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GENERAL GYNECOLOGY

Female sexual dysfunction in Iran: study of prevalence and risk factors

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Abstract
Purpose To assess the prevalence of and risk factors for female sexual dysfunction (FSD) among women in Birjand city, Iran.
Methods This cross-sectional population-based survey was conducted in nine areas of Birjand, the provincial center of South Khorasan province and married women aged between 15 and 72 years were included. Data were collected by face-to-face interview and completing a self-administered questionnaire. FSD and related risk factors were assessed.
Results A total of 821 women with mean age of 31.5 ± 9.1 were studied. Of them, 694 (84.6 %) had active sexual relationship with their husband, 239 (29.1 %) had less than one intercourse per week, 320 (39 %) did not feel pleasure with their sexual activity and intercourse, 86 (10.5 %) had never attained an orgasm, 604 (73.6 %) had a highly satisfactory relationship with their husband.
Conclusions Dissatisfaction and not feeling pleasure with sexual activity was the most common FSD in our study. Further epidemiologic investigation is clearly warranted.

Keywords Iran · Female sexual dysfunction · Female · Epidemiology

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Introduction

Sexuality is an important and complex domain in quality of life studies [1]. Female sexual dysfunction (FSD), a multidimensional medical subject with organic (biological), psychological and social (interpersonal) determinants, is estimated to be very common among women in the westernized countries [2]. The importance of sexual health for quality of life and overall life satisfaction has been increasingly recognized [3]. Sexual dysfunction is defined as a disturbance of the processes that characterize the sexual response cycle or as pain associated with sexual intercourse [3]. Epidemiological data on sexual dysfunction are relatively scanty and vary widely [4]. Sexual dysfunction is a taboo subject in many countries; hence, this problem is often not volunteered [1]. An analysis of data in US from the National Health and Social Life Survey found that sexual dysfunction is more prevalent in women (43 %) than in men (31 %) and the prevalence varied among women of different racial groups [5]. Women of different racial groups show different patterns of sexual dysfunction [4]. There is limited information on the prevalence, incidence, and antecedents of FSD [5]. In Middle East countries, family is the basic and the most essential unit of the society. Sexual dysfunction is an important issue that affects family's well-being. Many women with important sexual dysfunction in this part of world do not

consult their family physicians for sexual dysfunction, possibly due to cultural factors, e.g. shyness, embarrassment, and reluctances [4]. Data on the prevalence of FSD collected in Middle East are even scantier. The aim of this study was to determine the prevalence and associated risk factors of FSD among women in Birjand, the provincial center of South Khorasan province, Iran.

Methods

This study was performed on a representative sample of the population of married women 15–72 years of age living in Birjand. Unmarried women were not included in the study. All participants were randomly selected by systematic sampling from the complete record list of women supervised by the health centers and were recruited from nine areas of city served by nine health centers, all of them were maintained by Birjand University of Medical Sciences. To calculate the sample size, $N = z^2p\ (1 - p)/d^2$ formula was used; where N was the minimum required sample size, Z score was 1.96 for the confidence level 95 %, p the proportion affected and d is the desired precision of this expected proportion. The approximate prevalence of the problem was assumed 30 % (0.3) [1] and its desired precision (d) was 0.03, then the minimum sample size was calculated 897. The study was approved by Research Ethic Committee of the Birjand University of Medical Sciences. We contacted 900 women either at their home or in the health centers, of whom 821 (91.2 %) gave verbal and written consent to participate in the study, were interviewed and completed a structured questionnaire. Married women living with her husband who voluntarily gave the consent were included. Divorced, widows and pregnant women were excluded. The confidentiality of the women's data was ensured by the lack of any identifying personal information.

