

Prevalence and risk factors of the female sexual dysfunction in a sample of infertile Iranian women

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Abstract

Background Infertility has a major impact on women's quality of life and emotional well-being. The resulting interpersonal problems extend to women's sexual relationships, with a high proportion of infertile women reporting sexual problems.

Aim To determine the prevalence and identify the potential risk factors of female sexual dysfunction (FSD) among infertile Iranian women.

Methods Using a cross-sectional study design including 12 infertility clinics in five Iranian cities, FSD was assessed in 604 infertile women using the culturally adapted, multidimensional Female Sexual Function Index (IV-FSFI). Depression, anxiety and health-related quality of life (HRQL) were also assessed for all infertile patients. Depression and anxiety were assessed with the Hospital Anxiety and Depression Scale (HADS) while HRQL was measured using the Short Form 36 (SF-36).

Main outcome measure Prevalence of FSD in infertile women and associated factors.

Results Infertile women reported significantly lower scores on the FSFI domains in comparison with healthy women. Risk factors for FSD as determined by multilevel analyses were older age and self-reported depression. Furthermore, secondary infertility, lower educational level and higher partner education put women at increased risk for FSD.

Conclusions Among infertile women, sexual dysfunctions seem to be prevalent higher than previously published in Iran. This finding may have implications on the clinical assessment of sexual function and the role of demographic and psychological factors in infertile women.

Keywords Infertility · Female sexual dysfunction · FSD · FSFI · Iran

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Introduction

It is estimated that around 20 % of couples suffer from infertility [1, 2] with prevalence rates of infertility differing substantial among countries [3, 4]. Whereas approximately 6–26 % of women in industrialized countries are unable to have children, the rates of infertile women in south Asian populations are much lower, ranging from 4 to 6 % according to the World Fertility Survey [3, 4]. In Iran—as a developing country—there are only a limited number of studies that have tried to estimate infertility among couples. An early epidemiologic study conducted in 2004 reported a prevalence of lifetime primary infertility of 24.9 % among Iranian women, aged 19–49 years [5]. In contrast, a more recent population-based study revealed that 8 % of Iranian couples suffered from infertility [6]. Genital infections and environmental variables, such as dietary factors, low family

income, and limited access to health services, have been considered as predisposing factors that may increase infertility among Iranian women [6, 7].

Infertility has a major impact on women's quality of life and is associated with feelings of loss of control, diminished self-esteem, chronic bereavement, anxiety, and depression [1, 8]. Moreover, infertile women are often blamed for their inability to bear a child—a problem which can facilitate or trigger divorce by the husband [9]. These interpersonal problem which result in low relationship satisfaction often extend to women's sexual relationships, with a high proportion of infertile women reporting sexual problems (40–50 %) [10, 11]. In Iranian population, only one study has looked at sexual functioning among infertile women so far [12]. Using the Sexual Function Questionnaire (SFQ) to assess FSD, the study revealed that only 7 out of 100 infertile Iranian women reported normal sexual functioning. The most prevalent sexual problem among these women was decreased sexual arousal (80 %) [12].

Whilst epidemiologic studies indicate that FSD is common among infertile women, the direction of causality remains yet to be determined. Sexual problems may indirectly cause infertility by lowering the frequencies of sexual intercourse, however, it is equally likely that infertility impacts directly on women's sexual functioning [10]. Previous studies have indicated that infertile women often feel inferior and develop a diminished self-esteem which can impact their levels of sexual desire provoke them to be less relaxed during sexual activities [13, 14]. Despite evidence of alarming prevalence rates of FSD among infertile women, there is limited knowledge about the risk factors causing FSD in these women. Also, to date, there are only a limited number of epidemiological studies investigating FSD in Iranian women suffering from infertility [15, 16].

Aim

The objective of this cross-sectional study was to evaluate the prevalence of FSD and the specific psychological and health-related risk factors causing sexual problems among infertile Iranian women using a range of standardized, validated self-report questionnaires.

