Comparison of Sexual Function in Infertile Women with Polycystic Ovary Syndrome and Endometriosis: A cross-sectional Study

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Abstract

Introduction: Infertility is one of the issues affecting sexual function (SF). Infertility is also one of the complications of polycystic ovary syndrome (PCOS) and endometriosis. This research seeks to assess and compare SF and the prevalence of sexual dysfunction with PCOS and endometriosis in infertile women.

Methods: A cross-sectional study was carried out on 630 samples (210 infertile women with endometriosis, 210 infertile women with PCOS, and 210 healthy women of childbearing age as the control group). SF was assessed by the Female Sexual Function Index (FSFI). Descriptive statistics and inferential statistics (One Way ANOVA and logistic regression) were used to analyze the data.

Results: The results showed that the mean score of total FSFI in the two groups of PCOS and endometriosis was lower than the control group ($P<0.001$). In addition, women with higher education (university education) had a significantly higher score of total FSFI.

Conclusion: Sexual dysfunction rates are high in infertile women with endometriosis and PCOS, so infertility service providers in infertility centers need to pay attention to this issue.

Introduction

Worldwide estimation of infertility prevalence was 9% and also had similar rates in developed and less developed countries [1]. Infertility is defined by the World Health Organization as “a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse”[2]. A person with infertility faces complex issues that include biological, psychological, social, and ethical domains [3]. Infertility is a two-person problem and it's more of an individual issue, so it affects the marital and sexual life of a couple [4]. Sexual problems are common in infertile couples and have been reported between 5% and 55% [5]. One of the factors impressed in infertile women is a sexual function (SF), which is a key factor in physical and marital health and can significantly reduce the quality of life [6].

Endometriosis and Polycystic ovary syndrome (PCOS) affect millions of women in the world [7]. PCOS is the most common endocrine disorder in women of reproductive age. Sometimes this syndrome increases the level of anxiety and tension that leads to depression, eating disorders, sexual dysfunction, and so on [8]. Endometriosis is a chronic condition affecting women of reproductive age. It is determined by the presence of endometrial-like tissue outside the uterus, which induces a local inflammatory response [9]. Thirty-two percent of patients with endometriosis express sexual problems with intercourse pain, reduced intercourse per month, and feelings of guilt against the partner [10].

In various biological windows in endometriosis and PCOS, several oxidative stress markers have been studied. Studies have shown an imbalance in the levels of free radicals and disruptive antioxidants in cellular homeostasis, which is supported by higher levels of oxidants and leads to reproductive and metabolic complications [7]. Multiple studies have shown that oxidative stress also plays an important role in the pathophysiological mechanism of male sexual dysfunction [11–13]. Based on this fact, it is assumed that oxidative stress may also play a role in the mechanism of female sexual dysfunction [14].Considering the increasing prevalence of PCOS (from 5–10% in the majority of the studies) [15] and endometriosis (estimated prevalence of 10%) [16] and their impact on fertility and sexual life, this study aims to compare the SF of infertile women having either of these two diseases with the control group.

Methods

Participants and study design

This cross-sectional study was carried out on 630 patients selected through convenience sampling method (210 infertile women with endometriosis, 210 infertile women with PCOS, and 210 healthy women of reproductive age as control group). Then, using the appropriate formula with α set at 0.05 and 1-β at 0.95, a sample size of 195 women was found to be required for each group. This study was conducted in infertile women with PCOS and endometriosis who referred to the Infertility Clinic of Arash Hospital (referral center) in Tehran, Iran in 2018–2019. The diagnosis of PCOS was according to the Rotterdam criteria[17] and endometriosis diagnosis was confirmed laparoscopy. Based on laparoscopic findings, we exclude women with abnormalities other than endometriosis. The subjects included 210 infertile women with a laparoscopic and/or histological diagnosis of endometriosis. Control group women were selected from the women referred to the Arash hospital clinic in Tehran without a history of reproductive problems and disease.

Eligibility criteria

The criteria for entering the study were the absence of any other physical diseases (such as heart and kidney disease, diabetes, and …) according to the medical records of patients. The control group's inclusion criteria consisted of having at least one alive and healthy child and not being in the postpartum period. Women who completed the questionnaires incompletely or met the inclusion criteria but refused to continue participation in the study were excluded from the study.

Measures

Some demographic and fertility information of participants including age, education, occupation, body mass index (BMI), and type of infertility were collected.

