002$). Participants with a monthly income of 10,000–25,000 SR showed significantly lower odds than those with < 10,000 SR (OR = 0.33, 95%CI: 0.14–0.77, $p = 0.011$). Those with other psychiatric disorders had significantly higher odds of sexual dysfunction than others (OR = 2.12, 95%CI: 1.11–4.06, $p = 0.024$). Furthermore, participants with a history of smoking cigarettes had significantly lower odds of sexual dysfunction than others (OR = 0.23, 95%CI: 0.06–0.87,

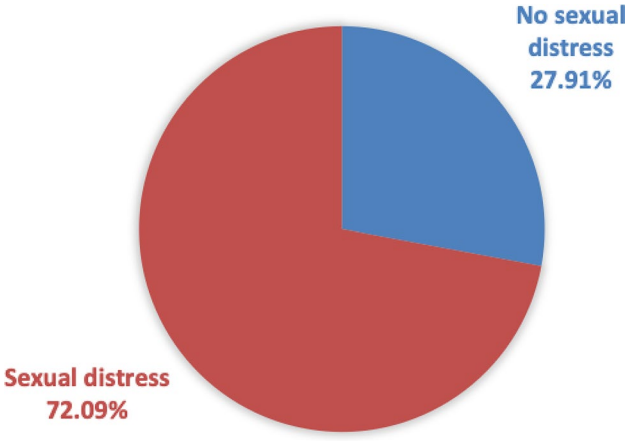

Fig. 3 Distribution of participants according to sexual distress (FSDS-R)

$p = 0.031$). Moreover, participants experiencing physical symptoms showed significantly higher odds of sexual dysfunction than others (OR = 3.46, 95%CI: 1.56–7.66, $p = 0.002$).

Table 8 shows the results of the logistic regression analysis for factors associated with sexual distress according to the FSDS-R. Based on the results of the univariate logistic regression analysis, married patients showed significantly higher odds of sexual distress than single ones (OR = 2.3, 95%CI: 1.25–4.22, $p = 0.007$). Participants with other psychiatric disorders showed significantly higher odds of sexual distress than others (OR = 1.74, 95%CI: 1–3.01, $p = 0.049$). Participants with history of smoking, current smokers, and patients with chronic diseases showed significantly higher odds of sexual distress than those with no history of smoking (OR = 2.78, 95%CI: 1.24–6.22, $p = 0.013$), non-smokers (OR = 4.42, 95%CI: 1.31–14.98, $p = 0.017$), and those with no chronic diseases (OR = 2.11, 95%CI: 1.13–3.96, $p = 0.02$), respectively.

After adjustment for the included factors, marital status, taking psychiatric medications, and having chronic diseases were significantly associated with sexual distress, as married participants showed significantly higher odds of sexual distress than single ones (OR = 4.77, 95%CI: 1.67–13.59, $p = 0.003$). Participants regularly taking psychiatric medications showed lower odds of sexual distress (OR = 0.43, 95%CI: 0.19–0.96, $p = 0.039$). Furthermore, participants with chronic diseases had higher odds of sexual distress than those with no chronic diseases (OR = 2.53, 95%CI: 1.09–5.87, $p = 0.03$) (Table 8).

Discussion

The aim of our study is to explore sexual dysfunction and distress and their associated factors among patients with depression. According to the ASEX scores, almost half of the participants exhibited sexual dysfunction. This figure is consistent with previous studies conducted among patients with depression. In a multicenter Chinese study [16], the authors found that sexual dysfunction was prevalent in 61.9% of the participants. Another study evaluating Saudi male patients with depression found that sexual dysfunction was prevalent, affecting approximately 60% of the participants [19]. We hypothesize that the somewhat lower rate of sexual dysfunction in our sample compared to the other studies [16, 19] might have been due to different sex distributions, illness severities, or other unmeasured sociocultural factors. Nevertheless, our findings and these studies' findings [16, 19] reflect the importance of screening for sexual dysfunction among patients with depression. Furthermore, the high rates of sexual dysfunction found in our study also emphasize the need to develop collaborative care models, involving psychiatrists as well as other medical professionals, such as urologists and gynecologists.

Our study found a statistically significant bivariate association between older age and sexual dysfunction ($p = 0.004$), with the 46–55 age group showing the highest proportion of dysfunction (64.4%). However, this association was not confirmed as an independent predictor in the logistic regression analysis, where no individual age category reached statistical significance. Accordingly, this finding should be interpreted with caution and presented as a bivariate observation only. Our finding aligns with another cross-sectional study of 273 MDD patients conducted in West China [16]. The study [16] reported that patients aged ≥ 45 were significantly more likely to experience sexual dysfunction. That said, it is important to highlight that in both our study and the West China study [16] the samples consisted only of depressed patients without a non-depressed control group. The associations with older age most likely reflect well-established general associated factors for sexual dysfunction in the broader population rather than effects specific to depression. Thus, future Saudi studies incorporating non-depressed comparison groups would allow stronger causal inference about depression-specific contributions to sexual dysfunction. Furthermore, in Saudi Arabia, some studies have examined the topic of sexual dysfunction, though not among samples of depressed patients. For instance, a community-based study conducted among adult Saudi males recruited from the community found that older age was associated with higher sexual dysfunction [8]. Another Saudi study examined knowledge and prevalence of vaginismus among women in Najran, Saudi Arabia, with vaginismus being viewed as a specific form of sexual dysfunction [26]. In this study, the authors found that older age, specifically over 45 years, was a significant predictor of vaginismus complaints [26]. Other Saudi studies have also found that older age is a predictor for sexual dysfunction in women, such as Madbouly K et al.'s study [27]. Collectively, such findings may reflect