The sampling method used was stratified sampling technique and the population was stratified based on people covered by nine urban health centers in Birjand city. The participants of a stratum were selected from home residents in each region by systematic random sampling method. Interviews took place either at the home for 788 (96 %) women or by interview at a health center for 33 (4 %) person. Data for the study were collected by self-reported questionnaires and in-person interviews which were done by a trained interviewer. Demographic characteristics, including subject age, educational level (illiterate, primary/secondary school, high school, and university degree), occupational status (housewife, worker, government employee/private contractor), and years passed since marriage, were assessed in all women. In addition, risk factors associated with health including previous pregnancies and contraception methods, smoking (a history of smoking for >2 pack-years), addiction (daily use of narcotics for 30 or more consecutive days), current medications (drugs taken within the previous week), dyspnea, chronic diseases (e.g. diabetes, hypertension, endocrine disease, and cardiovascular disease), infertility, menopause status (menopause or menstruation cycle), urinary tract infection, and surgical history (hysterectomy, colporrhaphy, and other pelvic surgeries) were also assessed in all women.

We designed a 33-item FSD questionnaire primarily based on the Report of the International Consensus Development Conference on FSD [6]. This investigator-made questionnaire was used for the study, where its validity and reliability were determined before data gathering. To confirm the validity of the questionnaire, we used the content validity method and to confirm the reliability we used Cronbach's alpha test. The content validity of the questionnaire was tested by an expert panel of a gynecologist, a social medicine specialist, and a nurse (MSc.). The final questionnaire was initially tested in a pilot study on 30 women and it has been shown to be reliable with a Cronbach's alpha as 0.86. Four general areas of sexual functioning were defined for this study: sexual desire, orgasm, satisfaction, and pain during intercourse. Sexual desire was assessed with three questions as sexual activity status (whether she has active sexual relationship with her husband or not), frequency of sexual intercourse per week, and the changes in their sexual desire from early in their marriage to the time of interview (decreased, increased, or no changed). Orgasm attainment was defined as an orgasm that results solely from vaginal intercourse without any manual stimulation (at three levels of never, occasionally, and always) and whether she experienced orgasm without vaginal intercourse (two questions). Satisfaction was assessed by three questions including whether she felt pleasure with sexual activity and intercourse (yes or not), how her overall relationship with her husband was (highly satisfactory, moderately satisfactory, and unsatisfactory) and what was the reason for disliking the sexual activity and intercourse. Pain was assessed by three questions including pain frequency during intercourse, pain frequency at vaginal penetration and following full vaginal penetration and whether the pain degree had changed from the beginning of marriage.

All statistical analyses were done using SPSS, version 11.5 (SPSS, Chicago, IL, USA). Chi-square, one-way ANOVA, and binary logistic regression multivariate analysis model (in a stepwise forward conditional manner) was used to calculate independent risk factors for FSD. The dependent variables for regression were the questionnaire subdomains including active sexual relationship, orgasm, satisfaction, and pain. All hypothesis tests that were two-tailed with $P < 0.05$ considered significant. Data are presented as mean ± standard deviation (SD) for quantitative

variables, and frequency and percent for qualitative variables.

Results

A total of 821 women from nine areas in Birjand entered this study; all participants were potentially sexually active. The mean age was 31.5 ± 9.1 (range 15–72) years. Principle characteristics including social and demographic parameters and medical history are listed in Table 1.

In the domain of sexual desire, 694 (84.6 %) respondents had active sexual relationship with their husband and 127 (15.4 %) indicated that they were inactive in sexual relationship, 239 (29.1 %) had less than one intercourse per week, 363 (44.2 %) had one intercourse per week and 421 (51.3 %) said their sexual desire has decreased relative to their experiences at the beginning of marriage (Table 2). In multivariate logistic regression analysis, active sexual relationship had a significant positive association with having menstruation cycles (OR 2.4, 95 % CI 1.2–4.8), highly (OR 16.6, 95 % CI 10–100) and moderately (OR 5.2, 95 % CI 0.6–16.6) satisfactory relationship with husband, and also a negative association with use of anxiolytic–antidepressant medications (OR 0.27, 95 % CI 0.13–0.55), and musculoskeletal disorders (OR 0.45, 95 % CI 0.26–0.76) ($P < 0.05$). It was not associated with age, educational level, parity, dyspareunia, breast feeding, diabetes, hypertension, hyperthyroidism, dyspnea, husband's age, and age difference with husband.