The FSFI is a 19-item patient-reported outcome measure consisting of 6 separate domains of female sexual function, desire (items 1–2), arousal (3–6), lubrication (7–10), orgasm (11–13), satisfaction (14–16), and pain (17–19) [18]. Initial validation showed a good internal consistency for all scales in a general population study sample, as well as in subgroups of FSD (female sexual dysfunction) patients

and control subjects (Cranach's a = 0.82–0.97). Test-retest reliability was acceptable (r = 0.79–0.86) [19]. The Persian version of the Female Sexual Function Index was validated by Mohammadi et al, which is used as a reliable and valid tool for women's sexual performance evaluation in Iran. The total score was obtained by summing the scores of six domains. Cutting points for the total scale and subscales were as follows: total scale 28, desire 3.3, arousal 3.4, lubrication 3.4, orgasm 3.4, satisfaction 3.8 and, pain 3.8. Scores greater than the cut point indicated good functioning [18, 20].

Depression And Anxiety

Hospital Anxiety and Depression Scale (HADS) is designed to measure mood swings, especially anxiety and depression. On this scale, there are seven questions about anxiety symptoms (questions 1,4,5,8,9,12) and there are seven questions about the symptoms of depression (questions 2,3,6,7,10,11,14). It is graded on the basis of a four-point scale (0, 1, 2, 3) (0 = never, 1 = seldom, 2 = sometimes & 3 = always). Finally, out of a total of 21 points earned, scores above 8 in each category were considered as anxiety and depression. Its validity and reliability in Iran showed acceptable results [21].

Statistical analysis

The collected data were analyzed by descriptive and analytic statistics using Statistical Package for Social Sciences (SPSS version 20) software used to describe the data. The Levin test was used to describe the homogeneity of variances of the groups. Also, the mean of the three groups in terms of different variables was compared using one-way ANOVA (Analysis of variance) and Kruskal-Wallis tests. In addition, logistic regression was used to adjust for age, type of infertility, education levels, and occupation.

Results

A total of 630 samples including 210 women with PCOS, 210 women with endometriosis and210 women in the control group were examined. In the endometriosis group, 115 (54.8%) were involved in stage 4, 76 (36.2%) were involved in stage 3, and 19 (9%) were involved in stages 1 and 2.

Table 1
Comparison of demographic variables in three groups

Variables	PCOS group	Endometriosis group	Control group	P. value
Age	30.0 ± 5.3	31.1 ± 5.3	31.4 ± 2.7	< 0.001*
BMI	26.6 ± 4.2	25.9 ± 3.7	25.8 ± 3.7	0.088*
Type of infertility				
Primary	136(64.8)	178(84.8)	-	< 0.001**
Secondary	74 (35.2)	32(15.2)	-	
Duration of infertility	3.1 ± 2.4	3.6 ± 2.7	-	0.101
Education				
Diploma (< 12 years)	49(23.3)	118(56.2)	53 (25.23)	< 0.001**
College education (≥ 12 years)	161(76.7)	92(43.8)	157 (74.77)	
Occupation				
Housewife	186(88.6)	47(22.4)	103 (49)	< 0.001**
Employed	24(11.4)	163(77.6)	107(51)	
HADS				
Depression	5.1 ± 4.1	5.1 ± 4.0	4.6 ± 4.0	0.270
Anxiety	7.2 ± 4.6	6.9 ± 4.0	6.6 ± 4.0	0.334
Total scores	12.3 ± 8.1	12.1 ± 7.3	11.2 ± 7.3	0.276

PCOS: Polycystic Ovary Syndrome, HADS: hospital anxiety and depression scale, *Values are given as mean ± SD using analysis of variance (ANOVA) or T-Test ** Values are given as a number (%) using Chi-squared test

Comparing the mean age of the three groups revealed that the mean age of the PCOS group was significantly lower than that of in the endometriosis and control group (P < 0.001). Also, there was a significant difference between the groups regarding the level of education, occupation, and type of infertility (P < 0.001) but the mean body mass index (BMI), and duration of infertility did not differ significantly between groups (Table 1).

Based on one-way ANOVA and Dennett test (due to the heterogeneity of variances), there were significant differences in the mean score of total FSFI and its subscales between the three groups (P < 0.001). As it is shown in Table 2, the mean total score of FSFI in the endometriosis group was significantly lower than PCOS and control groups, and mean total score of FSFI in PCOS group was significantly lower than the control group. In the endometriosis group, the score of orgasm, pain, and satisfaction subscales were

significantly lower than PCOS and control groups. There were no significant differences in desire, arousal, and lubrication subscales between endometriosis and control groups.