Table 5 Relation between sociodemographic, medical, and psychiatric data and sexual dysfunction of participants

Item	Sexual dysfunction (ASEX)		*p*-value
	No (*n* = 140)	Yes (*n* = 118)	
Age (years)			
18–25	27 (19.29%)	23 (19.49%)	0.004
26–35	29 (20.71%)	14 (11.86%)	
36–45	39 (27.86%)	19 (16.1%)	
46–55	21 (15%)	38 (32.2%)	
56–65	24 (17.14%)	24 (20.34%)	
Sex			
Male	47 (33.57%)	14 (11.86%)	< 0.001
Female	93 (66.43%)	104 (88.14%)	
Marital status			
Single	54 (38.57%)	33 (27.97%)	0.171
Married	72 (51.43%)	67 (56.78%)	
Divorced/Separated	11 (7.86%)	11 (9.32%)	
Widowed	3 (2.14%)	7 (5.93%)	
Duration of marriage (years)	(*n* = 72)	(*n* = 67)	
1–5	8 (11.11%)	3 (4.48%)	0.063
6–10	11 (15.28%)	3 (4.48%)	
11–15	7 (9.72%)	9 (13.43%)	
> 15	46 (63.89%)	52 (77.61%)	
Employment status			
Unemployed	81 (57.86%)	82 (69.49%)	0.054
Employed	59 (42.14%)	36 (30.51%)	
Monthly income (SR)			
< 10,000	84 (60%)	92 (77.97%)	0.004
10,000–25,000	46 (32.86%)	18 (15.25%)	
> 25,000	10 (7.14%)	8 (6.78%)	
Duration of depression diagnosis (years)			
< 1	10 (7.14%)	8 (6.78%)	0.439
1–5	64 (45.71%)	45 (38.14%)	
6–10	28 (20%)	22 (18.64%)	
≥ 11	38 (27.14%)	43 (36.44%)	
Having other psychiatric disorders			
No	74 (52.86%)	51 (43.22%)	0.123
Yes	66 (47.14%)	67 (56.78%)	
Anxiety	(*n* = 66)	(*n* = 67)	
No	8 (12.12%)	3 (4.48%)	0.110
Yes	58 (87.88%)	64 (95.52%)	
OCD	(*n* = 66)	(*n* = 67)	
No	61 (92.42%)	66 (98.51%)	0.115
Yes	5 (7.58%)	1 (1.49%)	
BPD	(*n* = 66)	(*n* = 67)	
No	61 (92.42%)	65 (97.01%)	0.274
Yes	5 (7.58%)	2 (2.99%)	
ADHD	(*n* = 66)	(*n* = 67)	
No	63 (95.45%)	67 (100%)	0.119
Yes	3 (4.55%)	0 (0%)	
Taking any psychiatric medications regularly			
No	38 (27.14%)	26 (22.03%)	0.344
Yes	102 (72.86%)	92 (77.97%)	
History of smoking cigarettes			
No	103 (73.57%)	99 (83.9%)	0.045
Yes	37 (26.43%)	19 (16.1%)	

Table 5 (continued)

Item	Sexual dysfunction (ASEX)		*p*-value
	No (*n* = 140)	Yes (*n* = 118)	
Duration of smoking (years)	(*n* = 37)	(*n* = 19)	
< 1	14 (37.84%)	5 (26.32%)	0.553
1–5	10 (27.03%)	8 (42.11%)	
6–10	7 (18.92%)	2 (10.53%)	
> 10	6 (16.22%)	4 (21.05%)	
Current smoking status			
No	121 (86.43%)	104 (88.14%)	0.683
Yes	19 (13.57%)	14 (11.86%)	
Using any drugs or illegal substances (such as alcohol, marijuana, steroids)			
No	126 (90%)	108 (91.53%)	0.674
Yes	14 (10%)	10 (8.47%)	
History of chronic diseases			
No	102 (72.86%)	70 (59.32%)	0.022
Yes	38 (27.14%)	48 (40.68%)	
DM	(*n* = 38)	(*n* = 48)	
No	17 (44.74%)	20 (41.67%)	0.775
Yes	21 (55.26%)	28 (58.33%)	
HTN	(*n* = 38)	(*n* = 48)	
No	19 (50%)	18 (37.5%)	0.245
Yes	19 (50%)	30 (62.5%)	
Cardiovascular diseases	(*n* = 38)	(*n* = 48)	
No	33 (86.84%)	40 (83.33%)	0.652
Yes	5 (13.16%)	8 (16.67%)	
Urinary tract diseases and infertility and fertility disorders	(*n* = 38)	(*n* = 48)	
No	32 (84.21%)	45 (93.75%)	0.151
Yes	6 (15.79%)	3 (6.25%)	
Taking any medications regularly to treat chronic diseases			
No	106 (75.71%)	73 (61.86%)	0.016
Yes	34 (24.29%)	45 (38.14%)	
Experiencing any physical symptoms (such as difficulty breathing, pain) that affect your sexual activity			
No	125 (89.29%)	86 (72.88%)	0.001
Yes	15 (10.71%)	32 (27.12%)	
To what extent do these physical symptoms affect your sexual activity?	(*n* = 15)	(*n* = 32)	
Rarely	3 (20%)	2 (6.25%)	0.2
Occasionally	9 (60%)	17 (53.13%)	
Frequently	0 (0%)	6 (18.75%)	
Always	3 (20%)	7 (21.88%)	
Exercise frequency			
I do not exercise	62 (44.29%)	68 (57.63%)	0.061
< 50 min/week	38 (27.14%)	31 (26.27%)	
50–100 min/week	20 (14.29%)	7 (5.93%)	
101–150 min/week	13 (9.29%)	5 (4.24%)	
> 150 min/week	7 (5%)	7 (5.93%)	