Methods

Subjects and recruitment

The cross-sectional survey was carried out between August 2011 and January 2012 on a sample of women referring to infertility clinics in the Iranian cities of Zahedan (two centers), Ahvaz (three centers), Qazvin (one center), Tehran (four centers) and Gilan (two centers). Patients were

classified as infertile according to the accepted medical definition of infertility (i.e. failure to conceive after 12 months of unprotected sexual intercourse) by the consulting gynecologists. A convenience sampling approach was used for sampling procedure. Infertile women were excluded from the study if they suffered from a chronic medical condition previously associated with FSD (e.g. diabetes mellitus and cardiovascular diseases, such as hypertension) or were using antidepressant medications [17, 18]. Women interested in participating in this study were asked to sign a consent form. After signing the consent form, a series of questionnaires were handed out to the participants by the consulting gynecologist. In the end, a total of 636 infertile women were eligible to participate in this study.

The study was approved by the Ethic Committee of the Qazvin University of Medical Sciences.

Measures

Demographic and lifestyle measures

Information on demographic and personal characteristics such as age, duration of marriage, educational level, family income and occupational status was obtained using a self-constructed questionnaire.

Female sexual dysfunction

Sexual dysfunction was assessed with the culturally adapted Iranian version (IV-FSFI) of the Female Sexual Function Index (FSFI) developed by Rosen et al. [19]. The 19-item questionnaire is a self-report measure that allows multidimensional assessment of sexual problems on six different domains, including sexual desire (two items), arousal (four items), lubrication (four items), orgasm (three items), satisfaction (three items), and pain (three items) [19]. Response options to each question are on a Likert-type scale ranging from 1 to 5 for items 1 and 2 (desire) and from 0 to 5 with the supplementary option “no sexual activity” for all other items (3–19). A higher score on the FSFI indicates better sexual functioning. More detailed information on response options, domain score computation and domain factor weights can be found in Rosen et al. [19]. The FSFI has received extensive psychometric evaluation in clinical and nonclinical samples [20–22]. The FSFI has been previously used to assess FSD among Iranian women [22–25]. A recent study evaluating the psychometric properties of the FSFI found the translated version to be a reliable and valid tool to screen Iranian women with unknown sexual health status, with Cronbach alpha's ranging from $\alpha = 0.72$ to $\alpha = 0.90$, as well as excellent construct validity [22].

Health-related quality of life

Health-related quality of life (HRQoL) of the participants was assessed using the Short Form 36 (SF-36) questionnaire [26]. The SF-36 is a self-administered questionnaire consisting of 36 items and 8 scales. The scales include physical function, role physical, bodily pain, general health, vitality, social function, role-function emotional, and mental health. Each item score is summed up to produce raw scale score for each health concept which is then transformed to a 0–100 scale. The SF-36 has also two summary scores which are the physical component summary (PCS) and the mental component summary (MCS). Higher questionnaire scores mean more HRQoL. Both scores have the advantage of being norm based and having reduced floor and ceiling effects [26]. The SF-36 has been translated into Persian language and has been validated for the use in the Iranian population [28]. The internal consistencies of the Persian version of the SF-36 were acceptable, ranging from $\alpha = 0.77$ to $\alpha = 0.90$ [27].

Anxiety and depression

The Hospital Anxiety and Depression Scale (HADS) were used to assess depression and anxiety among infertile women. The HADS is a self-administered instrument consisting of 14 questions. The instrument has two subscales including anxiety (seven items) and depression (seven items) [28]. All items rate from 0 to 3. For both, anxiety and depression, scores of 0–7, 8–10 and 11–21 are considered normal, borderline and abnormal, respectively. The HADS has previously been used as a psychological screening tool in infertile women [29–32]. A validation study of an Iranian version of the HADS indicated the translated version to be an acceptable, reliable and valid measure of psychological symptoms in Iranian patients [32].

Statistical analysis

Student's *T* test was used to compare the FSFI domains among healthy women and women with in fertility. The *P* values were adjusted for multiple comparisons using the Benjamini–Hochberg.