Table 2
Comparison of mean total FSFI scores and its subscales in three groups

Variable	PCOS Group	Endometriosis Group	Control Group	P value
Desire				
Mean ± SD	3.7 ± 0.8	4.1 ± 0.96	4.3 ± 1.1	< 0.001**
N (%) *	42(19.1%)	22(10.47)	34(16.2)	
Arousal				
Mean ± SD	3.9 ± 0.9	4.6 ± 1.3	4.8 ± 1.5	< 0.001**
N (%)	53(24.1)	41(19.5)	40(19)	
Lubrication				
Mean ± SD	4.1 ± 1.1	4.3 ± 0.7	5 ± 0.9	< 0.001**
N (%)	52(23.6)	1(0.5)	4(1.9)	
Orgasm				
Mean ± SD	4.5 ± 0.9	3.0 ± 1	4.7 ± 0.8	< 0.001**
N (%)	28(12.7%)	140(66.7)	27(12.9%)	
Satisfaction				
Mean ± SD	4.7 ± 1	3.7 ± 1	5 ± 0.7	< 0.001**
N (%)	44(20)	88(41.9)	5(2.4)	
Pain				
Mean ± SD	3.8 ± 1.2	3.5 ± 0.9	4.5 ± 0.9	< 0.001**
N (%)	118(56.2)	126(60)	73(34.8)	
Total FSFI				
Mean ± SD	25 ± 4.5	23.44 ± 2.6	28.5 ± 2.5	< 0.001**
N (%)	155(70.5)	204(97.1)	0	

PCOS: Polycystic Ovary Syndrome; FSFI: Female Sexual Function Index

*Frequency and percentage of sexual dysfunction and its subscales in three groups

**Comparison of subscale scores and total score of FSFI in three groups using analysis of variance ANOVA

P-values are adjusted for age, type of infertility, education levels, and occupation

In the PCOS group, the score of desire, arousal, and lubrication subscales was significantly lower than the endometriosis and control group (P < 0.001). There were no significant differences subscale between PCOS and control groups in the orgasm subscale (Table 2).

Our results showed that there was a significant relationship between education and SF, as women with college-level education had significantly lower sexual dysfunction (P < 0.001) (Table 3).

Table 3
Association between the various demographic variables and sexual dysfunction among the groups

Variable	FSFI score	P. Value
Education		< 0.001*
Diploma (< 12 years)	24.7 ± 3.5	
College education (≥ 12 years)	26.2 ± 4.1	
Occupation		0.984
Housewife	25.7 ± 3.4	
Employed	25.7 ± 4.0	
Type of infertility		0.428
Primary	25.3 ± 4.5	
Secondary	24.7 ± 4.6	
FSFI: Female Sexual Function Index		
*Values are given as mean ± SD using Student's t-test		

Also, comparison of the mean score of FSFI in different stages of endometriosis showed that the mean score of FSFI in stages 3 (mean score: 24.1) and 4 (mean score: 22.3) was lower than stages1 (mean score: 29.1) and 2 (mean score: 26.5) (P < 0.05).

Discussion

Sexual dysfunction is common in infertile couples, which is likely to be a "side effect" of frustration with their inability to have a child [15]. In our study, the mean score of total FSFI in the endometriosis group was lower than in other groups. This decrease was mainly attributed to the decrease in subscale scores of orgasm, pain, and satisfaction. The rate of sexual dysfunction in the endometriosis group reported 97.1% that can be attributed to the high percentage of women with stages 3 (36.2%) and 4 (54.8%) of endometriosis. The study of Donato et al [8] showed that each domain of the SF (satisfaction, desire, orgasm, and pelvic problem interference) had significantly affected endometriosis patients compared with healthy women. In our study, it was observed that in higher stages of endometriosis, the total FSFI

score was lower. It was shown in a study that women with deep infiltrating endometriosis have a SF impairment [16].

Various studies have provided that endometriosis has a negative effect on the different dimensions of SF [17–19]. In our study, the mean pain score in the endometriosis group was lower than the control group and the PCOS group. The cause of sexual dysfunction in endometriosis patients can be attributed to the association between deep endometriosis infiltration and dyspareunia which reduces sexual intercourses and causes a lower SF [20]. It seems that experiencing this annoying situation, women with endometriosis develop negative expectations of their sexual life which leads to threatening their sexuality [21].