Numerical data are presented as mean ± *SD*, and categorical data are presented as frequency (%). Statistical significance at *p*-value < 0.05

OCD: Obsessive-Compulsive Disorder, BPD: Borderline Personality Disorder, ADHD: Attention-Deficit Hyperactivity Disorder, DM: Diabetes Mellitus, HTN: Hypertension

sociocultural factors that accompany aging in the Saudi context.

In regard to biological sex, our study found that female participants had significantly higher odds of sexual dysfunction than male participants. Our result is consistent with those of another study conducted in West China [16]. This study [16] was conducted among adults diagnosed with MDD, and it found that biological sex plays a significant role in sexual dysfunction among depressed individuals, with female patients showing higher odds

Table 6 Relation between sociodemographic, medical, and psychiatric data and sexual distress of participants

Item	Sexual distress (FSDS-*R*)		*p*-value
	No (*n* = 72)	Yes (*n* = 186)	
Age (years)			
18–25	18 (25%)	32 (17.2%)	0.586
26–35	13 (18.06%)	30 (16.13%)	
36–45	13 (18.06%)	45 (24.19%)	
46–55	16 (22.22%)	43 (23.12%)	
56–65	12 (16.67%)	36 (19.35%)	
Sex			
Male	15 (20.83%)	46 (24.73%)	0.509
Female	57 (79.17%)	140 (75.27%)	
Marital status			
Single	31 (43.06%)	56 (30.11%)	0.008
Married	27 (37.5%)	112 (60.22%)	
Divorced/Separated	9 (12.5%)	13 (6.99%)	
Widowed	5 (6.94%)	5 (2.69%)	
Duration of marriage (years)	(*n* = 27)	(*n* = 112)	
1–5	2 (7.41%)	9 (8.04%)	0.509
6–10	1 (3.7%)	13 (11.61%)	
11–15	2 (7.41%)	14 (12.5%)	
> 15	22 (81.48%)	76 (67.86%)	
Employment status			
Unemployed	52 (72.22%)	111 (59.68%)	0.061
Employed	20 (27.78%)	75 (40.32%)	
Monthly income (SR)			
< 10,000	55 (76.39%)	121 (65.05%)	0.057
10,000–25,000	16 (22.22%)	48 (25.81%)	
> 25,000	1 (1.39%)	17 (9.14%)	
Duration of depression diagnosis (years)			
< 1	4 (5.56%)	14 (7.53%)	0.434
1–5	36 (50%)	73 (39.25%)	
6–10	11 (15.28%)	39 (20.97%)	
≥ 11	21 (29.17%)	60 (32.26%)	
Having other psychiatric disorders			
No	42 (58.33%)	83 (44.62%)	0.048
Yes	30 (41.67%)	103 (55.38%)	
Anxiety	(*n* = 30)	(*n* = 103)	
No	4 (13.33%)	7 (6.8%)	0.253
Yes	26 (86.67%)	96 (93.2%)	
OCD	(*n* = 30)	(*n* = 103)	
No	29 (96.67%)	98 (95.15%)	> 0.999
Yes	1 (3.33%)	5 (4.85%)	
BPD	(*n* = 30)	(*n* = 103)	
No	29 (96.67%)	97 (94.17%)	> 0.999
Yes	1 (3.33%)	6 (5.83%)	
ADHD	(*n* = 30)	(*n* = 103)	
No	28 (93.33%)	102 (99.03%)	0.127
Yes	2 (6.67%)	1 (0.97%)	
Taking any psychiatric medications regularly			
No	15 (20.83%)	49 (26.34%)	0.358
Yes	57 (79.17%)	137 (73.66%)	
History of smoking cigarettes			
No	64 (88.89%)	138 (74.19%)	0.010
Yes	8 (11.11%)	48 (25.81%)	

Table 6 (continued)