Multilevel analyses on $n = 604$ patients nested within 12 centers were conducted. More specifically, $n = 604$ patients (at level 1) nested within 12 centers (at level 2) comprised the multilevel data structure considered in these analyses. To take into account the effect of clustering, a multilevel data analyses approach was applied. We tested four sets of multilevel regression models (random intercept models). To avoid multi-collinearity, standardized forms of the continuous variables were used, including age, duration

of marriage, depression and physical component summary (PCS). The following are detailed descriptions of the four models:

Model 1: This is a two-level null (empty) model of patients nested within the centres (level 2) with only the constant term in the fixed and random parts. Variation in the FSFI was partitioned across patients (within the different centres) and between the centres. The intra-class correlation coefficient indicates the proportion of total variance that resides between the centres at level 2.

Model 2: This is the same as Model 1 with addition of compositional factors (age, duration of marriage, household income, patient and husband educational attainment, employment status) in the fixed part. The model assessed the compositional effect on the FSFI.

Model 3: This is the same as Model 2 with the added variable of type of infertility. Here, the model assessed the effect of type of infertility on FSFI after adjusting for compositional factors.

Model 4: This is the same as Model 3 with addition of the variables depression and PCS. Due to high correlations between the MCS and PCS and also depression and anxiety ($r > 0.6$), we only chose PCS and depression to be entered in the model to avoid multi-collinearity. We assessed whether depression and PCS exerted effects on FSFI after adjusting for type of infertility and other compositional factors. The purpose of this model was to examine whether FSD was associated with quality of life and depression in the presence of the confounding factors such as age, educational status, type of infertility etc.

All statistical analyses were performed using STATA software package (version 11).

Results

Approximately 95 % of infertile women ($n = 604$) agreed to participate in this study. Unwillingness to respond to the sexual questions was the main reason for drop out. The mean age of all participating infertile women was 30.0 years ($SD = 7.8$, range 18–42 years). Almost two-third of women suffered from primary infertility ($n = 410$; 67.9 %). The most of them had completed college school (61.8 %). 35.6 % of the healthy women had any kind of sexual dysfunction according to cut off 26.55 for the FSFI. Comparing the FSFI domains and total scores across primary and secondary infertile women indicated that women with secondary infertility reported worse sexual functioning. In the other words, secondary infertile women reported lower scores in all FSFI domains in comparison with primary infertile women even after adjusting for *P* values (Table 1).

Demographic characteristics of the study sample are shown in Table 2. We observed differences in relation to

Table 1 Sexual function scores for each functional domain in primary and secondary infertile women

	Primary infertile women (<i>n</i>)	Secondary infertile women (<i>n</i>)
Arousal ^a	3.42 (0.76)	3.32 (0.82)
Lubrication ^a	3.80 (0.89)	3.62 (0.99)
Orgasm ^a	3.39 (0.84)	3.05 (0.95)
Satisfaction ^a	3.96 (0.84)	3.69 (0.94)
Pain ^a	3.98 (0.94)	3.72 (1.02)
Total score ^a	22.50 (3.60)	20.68 (4.09)

^a Statistically significant according to Benjamini–Hochberg procedure

duration of marriage and family income between women with primary infertility and secondary infertility. We further found a very high correlation between anxiety and depression ($r = 0.69$). Both, anxiety and depression were inversely correlated with all FSFI domains and the total FSFI score (i.e. women with higher anxiety and depression scores reported more sexual problems), with the highest correlations found between sexual satisfaction and both

variables ($r = -0.44$ and $r = -0.39$, respectively). Prevalence of depression was 46 % ($n = 189$) and 41 % ($n = 79$) in primary infertile and secondary infertile women, respectively. The mean standard deviations for the HADS depression score for primary and secondary infertile women are 6.6 ± 2.4 and 6.2 ± 2.2 , respectively. No significant difference in mean could be detected between primary and secondary infertile women of the HADS depression score. The prevalence of anxiety was 52 % ($n = 213$) and 50 % ($n = 97$) in primary infertile and secondary infertile women, respectively. The mean standard deviations for the HADS anxiety score for the primary and secondary infertile women were 8.8 ± 3.2 and 8.5 ± 3.0 , respectively.

Correlation between PCS and MCS was $r = 0.60$.

Table 3 provides the results of the multilevel analyses. The null model with no predictors (Model 1) revealed a significant variation in the FSFI total score between the centers ($\sigma_{u0}^2 = 5.22$). However, these results did not take into account the compositional characteristics.