In the domain of orgasm disorder, 109 (13.3 %) women stated that they always attained orgasm, 606 (73.8 %) replied that they often or usually had orgasm, and 86 (10.5 %) of respondents had never had an orgasm experience. Totally, 233 (28.4 %) women stated that their orgasm were with sexual stimulation other than intercourse. In multivariate analysis the experience of orgasm was negatively associated with housewife (OR 0.33, 95 % CI 0.12–0.95) and worker (OR 0.08, 95 % CI 0.01–0.57) occupations, as well as having dyspareunia (OR 0.53, 95 % CI 0.29–0.99). However, being sexually active (OR 6.66, 95 % CI 1.22–12.57), and highly (OR 17.16, 95 % CI 5.42–54.29) or moderately (OR 5.93, 95 % CI 1.85–19.09) satisfactory relationship with husband had a positive impact on the experience of orgasm (Table 3). It was not associated with age, education, duration of marriage, menopause status, method of contraception, chronic diseases, and use of medication.

In the domain of satisfaction, only 501 (61 %) respondents said that they did feel pleasure with their sexual activity and intercourse. The rest of 39 % (not feeling pleasure) included the most common FSD among study population. However, 604 (73.6 %) stated that overall

Table 1 Socio-demographic parameters of the study population ($n = 821$)

Variables	
Age group (years)	
15–20	60 (7.3 %)
21–25	186 (22.7 %)
26–30	183 (22.3 %)
31–35	157 (19.1 %)
36–40	112 (13.6 %)
41–45	60 (7.3 %)
46–50	37 (4.5 %)
51–72	26 (3.2 %)
Education level	
Illiterate	110 (13.4 %)
Primary/secondary school	394 (48 %)
High school	253 (30.8 %)
University degree	64 (7.8 %)
Occupation	
Housewife	684 (83.3 %)
Worker	16 (2 %)
Government employee/private contractor	121 (14.7 %)
Parity	
Nulliparous	78 (9.5 %)
1–3 deliveries	511 (62.3 %)
4–6 deliveries	162 (19.7 %)
7 and more deliveries	70 (8.5 %)
Age difference with husband (years)	4.4 ± 4.4 (range 19–34)
Marriage duration (years)	11.0 ± 9.1 (range 0–46)
Menstruation status	
Menopause	118 (14.4 %)
Menstruation cycle	703 (85.6 %)
Medical history	
Diabetes	19 (2.3 %)
History of UTI	103 (12.5 %)
Breathlessness	44 (5.4 %)
Hypertension	33 (4 %)
Thyroid disease	16 (1.9 %)
Infertility	30 (3.7 %)
Breast cancer	3 (0.4 %)
Cardiovascular disease	27 (3.3 %)
Contraception history	
Non	149 (18.1 %)
Oral pill	223 (27.2 %)
Condom	220 (26.8 %)
Withdrawal	156 (19 %)
Intrauterine device	60 (7.3 %)
Tubal ligation	30 (3.7 %)
Surgical history	
Hysterectomy	9 (1.1 %)
Colporrhaphy	24 (2.9 %)
Other pelvic surgeries	22 (2.7 %)

Table 2 Characteristic of women regarding desire domain and satisfaction domain

Having active sexual relationship	694 (84.6 %)
Inactive sexual relationship in different age groups	
15–20	13 (21.7 %)
21–25	20 (10.8 %)
26–30	14 (7.7 %)
31–35	22 (14 %)
36–40	15 (13.4 %)
41–45	15 (25 %)
Over 45	26 (41.3 %)
Number of coitus per week	
Less than one per week	239 (29.1 %)
One	363 (44.2 %)
Two	110 (13.4 %)
Three	56 (6.8 %)
More than 3 per week	53 (6.5 %)
Changes in sexual desire relative to experiences at the beginning of marriage	
Decreased	421 (51.3 %)
Increased	104 (12.7 %)
No change	296 (36 %)
Feel pleasure with your sexual activity and intercourse	
Yes	501 (61 %)
No	320 (39 %)
Overall relationship with husband	
Highly satisfactory	604 (73.6 %)
Moderately satisfactory	186 (22.6 %)
Unsatisfactory	31 (3.8 %)

relationship with their husband was highly satisfactory (Table 2).