Item	Sexual distress (FSDS-*R*)		*p*-value
	No (*n* = 72)	Yes (*n* = 186)	
Duration of smoking (years)	(*n* = 8)	(*n* = 48)	
< 1	2 (25%)	17 (35.42%)	0.024
1–5	0 (0%)	18 (37.5%)	
6–10	3 (37.5%)	6 (12.5%)	
> 10	3 (37.5%)	7 (14.58%)	
Current smoking status			
No	69 (95.83%)	156 (83.87%)	0.010
Yes	3 (4.17%)	30 (16.13%)	
Using any drugs or illegal substances (such as alcohol, marijuana, steroids)			
No	67 (93.06%)	167 (89.78%)	0.417
Yes	5 (6.94%)	19 (10.22%)	
History of chronic diseases			
No	56 (77.78%)	116 (62.37%)	0.018
Yes	16 (22.22%)	70 (37.63%)	
DM	(*n* = 16)	(*n* = 70)	
No	6 (37.5%)	31 (44.29%)	0.621
Yes	10 (62.5%)	39 (55.71%)	
HTN	(*n* = 16)	(*n* = 70)	
No	7 (43.75%)	30 (42.86%)	0.948
Yes	9 (56.25%)	40 (57.14%)	
Cardiovascular diseases	(*n* = 16)	(*n* = 70)	
No	14 (87.5%)	59 (84.29%)	> 0.999
Yes	2 (12.5%)	11 (15.71%)	
Urinary tract diseases and infertility and fertility disorders	(*n* = 16)	(*n* = 70)	
No	16 (100%)	61 (87.14%)	0.130
Yes	0 (0%)	9 (12.86%)	
Taking any medications regularly to treat chronic diseases			
No	56 (77.78%)	123 (66.13%)	0.069
Yes	16 (22.22%)	63 (33.87%)	
Experiencing any physical symptoms (such as difficulty breathing, pain) that affect your sexual activity			
No	62 (86.11%)	149 (80.11%)	0.262
Yes	10 (13.89%)	37 (19.89%)	
To what extent do these physical symptoms affect your sexual activity?	(*n* = 10)	(*n* = 37)	
Rarely	1 (10%)	4 (10.81%)	0.746
Occasionally	4 (40%)	22 (59.46%)	
Frequently	2 (20%)	4 (10.81%)	
Always	3 (30%)	7 (18.92%)	
Exercise frequency			
I do not exercise	32 (44.44%)	98 (52.69%)	0.532
< 50 min/week	21 (29.17%)	48 (25.81%)	
50–100 min/week	9 (12.5%)	18 (9.68%)	
101–150 min/week	4 (5.56%)	14 (7.53%)	
> 150 min/week	6 (8.33%)	8 (4.3%)	

Numerical data are presented as mean ± *SD*, and categorical data are presented as frequency (%). Statistical significance at *p*-value < 0.05

OCD: Obsessive-Compulsive Disorder, BPD: Borderline Personality Disorder, ADHD: Attention-Deficit Hyperactivity Disorder, DM: Diabetes Mellitus, HTN: Hypertension

of such dysfunction. As noted earlier, the absence of a non-depressed control group in our study and this study [16] means that this finding should be interpreted as a general within-sample association rather than a depression-specific effect. Furthermore, in Saudi Arabia, some studies have examined the topic of sexual dysfunction, though not among women with depression. For instance, a community-based study conducted among Saudi women found the rate of sexual dysfunction to be 56% [7]. The sex-related finding highlights the importance of

Table 7 Logistic regression analysis for factors associated with sexual dysfunction according to ASEX score

Item	Univariate analysis			Multivariable analysis		
	Unadjusted OR	**95%CI**	***p*-value**	**Adjusted OR**	**95%CI**	***p*-value**
Age (years)						
18–25	Ref			Ref		
26–35	0.57	0.24 to 1.32	0.188	0.61	0.22 to 1.72	0.347
36–45	0.57	0.26 to 1.25	0.161	0.58	0.17 to 1.98	0.386
46–55	2.12	0.98 to 4.59	0.055	2.19	0.58 to 8.21	0.244
56–65	1.17	0.53 to 2.6	0.692	0.81	0.19 to 3.46	0.779
BMI (kg/m^2)	1	0.97 to 1.04	0.907	0.96	0.92 to 1.01	0.13
Sex						
Male	Ref			Ref		
Female	3.75	1.94 to 7.26	< 0.001	3.55	1.61 to 7.8	0.002
Marital status						
Single	Ref			Ref		
Married	1.52	0.88 to 2.63	0.131	1.08	0.4 to 2.93	0.876
Divorced/Separated	1.64	0.64 to 4.19	0.305	1.58	0.44 to 5.7	0.488
Widowed	3.82	0.92 to 15.8	0.064	2.5	0.42 to 15	0.316
Employment status						
Unemployed	Ref			Ref		
Employed	0.6	0.36 to 1.01	0.054	1.33	0.59 to 2.97	0.491
Monthly income (SR)						
< 10,000	Ref			Ref		
10,000–25,000	0.36	0.19 to 0.66	0.001	0.33	0.14 to 0.77	0.011
> 25,000	0.73	0.28 to 1.94	0.528	0.65	0.16 to 2.54	0.534
Duration of depression diagnosis (years)						
< 1	Ref			Ref		
1–5	0.88	0.32 to 2.4	0.801	1.97	0.59 to 6.54	0.27
6–10	0.98	0.33 to 2.91	0.974	2.04	0.54 to 7.74	0.295
≥ 11	1.41	0.51 to 3.95	0.508	2.32	0.62 to 8.74	0.213
Having other psychiatric disorders						
No	Ref			Ref		
Yes	1.47	0.9 to 2.41	0.123	2.12	1.11 to 4.06	0.024
Taking any psychiatric medications regularly						
No	Ref			Ref		
Yes	1.32	0.74 to 2.34	0.345	0.98	0.48 to 1.99	0.959
History of smoking cigarettes						
No	Ref			Ref		
Yes	0.53	0.29 to 0.99	0.047	0.23	0.06 to 0.87	0.031
Current smoking status						
No	Ref			Ref		
Yes	0.86	0.41 to 1.79	0.683	2.85	0.67 to 12.23	0.158
Using any drugs or illegal substances (such as alcohol, marijuana, steroids)						
No	Ref			Ref		
Yes	0.83	0.36 to 1.95	0.675	1.29	0.35 to 4.74	0.703
History of chronic diseases						
No	Ref			Ref		
Yes	1.84	1.09 to 3.11	0.022	0.45	0.07 to 2.96	0.407
Taking any medications regularly to treat chronic diseases						
No	Ref			Ref		
Yes	1.92	1.12 to 3.28	0.017	2.74	0.44 to 17.22	0.282
Experiencing any physical symptoms (such as difficulty breathing, pain) that affect your sexual activity						