In Model 2, the FSFI total score decreased as age of the patients increased. Patients with high income were more

Table 2 Sample characteristics of our sample of 604 infertile Iranian women

Characteristic	Infertile women		
	Primary infertile women (<i>n</i> = 410)	Secondary infertile women (<i>n</i> = 194)	Total (<i>n</i> = 604)
	Mean, SD		
Age	30.22 (7.68)	29.75 (8.06)	30.07 (7.80)
Duration of marriage (years)	6.80 (7.92)	7.48 (8.66)	7.03 (8.16)
	<i>N</i> (%)		
Education			
Unlettered	10 (2.4 %)	4 (2.1 %)	14 (2.3 %)
Primary school	17 (4.1 %)	10 (5.2 %)	27 (4.5 %)
Secondary school	191 (46.6 %)	98 (50.5 %)	289 (47.8 %)
College school or above	192 (46.8 %)	82 (42.3 %)	274 (45.4 %)
Husband's education			
Unlettered	8 (2.0 %)	6 (3.1 %)	14 (2.3 %)
Primary school	34 (8.3 %)	21 (10.8 %)	55 (9.1 %)
Secondary school	236 (57.6 %)	112 (57.7 %)	348 (57.6 %)
College school or above	126 (30.7 %)	48 (24.7 %)	174 (28.8 %)
Missing	6 (1.4 %)	7 (3.7 %)	13 (2.2 %)
Family income (\$)			
≤800	27 (6.6 %)	32 (16.5 %)	59 (9.8 %)
800–1,500	244 (59.5 %)	103 (53.1 %)	347 (57.5 %)
1,500≥	139 (33.9 %)	59 (30.4 %)	198 (32.8 %)
Occupational status			
Housewife	260 (63.4 %)	132 (68.0 %)	392 (64.9 %)
Employee	108 (26.4 %)	41 (21.2 %)	149 (24.7 %)
Missing	42 (10.2 %)	21 (10.8 %)	63 (10.4 %)

Table 3 Fixed and random part results for the multilevel analytical models

	Model 1		Model 2		Model 3		Model 4	
	β (SE)	<i>P</i> value	β (SE)	<i>P</i> value	β (SE)	<i>P</i> value	β (SE)	<i>P</i> value
Fixed effects								
Constant	25.84 (7.78)	<0.001	19.91 (5.67)	<0.001	23.83 (6.29)	<0.001	23.63 (7.13)	<0.001
Age			-1.21 (0.34)	<0.001	-1.24 (0.36)	<0.001	-1.24 (0.35)	<0.001
Duration of marriage			0.11 (0.32)	0.732	0.32 (0.26)	0.214	0.13 (0.24)	0.590
Family income								
≤800			Ref		Ref		Ref	
800–1,500			3.91 (1.16)	<0.001	2.57 (0.75)	<0.001	2.60 (0.74)	<0.001
1,500≥			3.28 (0.91)	<0.001	2.60 (0.74)	<0.001	2.86 (0.80)	<0.001
Educational attainment								
Under diploma			Ref		Ref		Ref	
Diploma			4.11 (1.12)	<0.001	3.28 (0.94)	<0.001	2.37 (0.70)	<0.001
University			6.02 (1.80)	<0.001	4.13 (1.23)	<0.001	2.36 (0.67)	<0.001
Husband educational attainment								
Under diploma			Ref		Ref		Ref	
Diploma			-1.19 (0.52)	0.022	-1.24 (0.44)	0.005	-1.31 (0.38)	<0.001
University			-1.86 (0.60)	0.002	-1.63 (0.53)	0.002	-1.54 (0.46)	<0.001
Occupation								
Unemployed			Ref		Ref		Ref	
Employed			-0.89 (0.55)	0.103	-0.75 (0.46)	0.102	-0.10 (0.45)	0.823
Type of infertility								
Primary					Ref		Ref	
Secondary					-5.24 (1.47)	<0.001	-3.50 (0.93)	<0.001
Depression							-1.04 (0.30)	<0.001
Physical component summary (PCS)								
							1.52 (0.44)	<0.001
Random effects								
Between centers	5.22 (1.56)	<0.001	2.38 (0.67)	<0.001	1.94 (0.57)	<0.001	1.23 (0.36)	<0.001
Intra-class correlation	0.083		0.044		0.039		0.025	
-2*Log likelihood	3,538.70		2,804.67		2,640.67		2,431.06	

likely to have higher FSFI scores. Those in families having an income of 800\$ or more were likely to have a higher FSFI total score. Furthermore, women with educational attainment equal to or higher than high school diploma were more likely to have a higher FSFI total score whereas women whose husbands had a higher education had lower sexual problems.