Among women's reasons to dislike the sexual activity and intercourse, fear of pregnancy (14.9 %), difficulty to take the major ritual ablution after sexual intercourse (11.3 %), dyspareunia (11 %), and existence of teenager and elder children at home (10.5 %) were the most prevalent. In multivariate logistic regression analysis, an unsatisfactory sexual activity was positively associated with not feeling the pleasure with sexual activity (OR 20.58, 95 % CI 7.39–57.30), dyspareunia (OR 9.19, 95 % CI 4.36–19.34), fear to become pregnant (OR 10.7, 95 % CI 5.90–19.36), difficult to take the major ritual ablution after sexual intercourse (OR 5.19, 95 % CI 2.61–10.33), to avoid sexual act because of having teenager and elder children and for their respect while they are stay at home (OR 9.24, 95 % CI 4.44–19.23), being sick (OR 23.96, 95 % CI 4.61–124.54), financial problems (OR 8.34, 95 % CI 2.03–34.18), menopause (OR 2.26, 95 % CI 1.15–4.44), use of oral contraceptive agents (OR 1.74, 95 % CI 1.06–2.86), dyspnea (OR 4, 95 % CI 1.2–14.2), use of anxiolytic or/and antipsychotic medication (OR 2.7, 95 % CI 1.27–5.96). Also, an unsatisfactory sexual activity was negatively associated with unusual sexual practice during sexual intercourse by husband (OR 0.06, 95 % CI 0.00–0.51), active sexual relationship with the husband (OR 0.18, 95 % CI 0.08–0.38), and orgasm attainment (OR 0.28, 95 % CI 0.12–0.65) (Table 4).

In pain domain, 77 (9.4 %) women always, 369 (44.9 %) occasionally, and 375 (45.7 %) never felt pain

Table 3 Multivariate analysis for the relation of variables with experience of orgasm

Variables	*N* (%)	OR (95 % CI)	*P* value
Occupation			
Housewife	680 (83.2 %)	0.33 (0.12–0.95)	0.04
Worker	16 (2 %)	0.08 (0.01–0.57)	0.01
Government employee/private contractor	120 (14.7 %)	1	–
Parity			
Nulliparous	77 (9.5 %)	0.74 (0.24–2.3)	0.55
1–3 deliveries	506 (62.4 %)	2.62 (1.06–6.43)	0.05
4–6 deliveries	160 (19.7 %)	0.84 (0.33–2.09)	0.70
7 and more deliveries	69 (8.4 %)	1	–
Active sexual relationship			
Yes	688 (84.6 %)	6.66 (1.22–12.57)	<0.001
No	125 (15.4 %)	1	–
Close relationship with husband			
Very satisfactory	597 (73.6 %)	17.16 (5.42–54.29)	<0.001
Moderately satisfactory	183 (22.6)	5.93 (1.85–19.09)	0.002
Non-satisfactory	31 (3.8)	1	–
Dyspareunia			
Yes	441 (54 %)	0.53 (0.29–0.99)	0.04
No	375 (46 %)	1	–

Table 4 Multivariate analysis for the relation of variables with satisfaction domain

Variables	*N* (%)	OR (95 % CI)	*P* value
What is the reason you do not like sexual activity and intercourse?			
(a) I do not feel pleasure	64 (7.8 %)	20.58 (7.39–57.30)	<0.001
(b) My husband suffer from premature ejaculation	50 (6.1 %)		NS
(c) I have painful intercourse	90 (11.0 %)	9.19 (4.36–19.34)	<0.001
(d) I fear the pregnancy	122 (14.9 %)	10.7 (5.90–19.36)	<0.001
(e) This is difficult for me to take major ritual ablution after sexual intercourse	93 (11.3 %)	5.19 (2.61–10.33)	<0.001
(f) My children are in adulthood age	86 (10.5 %)	9.24 (4.44–19.23)	<0.001
(g) My husband insist for unusual sexual practice during intercourse	17 (2.1 %)	0.06 (0.00–0.51)	0.009
(h) I fear the gynecologic infection	33 (4 %)		NS
(i) I dislike my husband	18 (2.2 %)		NS
(j) I am sick	27 (3.3 %)	23.96 (4.61–124.54)	<0.001
(k) I hate sexual intercourse	71 (8.6 %)		NS
(l) We have financial problems	29 (3.5 %)	8.34 (2.03–34.18)	0.003
Other associated factors			
Active sexual relationship with the husband		0.18 (0.08–0.38)	<0.05
Orgasm attainment		0.28 (0.12–0.65)	<0.05
Menopause		2.26 (1.15–4.44)	<0.05
Dyspnea		4 (1.2–14.2)	<0.05
Oral contraceptive agents		1.74 (1.06–2.86)	<0.05
Anxiolytic or/and antipsychotic medication		2.7 (1.27–5.96)	<0.05