Table 7 (continued)

Item	Univariate analysis			Multivariable analysis		
	Unadjusted OR	95%CI	*p*-value	Adjusted OR	95%CI	*p*-value
No	Ref			Ref		
Yes	3.1	1.58 to 6.07	0.001	3.46	1.56 to 7.66	0.002

OR: Odds Ratio, CI: Confidence Interval. Statistical significance at *p*-value < 0.05

BMI: Body Mass Index

considering biological sex-sensitive sexual assessment among female patients with depression during their psychiatric evaluation.

In regard to income, our study found that participants with middle monthly income (10,000–25,000 SR) showed significantly lower odds of sexual dysfunction than those with lower income. Similar associations between socioeconomic status and sexual dysfunction have been reported internationally, demonstrating that lower income level is significantly associated with increased odds of female sexual dysfunction [28]. Our finding also aligns with another cross-sectional study among 200 Saudi women attending gynecology and primary care clinics [27], which reported that a lower family income is significantly related to sexual dysfunction among women. Our finding highlights the importance of early screening and detection of sexual dysfunction among those with low income and offering support to improve their economic status.

In regard to participants' psychiatric conditions, we found that the presence of other psychiatric disorders increased the odds of sexual dysfunction. This finding corresponds to a study among older Korean women that indicated that having any psychiatric disorder increased the odds of sexual dysfunction [29]. Psychotropic medications are known to affect sexual functioning, as demonstrated in a community-based cross-sectional Saudi study examining the prevalence and predictive factors of female sexual dysfunction [7]. In this study [7], the authors found that antidepressant use was the most important risk factor for sexual dysfunction. Thus, we recommend early screening of patients with multiple psychiatric disorders for sexual dysfunction. It is well established that several psychiatric disorders, including MDD, along with their pharmacological treatment, negatively affect sexual characteristics, such as desire and performance [30].

Our study also revealed a strong association between the medical history of patients and sexual dysfunction. Participants with a history of chronic diseases had higher odds of sexual dysfunction than those with no history of chronic diseases. Our finding is consistent with a systematic review [6] conducted among men from various Asian and European regions and populations, which found that chronic diseases, in particular, DM and HTN, exhibit a strong association with sexual dysfunction. Similar findings have been reported in Saudi Arabia, where DM, thyroid disorders, and other chronic medical conditions have frequently been identified among individuals experiencing sexual dysfunction [26, 31]. Clinically, these findings highlight the need for a multidisciplinary approach that involves collaboration between mental health and other specialty providers, such as family medicine physicians and endocrinologists, to screen for and manage sexual dysfunction among those with chronic medical illnesses. Chronic diseases, such as HTN and DM, have a negative impact on sexual performance, which is impaired through neurological and vascular pathways derived from the pathophysiology of these diseases and exacerbated by their severity [32]. Moreover, effective management and improvement of the disease control of these conditions have been shown to improve sexual health [32]. Furthermore, our study found a significant statistical association not only between chronic medical illnesses and sexual dysfunction, but also between taking medicines for these chronic diseases and sexual dysfunction. This is consistent with earlier findings that chronic diseases—and at times their medications—are among major contributors to sexual dysfunction via vascular, neurological, and psycho-pathological pathways [33–35]. From a clinical perspective, this finding highlights the need for sexual health screening of chronically ill patients and careful examination of their medication regimen when they are being cared for, medically and psychiatrically. Our results also indicated that participants experiencing physical symptoms, such as pain or shortness of breath, exhibited significantly higher odds of sexual dysfunction than those without such symptoms. This result is similar to those of previous studies that have shown that somatic symptoms (physical complaints) have an effect on sexual functioning [36], especially in individuals with mood disorders [37]. Thus, healthcare providers must be aware of bodily symptoms that can act as barriers for intimacy and the integration of physical and psychological care.

Our study surprisingly found that participants with a history of smoking cigarettes had significantly lower odds of sexual dysfunction than others. This finding is in contrast to abundant previous literature that has consistently demonstrated smoking to be a risk factor for sexual dysfunction [38, 39]. Residual confounding, small subgroup sizes, or reporting biases have likely influenced our

Table 8 Logistic regression analysis for factors associated with sexual distress according to FSDS-R