In Model 3, we observed that patients with second type of infertility had a lower FSFI total score compared to those with primary type of infertility, after adjusting for compositional factors.

In Model 4, patients with higher PCS scores were more likely to have a higher FSFI total score which further decreased as depression scores increased after adjusting for compositional factors and type of infertility.

Discussion

Prevalence of FSD

Although studies investigating the impact of infertility on FSD are scarce, they have consistently demonstrated that sexual complaints are very common among infertile women [10] and that these women are more prone to depression, anxiety, and stress [33, 34]. The objective of this study was to further examine the impact of infertility on female sexual function in an Iranian population sample of infertile women and to identify potential psychological and health-related risk factors for FSD.

In this study, we report a prevalence of FSD of 56 % among infertile Iranian women. This estimate is slightly

different from estimates found in other epidemiologic studies assessing FSD in infertile women. Whilst studies conducted in the US ($n = 218$) [10] and in Iran found a lower prevalence of sexual problems (40 and 48 %, respectively), Keskin et al. [35] observed higher numbers, with 64.8 % ($n = 79$) of primary infertile women, and 76.5 % ($n = 39$) of secondary infertile women reporting sexual problems. It is possible that women from different ethical and cultural background have a different awareness and perception of their own body and their sexual functioning, offering a potential explanation for this discrepancy in prevalence.

Sexual function is one of the important components of health and overall quality of life. Given the effect infertility has on women's physical health and emotional well-being it is not surprising that a substantial proportion of infertile women report sexual impairment and problems. These problems are often the consequence of disturbances in the relationship and decreased closeness and intimacy which impacts intercourse frequency, and sexual satisfaction [48]. Thus, one might expect the prevalence of FSD among infertile women to be higher than in general population. Indeed have several pieces of evidence suggested that FSD is more common in infertile compared to fertile women [33–35] and a large cross-sectional study conducted in Iran ($n = 2,626$) found a prevalence of FSD of 31.5 %—much lower compared to our study (57 %) [25]. However, a perusal of epidemiologic literature shows that other studies conducted on unselected, non-clinical population samples report prevalence estimates similar to the ones found for infertile women. In a study conducted in a Turkish population sample, Cayan et al. [36] found a prevalence rate of FSD of 46.9 %. Similarly, in the Natsal 2000 study—a probability sample of 11,161 British men and women aged 16–44 years—Mercer and colleagues found prevalence estimates of up to 43 % (for lack of interest in sex) [37]. Although FSD in infertile women seems to be slightly more common, a direct comparison of prevalence estimates is not possible due to the use of different self-report instruments to assess FSD and the considerable differences in sample size.

Risk factors for FSD

In the present study, we further determined factors that may influence sexual function in infertile women. Overall, our results are in line with previously reported findings. Age turned out to be one of the main risk factors. This association is most likely due to woman's sexual function and frequency of sexual activities that tend to decline in the second decade of women [38].

In addition to age, we found other socio-demographic and psychological variables to potentially mediate