PCOS is characterized by a range of hormonal and body changes including obesity, acne, hirsutism, hyperinsulinemia, hyperprolactinemia, insufficient gonadotropin secretion, and hyperandrogenism. These changes can affect the sexuality of women with PCOS [22]. Menstrual irregularity and infertility caused by PCOS can damage SF [23]. Women with PCOS are also at risk of depression and anxiety that can negatively affect their SF [24]. In our study, the total score of FSFI and its subscales were lower in the PCOS group than in the control group and the rate of sexual dysfunction in the PCOS group reported as 70.5%. In contrast, Shafti and his colleagues [7] concluded that there was no significant difference in SF of women with PCOS with the control group in their study. In the present study, scores of desire, arousal, and lubrication subscales in the PCOS group were lower than the endometriosis and control group. In a study, a desire was the most impaired domain of SF in PCOS patients which was highly correlated with hirsutism which had the most impact on patients' body image [25]. PCOS is an endocrine disorder. Receptors for hormones (androgens, estrogens, and progesterone) are found in the brain and also in genital tissues, suggesting that they are important both in central (desire, arousal) and peripheral SF [26].

In our study, the mean BMI was higher in the PCOS group. In a review study by Murgel et al [27], it was concluded that BMI and infertility affect sexuality in women with PCOS. In the study of Dashti et al [28], BMI level higher than normal was associated with decreased desire and satisfaction and education was one of the factors affecting SF in women with PCOS. The result of the meta-analysis of Pastoor et al [29] was in line with our study conclusion. In this meta-analysis, in women with PCOS, SF and sexual attractiveness were damaged. The findings of our study are similar to the research findings of Hashemi et al [30]. In this study, stimulation and wetting disorders were the most sexual dysfunction in infertile women with PCOS, and SF in women with PCOS was mostly affected by infertility. In women with PCOS, the factors affecting sexual functioning include disarranged hormone levels especially androgens, infertility, obesity, and associated problems like metabolic syndrome, body image issues, and low self-esteem. High testosterone levels directly have an effect on sexual motivation and desire. Obesity leads to sexual inhibition, decreased sexual desire, and poor body image, and low self- esteem which in turn have an effect on sexual functioning [31]. In our study, the mean score of the orgasm subscale in the PCOS group was not significantly different with the control group.

In examining the relationship between various socio-demographic sexual dysfunction and variables between groups, just the level of education was significantly correlated with sexual dysfunction (Tables 2 and 3). Compared to women who do not have a university education, women with a university education are less likely to have sexual dysfunction. Our research samples were only women of reproductive age and had higher education (65% had college-level education). On the other hand, some studies have shown that higher education can be a protection against sexual dysfunction [22–25]. This is probably due to the search for better health behaviors associated with higher education [26].

Conclusion

In the present study, sexual dysfunction in the endometriosis group was less than the control group and the PCOS group and it was lower in PCOS group compared to the control group. Most sexual dysfunction in the endometriosis group was related to orgasm, satisfaction, and pain subscales and in PCOS group was related to desire, arousal, and lubrication subscales. In our population, it seems that achieving a college-level education against sexual dysfunction acts as a protector. Considering the impact of endometriosis and PCOS on SF of infertile women, attention, and assistance in solving these patients ' sexual problems during the infertility diagnosis and treatment process contributes to improving and maintaining their sexual health.

Abbreviations

FSFI
Female Sexual Function Index
SF
Sexual Function
HADS
Hospital Anxiety and Depression Scale
BMI
Body Mass Index
PCOS
Polycystic Ovary Syndrome
ANOVA
Analysis of variance

Declarations

Ethics approval and consent to participate

This research was approved by the Ethics Committee of Tarbiat Modares University of Medical Sciences (IR.MODARES.REC.1397.211). All procedures were in accordance with the ethical standards of the Regional research committee and with the Declaration of Helsinki 1964 and it later amendments. After

explaining the study's purposes, written consent and verbal assent were collected from all participants and women were informed that their participation were voluntary, confidential, and anonymous, and were apprised of their right to withdraw from the research at any time.

Consent for publication

Not applicable.

Availability of data and materials

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request

Competing interests

The authors declare no conflict of interest.

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None.

Authors' contributions

Sh.JS and Z.D contributed to the conception and design of the study; Z.D and Sh.JS did the literature search; N.J, Z.D and Sh.JS performed the statistical analysis; Z.D, N.J and Sh.JS wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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