Item	Univariate analysis			Multivariable analysis		
	Unadjusted OR	95%CI	*p*-value	Adjusted OR	95%CI	*p*-value
Age (years)						
18–25	Ref			Ref		
26–35	1.3	0.54 to 3.1	0.557	0.92	0.32 to 2.65	0.877
36–45	1.95	0.84 to 4.53	0.122	0.94	0.27 to 3.32	0.925
46–55	1.51	0.67 to 3.41	0.32	0.38	0.1 to 1.51	0.17
56–65	1.69	0.71 to 4.04	0.24	0.64	0.13 to 3.09	0.582
BMI (kg/m^2)	1.01	0.97 to 1.05	0.657	0.99	0.94 to 1.05	0.738
Sex						
Male	Ref			Ref		
Female	0.8	0.41 to 1.55	0.509	1.06	0.47 to 2.39	0.897
Marital status						
Single	Ref			Ref		
Married	2.3	1.25 to 4.22	0.007	4.77	1.67 to 13.59	0.003
Divorced/Separated	0.8	0.31 to 2.08	0.647	1.57	0.42 to 5.9	0.502
Widowed	0.55	0.15 to 2.06	0.378	1.14	0.2 to 6.39	0.884
Employment status						
Unemployed	Ref			Ref		
Employed	1.76	0.97 to 3.18	0.063	1	0.42 to 2.42	0.994
Monthly income (SR)						
< 10,000	Ref			Ref		
10,000–25,000	1.36	0.71 to 2.61	0.349	1.11	0.45 to 2.76	0.822
> 25,000	7.73	1 to 59.54	0.05	6.91	0.69 to 69.28	0.1
Duration of depression diagnosis (years)						
< 1	Ref			Ref		
1–5	0.58	0.18 to 1.89	0.365	0.4	0.11 to 1.5	0.176
6–10	1.01	0.28 to 3.71	0.984	0.76	0.17 to 3.35	0.719
≥ 11	0.82	0.24 to 2.76	0.744	0.44	0.1 to 1.93	0.273
Having other psychiatric disorders						
No	Ref			Ref		
Yes	1.74	1 to 3.01	0.049	1.87	0.95 to 3.68	0.07
Taking any psychiatric medications regularly						
No	Ref			Ref		
Yes	0.74	0.38 to 1.42	0.359	0.43	0.19 to 0.96	0.039
History of smoking cigarettes						
No	Ref			Ref		
Yes	2.78	1.24 to 6.22	0.013	3.38	0.84 to 13.61	0.087
Current smoking status						
No	Ref			Ref		
Yes	4.42	1.31 to 14.98	0.017	2.27	0.41 to 12.72	0.35
Using any drugs or illegal substances (such as alcohol, marijuana, steroids)						
No	Ref			Ref		
Yes	1.52	0.55 to 4.25	0.42	0.44	0.1 to 2	0.291
History of chronic diseases						
No	Ref			Ref		
Yes	2.11	1.13 to 3.96	0.02	2.53	1.09 to 5.87	0.03
Experiencing any physical symptoms (difficulty breathing, pain) that affect your sexual activity						
No	Ref			Ref		
Yes	1.54	0.72 to 3.29	0.265	1.1	0.45 to 2.69	0.833
Exercise frequency						
I do not exercise	Ref			Ref		
< 50 min/week	0.75	0.39 to 1.43	0.378	0.71	0.34 to 1.48	0.358
50–100 min/week	0.65	0.27 to 1.6	0.35	0.8	0.29 to 2.2	0.661

Table 8 (continued)

Item	Univariate analysis			Multivariable analysis		
	Unadjusted OR	95%CI	*p*-value	Adjusted OR	95%CI	*p*-value
101–150 min/week	1.14	0.35 to 3.72	0.825	0.88	0.21 to 3.63	0.855
> 150 min/week	0.44	0.14 to 1.35	0.15	0.29	0.07 to 1.22	0.091

OR: Odds Ratio, CI: Confidence Interval. Statistical significance at *p*-value < 0.05

BMI: Body Mass Index

findings. From a clinical perspective, our results regarding smoking must be viewed with caution and should not be interpreted as a robust or clinically meaningful effect.

Our study also examined sexual distress using FSDS-R, finding that almost three quarters of the respondents exceeded the FSDS-R threshold for clinically relevant sexual distress. We could not find similar studies among similar populations to our study directly measuring sexual distress using the FSDS-R. However, two studies [40, 41] examining sexual dysfunction using the Female Sexual Functioning Index (FSFI) found a high prevalence of sexual dysfunction, specifically 90% [40] and 95.7% [41], with one study [40] showing a significant decrease in the desire subset of FSFI and the other [41] finding decreased sexual desire in 97.9%, poor vaginal lubrication (100%), a problem with arousal (100%), reduced satisfaction (96.8%), reduced ability to achieve orgasm (100%), and pain during sexual intercourse in 100% of the participants. The lack of studies specifically assessing sexual distress in Saudi Arabia, compared with the much larger literature on sexual dysfunction [7, 19], highlights an important gap in the Saudi literature. We urge future Saudi researchers to examine sexual distress among patients with depression using the FSDS-R to allow local data to be compared.

In regard to relationships, our study showed that marital status was significantly associated with sexual distress, as married participants exhibited significantly higher odds of sexual distress than single ones. Our result aligns somewhat with previous research showing that emotional stress, lack of communication, and unmet relationship expectations in marriage can generate sexual distress [42, 43], reflecting that being married could be associated with sexual distress under certain circumstances. Such findings highlight the importance of mental health professionals carefully assessing the quality, rather than just the status of relationships, while assessing sexual health and emotional well-being.

Furthermore, our study found that participants with chronic diseases had higher odds of sexual distress than those with no chronic diseases. Chronic illnesses, such as DM, are known to have a negative effect on psychology, body image, and relationships and hence increase emotional disturbances. For instance, in one study [44], more women with diabetes than control subjects reported significantly high rates of sexual dysfunction, with a significant difference found for decreased lubrication, which we hypothesize to be linked to sexual distress. Thus, we recommend screening for sexual distress among patients with depression who are also known to have chronic medical illnesses, such as diabetes. Furthermore, we recommend developing multimodal treatment plans that take account of physical and psychological health in order to decrease the level of sexual distress among those at risk.