women's sexual functioning. A strong predictor of sexual problems in our sample was depression ($P < .001$). Depression is associated with infertility and FSD. A diagnosis such as infertility may provoke depression in females because of the inability to conceive. Furthermore, failure to respond to the treatment of infertility, as well as the diagnosis of infertility itself, is considered resource potential causes of depression and anxiety. We found that infertile women are twice as likely to report depressive symptoms as compared to fertile women [39]. Furthermore, women with identified somatic causes for their infertility had significantly higher depression scores than those with unexplained infertility [39]. However, it is not exactly clear how depression is related to infertility. Previous studies reported some suppositions for depression in infertility including therapeutic failure, worse socio-economic conditions, lack of support from the partner and a history of depression in patient. In this study, anxiety and depression were found to be existent in around half of the patients (50 %). Similar findings were reported by Ramezanzadeh et al. [40] who assessed psychopathological profile of 370 infertile Iranian women and found evidence for a diagnosis of depression in 40.8 % of the women. Anxiety, on the other hand was reported in 86.8 % of the women [40]. Similarly to our study, depression had a negative impact on female's sexual functioning. This finding also in line with a study conducted by Mezones-Holguin et al. [41] reporting associations between depression and FSD, where depression was regarded as psychosocial risk factor affecting women's sexual functioning, and with the results of a community epidemiological survey, showing that women with moderate to high scores on a self-report measure of depression are at a significantly higher risk for arousal difficulties in particular [42]. These results are not surprising, as the involvement of psychological entities in the development and maintenance of FSD has long been established [1, 3, 8].

We further report a significant association between lower HRQoL (i.e. lower PCS) and an increased risk of sexual problems. Infertility clearly has a major impact on women's quality of life which extends to women's sexual life and satisfaction. These findings are in line with previous studies indicating reduced HRQoL in infertile women in comparison to general population [43, 44] and how the diagnosis and treatment of infertility may cause psychological side effects (such as vaginism, anorgasmia and dyspareunia) [45, 46]. However, we were unable to establish whether low HRQoL affects women's sexual functioning or whether an impaired sexuality due to the diagnosis of infertile and the tiresome treatments impact on women's HRQoL. The factors influencing better or worse HRQoL may vary in different infertile populations of different ethnic backgrounds therefore identification of these

factors is vital for an optimal and best possible medical and psychological support.

In this study, women with primary infertility reported better sexual functioning in comparison to those with secondary infertility. Our results are in line with a recent study observing a higher prevalence of FSD in secondary infertile women compared to women with primary infertility [35]. A potential explanation for this finding may be that women with primary infertility are more successful in coping with infertility than those with those secondary infertility.

Our study was conducted in a developing country where the majority of people are Muslim (around 98 % of people). Contrary to Western Culture where marriage is thought to be the result of love and acquaintance, in the Islamic culture—especially in the traditional beliefs—marriage is based on family arrangements [47]. Therefore, low marital satisfaction especially among women is a common problem, considering that most Islamic countries have a male-centered family system. Forced marriages and related decrease in marital satisfaction may promote the development of sexual problems among couples, even more so among infertile women who are not able to insure reproduction. According to Islamic beliefs marriage is most of all a way to procreate and to ensure the formation of a family [48]. This is further demonstrated by the fact that the Islam rejects artificial insemination as a way of infertility management. Given this, infertile Islamic women are under high pressure to procreate and infertility might affect them more compared to women from Western cultures. Therefore, further studies should take into account the religion as a mediator in the development and prevalence of FSD among infertile women.

Limitations

Despite the importance of the present findings, this study has some limitations. First, the data were collected from an Iranian patient sample; therefore, the findings should not be extrapolated to the general population or other populations and need to be confirmed in studies of larger size. Second, the infertile women were of a heterogeneous group and the etiology (i.e. concrete causes of infertility) was not assessed. Future studies should further evaluate how infertility due to different causes affects women's sexual functioning. A third, general study limitation is the fact that we were not able to directly determine the direction of causality between our variables. Additional prospective research is needed to investigate the link between infertility and FSD to determine whether variance in candidate “risk” factors can track temporal changes in sexual function. Also, we did not include

“sexual distress” as a diagnostic criterion for FSD. Recent studies have underlined the clinical importance to include sexual distress in the diagnosis of FSD, as otherwise prevalence estimates might be crucially inflated when not doing so. Therefore, future research should consider incorporating sexual distress, rather than relying purely on quantification of levels of sexual functioning.

Conclusion

Our findings suggest that infertility impacts on women's sexual function. Health care professional should be sensitive to the impact that the diagnosis of infertility can have on women's sexuality. They should further pay attention to ethnicity, religious and cultural background of their patients especially in view of the factors influencing HRQoL. This sensitivity is particularly important in the area of reproductive medicine in general and in infertility in particular.

Conflict of interest The author does not have any conflict of interest, including financial and personal relationship with people or organizations that could inappropriately influence this work.

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