NS not significant

during intercourse. Totally, 198 (24.1 %) women had pain during penetration, 184 (22.4 %) following penetration, and 103 (12.5 %) reported pain at both time. We considered positive dyspareunia for either "always" or "occasionally" experience of pain and negative for "never"; then multiple logistic regression analysis was performed and showed a significant positive association of pain with nulliparity (OR 4.12, 95 % CI 1.79–9.46), or having one to three deliveries (OR 3.14, 95 % CI 1.59–6.18), and also a negative association with orgasm attainment (OR 0.45, 95 % CI 0.31–0.95).

Only 153 (18.6 %) cases reported that they had consulted with a health professional for their sexual problems and of them 106 (69.3 %), 39 (25.5 %), and 8 (5.2 %) women had taken counsel, respectively, from a physician, a health center, and a psychiatrist.

Discussion

Standard epidemiologic sampling by survey at home of women and in-person interviews by trained personnel in Birjand, the provincial center of South Khorasan province, can be considered as an advantage of this study. Our study obtained data regarding FSD as well as demographic characteristics, general health, and contraception methods. The possibility of underreporting biases in face-to-face interviews should be considered on account of occasional lack of adequate privacy during interviews and women's reluctance to talk about such sensitive issues. Out of 900 women, 91.2 % participated in our study, hence we had a low dropout rate in comparison to studies conducted by telephone interview or mailed surveys [7]. As a weakness in our study, formally validated questionnaire in Persian language was not available, so we prepared a questionnaire in Persian language according to report of the international consensus development conference on FSD [6] which covers most domains of FSD. Likewise, Elnashar [4] in Lower Egypt has assessed FSD by personal interview and a self-made questionnaire comprises six response items. Different studies have used varied questionnaires [1, 5, 8, 9]. There are other self-reported measures in the literature which include structured interviews, event logs, and patient diary methods [6]. Although the female sexual function index (FSFI) described by Rosen et al. [10] is currently the most frequently used FSD questionnaire, it has not been formally validated in Persian language. Report of the international consensus development conference on FSD in year 2000 indicates that FSD is an under researched and poorly understood area and epidemiological research on the prevalence, predictors, and outcomes of sexual dysfunction in women is urgently needed.

To critically review published data on the urogynecological aspects of FSD, very recently different databases were searched by Dalpiaz et al. [11] and indicated a lack of a standardized instrument for assessing FSD. Hence, there is an urgent need for further standardization and validation of FSD questionnaires.