In regard to participants' psychiatric condition, our study found that psychiatric medication use was associated with lower odds of sexual distress (adjusted OR = 0.43). Our finding should be interpreted with caution, however, as it is inconsistent with the literature, which often highlights the risk of sexual side effects associated with certain psychotropic medications [45, 46]. The sexual-related side effects of psychotropic medications should be taken into account while choosing the antidepressant treatment for individuals suffering from depression, especially if they exhibit other risk factors. Furthermore, in the univariate analysis, our study found that having comorbid psychiatric disorders was significantly associated with increased odds of sexual distress; however, this association was insignificant in the multivariable model. Nevertheless, psychiatric conditions, especially those that increase one's sensitivity to emotions, impair one's self-image, and lead to difficulty in experiencing emotional intimacy, such as anxiety and obsessive-compulsive and personality disorders, could lead to sexual difficulties. These results are consistent with previous research showing that psychiatric comorbidities are among the most robust correlates of sexual functional distress [47]. Our findings in regard to psychiatric comorbidities reflect the importance of taking a thorough psychiatric history and exploring the comorbid psychiatric conditions, especially those that tend to be highly comorbid with depression. Such an in-depth psychiatric history is even more relevant and significant in those presenting with sexual distress. Thus, we recommend screening for comorbid psychiatric conditions among depressed patients exhibiting sexual distress. Likewise, we recommend screening for sexual distress among patients with depression who are known to have other comorbid psychiatric conditions.

Concerning smoking cigarettes, our results, in the univariate analysis, indicated a statistically significant

relation between experiencing sexual distress and positive history of smoking cigarettes and the current smoking status. Our finding aligns with previous research demonstrating a link between smoking and increased sexual dysfunction and distress [48–50]. Clinically, our results reflect the importance of assessing smoking status among patients with depression, especially when assessing them for sexual-related difficulties or when patients report such difficulties. Our results also reflect the importance of having strategies to mitigate the negative consequences of smoking among depressed patients, such as developing smoking cessation programs.

Our study found no statistically significant association between sexual dysfunction or sexual distress and BMI, duration of depression, physical activity, and substance use. Regarding BMI, our result is consistent with previous evidence [51] suggesting a minimal independent effect of obesity on sexual functioning when controlling for comorbid medical and psychiatric conditions, although another systematic review and meta-analysis reported that elevated BMI may increase rates of sexual problems [52]. These varied findings between studies might reflect the complexity of the association between BMI and sexual dysfunction and distress, probably suggesting that other mediating factors could be implicated. Regarding duration of depression, our finding contrasts with a Swedish cohort study indicating that a longer illness may aggravate sexual dysfunction [53]. Although our study found no significant association between physical activity and sexual aspects, physical activity is known to benefit cardiovascular health, hormonal balance, and mood regulation [54–56]. Furthermore, substance use in our study also showed no significant association with sexual aspects. Our finding in regard to substance use is inconsistent with studies that found an association between substance use and sexual aspects [57, 58]. Regardless of the insignificance of our findings, healthy BMI, regular exercise, and avoidance of substance use should still be advocated among patients with depression.

Strengths and limitations

Our study has several notable strengths. First, one of the key strengths is the study's focus on a sensitive yet underexplored topic in the Saudi context. The study addresses a significant gap in the regional literature, contributing valuable data to inform mental health and sexual health interventions. Second, the study not only assessed sexual dysfunction, but also sexual distress. Third, the use of validated and reliable Arabic versions of assessment tools, namely the ASEX and the FSDS-R, enhances the accuracy and credibility of the findings. Finally, the sample size was sufficiently powerful to detect meaningful findings.

However, the study also has certain limitations. It is a cross-sectional study, which restricts the ability to establish causal relationships. While the findings demonstrate associations, they do not necessarily reflect causation. Future studies should consider a longitudinal design to assess changes over time. Additionally, the study lacks a non-depressed comparison group, which limits the ability to attribute observed associations with demographic and clinical variables—particularly age and sex—specifically to depression, as these may reflect general population-level associated factors for sexual dysfunction and distress. Future studies should consider incorporating non-depressed comparison groups to allow further assessment of these factors and to allow stronger causal inferences about depression-specific contributions to sexual dysfunction and distress. Another area that could add value to future Saudi research on the topic is the use of validated scales to assess other depression-related factors, such as severity and specifiers; in our study, all participants were formally diagnosed and followed in the Department of Psychiatry at the study's setting. This limitation is important, as depression severity, for instance, may influence sexual function and sexual distress, as shown in Turkistani's study [19]. Thus, we recommend that future Saudi studies consider employing structured clinical interviews or validated rating scales to provide a more precise characterization of depressive illness. Another consideration to be noted is that the psychotropic medication use was assessed in broad categories without differentiating between antidepressant classes, dosages, and duration of treatment. Furthermore, the timing of the sexual symptoms relative to depression was not assessed. Given the well-established effects of various psychotropic medications on sexual function [45, 46], this may have influenced the observed outcomes. Future research should consider including a more in-depth assessment of medications and the time frame and temporal relationship between depression and sexual symptoms, potentially through prospective or longitudinal study designs, to better understand the association between these factors and to allow for a more nuanced analysis of medication-related sexual side effects. Moreover, our limited assessment of certain factors, such as sociocultural and relational variables, might constrain the explanatory depth. Future Saudi research could consider incorporating such variables to better understand their influence on sexual dysfunction and sexual distress. Another limitation to be noted is that participants were recruited through convenience sampling, which may introduce selection bias. Participants who were more accessible or more willing to respond may differ systematically from those who were not included, potentially affecting the representativeness of the sample. To address this limitation, future research should consider

more rigorous sampling methodologies, such as randomized or stratified recruitment strategies. Furthermore, the study was conducted at a single tertiary care center, further limiting the generalizability of the findings to other healthcare settings, regions, or populations within Saudi Arabia, particularly those managed in primary care or community-based services. To overcome this limitation, future Saudi research could adopt multicenter-based designs to enhance the representativeness and generalizability of the results. Concerning data collection, the survey was administered online, which may introduce selection bias, as individuals without access to or comfort with these modalities may have been underrepresented. Future studies may benefit from incorporating alternative data-collection approaches, such as in-person assessments or physician-assisted data collection, to ensure broader, more inclusive participation.

Concerning the study's tool, we used the Arabic version of ASEX to assess sexual dysfunction and the Arabic version of FSDS-R to assess sexual distress. The Arabic version of the ASEX was used without validating it or assessing its psychometric properties in the current sample of Saudi patients with depression, although the scale was previously validated in Tunisian patients with schizophrenia [25]. Even though the scale was validated in patients with a different diagnosis (schizophrenia) and a different culture (Tunisia) [25], we opted to use it because it is a validated Arabic adaptation of a widely used instrument for assessing sexual dysfunction [24]. Furthermore, the original English ASEX has been used internationally across clinical populations, including patients with depressive disorders and antidepressant-related sexual dysfunction [59, 60]. In addition, a structured review of the ASEX demonstrated its use across a wide range of psychiatric and medical populations and supported its validity and utility in clinical settings [60]. Furthermore, the Arabic ASEX has been used in a Saudi population to assess sexual dysfunction among women with diabetes and thyroid disorders [61]. Thus, it has been used in the same culture though for different diagnoses. We recommend, then, that future Saudi studies investigating this topic consider using a scale that is specifically validated among depressed patients in Saudi Arabia.

Concerning the Arabic validated FSDS-R, which was used in our study, it is important to mention that the study that validated it did so only with women, not with men [23]. Thus, one of the limitations in our study was that we used a scale that was not validated among men, despite our sample including both men and women. Previous studies, however, have noted that the items of the original FSDS-R are gender-neutral and have supported its application in male populations [62], and the scale has been used to assess sexual distress in men and women [63]. We recommend that future Saudi studies investigating this topic consider using a scale that is specifically validated among depressed men in Saudi Arabia.

Conclusion

The purpose of this study was to examine the prevalence of sexual dysfunction and sexual distress among patients with depression and their associated risk factors. The prevalence of these two sexual-related aspects was concerning, with 45.74% of the participants exhibiting sexual dysfunction, according to the ASEX scores, and 72.09% experiencing sexual distress, according to the FSDS-R scores. Several factors were found to be significantly associated with sexual dysfunction: female sex, low monthly income, suffering from chronic diseases, and experiencing physical symptoms interfering with sexual activity. Likewise, sexual distress was significantly associated with various factors, including marital status, smoking history and its duration, chronic medical illnesses, and psychiatric comorbidities.

Collectively, our findings indicate the importance of screening for both sexual dysfunction and sexual distress among patients with depression, especially among those with additional risk factors, such as those we found to be significant. Thus, we encourage mental health workers in Saudi Arabia to incorporate a thorough sexual-related assessment into their psychiatric assessment of patients with depression. Furthermore, particular interventions could be used to mitigate the effects of certain associated factors. For instance, in our study, married individuals exhibited more sexual distress, and the literature shows that certain relationship-focused treatments, such as marital or couples therapy, can enhance communication, emotional closeness, and sexual pleasure [64, 65]. Thus, referral to a marital or couples therapist may be of value when caring for depressed patients with sexual concerns, especially when these concerns are so severe as to contribute to relationship strain. Our study's findings reflect the diverse nature of the factors associated with sexual dysfunction and sexual distress, including social-, psychological-, and medical-related factors. Our findings also emphasize the importance of following a multidisciplinary approach when assessing and caring for depressed patients with sexual dysfunction and sexual distress.

Abbreviations

ICD-10	International Classification of Diseases
DSM-V	Diagnostic and Statistical Manual of Mental Disorders
MDD	Major depressive disorder
KKUH	King Khalid University Hospital
IT	Information technology
FSDS-R	Female Sexual Distress Scale–Revised
ASEX	Arizona Sexual Experience Scale
IRB	Institutional Review Board
SD	Standard deviation
BMI	Body mass index
DM	Diabetes mellitus

HTN Hypertension
FSFI Female Sexual Functioning Index

Supplementary Information

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Supplementary Material 1

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Data availability
The data of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
The study was approved by the IRB at the College of Medicine at King Saud University, Riyadh, Saudi Arabia (research project no. E-24-9468), and was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from all participants. Participants were informed about the purpose of the study, the voluntary nature of their participation, and the confidentiality of their responses.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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