In our study, about 15 % had inactive sexual relationship with their husbands and over half of them had a decreased sexual desire relative to the experiences at the beginning of their marriage. Also, satisfactory relationship and having menstruation cycles had a positive role on active sexual activities and conditions such as musculoskeletal disorders and using anxiolytic–antidepressant drugs had a negative impact on it. Oksuz et al. [3] reported desire problem of 48.3 % as most common sexual dysfunction in Turkish women. Elnashar [4] reported hypoactive sexual desire disorder in 49.6 % of women, with only 3.6 % reporting increased desire. The most frequently cited study on FSD prevalence is the one by Laumann et al. [12] who investigated 1,749 women, aged 18–59 years living throughout the USA. In this landmark investigation, 43 % of women reported on FSD. Addis et al. [5] in a study on 40- to 69-year-old women of North California reported that 29 % of study population were not sexually active in the last year prior to the time of study. Oberg et al. [13] reported that 45 % of Swedish women had decreased desire, while Shokrollahi et al. [14] reported a lower rate of inhibited desire (15 %). This difference in prevalence rate may be explained by the differences in definition, methodology, and studied population [4]. In the Lower Egypt study, lower sexual desire was related to female circumcision, socio-economic circumstances such as low income and lack of adequate privacy at home, increased household duties, and husbands' choice of unsuitable time for sexual intercourse [4]. Although female circumcision is not practiced in Iran, it is difficult to take major ritual ablution after sexual intercourse as is practiced by Muslims and having financial problems were among the significant reason related to hypo-sexual desire in our study. The rate of one intercourse per week was about 44 % in our study. However, in Lower Egypt study, 12.2 % of women had one coitus per week and 58.5 % had two to four coituses per week [4]. Addis et al. [5] in a study in North California reported that 37 % had one intercourse or less in a month and 33 % had one coitus per week; in other words, 80 % had one or less sexual intercourse in a week. These differences may be explained by the differences in the mean age of the population of studies which was 29.9 ± 7.7, 31.5 ± 9.1, and 55.9 ± 8 for Lower Egypt, Birjand, and North California, respectively. Safarinejad et al. [1] reported 67 % of women had one intercourse per week and with increasing age, the proportion of women who did not have regular intercourse increased. Also, Dennerstein et al. [8] in a study on women's sexual functioning and lifestyle in 12 European countries with mean age of 52.7 years reported that the only domain that significantly varied between countries was the frequency of sexual intercourse and it was the highest for the group of Latin or southern countries (France, Portugal, Italy, and Spain).

In our study, 10.5 % had not experienced orgasm and 13.3 % always had orgasm. The experience of orgasm increased by being sexually active and having satisfactory relationship, and decreased by some conditions including dyspareunia and women's occupation (housewife and worker). Ponholzer et al. [9] reported that even in the youngest age groups (20–40 years), 20 % of women reported on significant orgasmic disorders ("never" or only "occasionally" an orgasm during sexual activity). In the lower Egypt study [4], orgasmic problem was the second most common sexual problem (43 %) and 10.5 % of women had primary anorgasmia which is in concordance with our study. Safarinejad et al. [1] from Iran reported 26 % of women had never achieved orgasm and it was the most common FSD in their study. They stated that the possible explanation may include a restraining sexual education, poor partner performance and technique, and negative beliefs with regard to sexual activity. Insufficient clitoral stimulation may account for most cases of absent orgasm and all women may be potentially orgasmic if adequately stimulated [1].

In present study, the most common FSD was satisfaction problem, hence 39 % of women indicated that they did not feel pleasure with sexual activity. The satisfaction problem was related to displeasure in sexual activity, fear of pregnancy, some religious and cultural beliefs, some women's conditions (illness, dyspnea, dyspareunia, and menopause), financial problems, method of contraception (oral agents), and medicines (anxiolytic or/and antipsychotic drugs). However, orgasm attainment, active sexual activities, and unusual sexual practice by husband had led them to an increased satisfaction levels. Oksuz et al. [3] from Turkey reported 45 % of women had the satisfaction problem and Addis et al. [5] from North California reported that one-third of women who were sexually active were not satisfied with their sexual activity.

In pain domain, only about 45 % said never had pain in sexual activity. Also, the pain domain score was improved among women with orgasm attainment and it was worsened among participants with lower parity (0–3 deliveries). Elnashar et al. [4] reported 31.5 % complain from dyspareunia in Lower Egypt and Oksuz et al. [3] reported 42.9 % pain problem in Turkish women. Ponholzer et al. [9] in a healthy Austrian cohort reported 12.8 % of women had any pain within the vagina or genital area during and after sexual activity.

Conclusion

Dissatisfaction and not feeling pleasure with sexual activity was the most common FSD in our study. This work provides estimate of the prevalence of FSD in Birjand. Further research on this prevalent disorder for better characterization and understanding of its epidemiology is a high and relevant necessity. There is an urgent need for further standardization and validation of the FSD questionnaires.

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Conflict of interest The authors declare that they have no conflict of interest.

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