

Sexual dysfunction in in-vitro fertilization (IVF) patients and the effect of ovarian reserve on sexual dysfunction

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Abstract

Aim: In this prospective study, we aimed to compare the patients scheduled for in vitro fertilization (IVF) with poor ovarian reserve to patients with unexplained infertility in the same age group in terms of sexual dysfunction.

Material and Methods: In this prospective study, a total of 146 patients admitted to the IVF center of Ondokuz Mayıs University between June 2018 and December 2018 were included in the study. Forty-eight of these patients had poor ovarian reserve and 98 were scheduled for IVF due to unexplained infertility. In these patients, the female sexual function index (FSFI) scores were calculated for the diagnosis of sexual dysfunction prior to treatment. In addition, ovarian reserve tests such as cyclic follicle stimulating hormone (FSH) and anti mullerian hormone (AMH) at the beginning of the menstrual cycle were recorded.

Results: The mean age of the female patients in the study was 30.2±5 years. The mean FSFI score was 22.36 ±3.31 and 22.44±3.53 in the group with poor ovarian reserve and with unexplained infertility, respectively. The prevalence of sexual dysfunction (FSFI score <26.55) in the poor ovarian reserve group was 89.6% (n=48) compared to the unexplained infertility group, which was 93.9% (n=98). The analysis of domains revealed no statistically significant difference between the two groups (p=0,356).

Conclusion: Sexual dysfunction is frequently observed in patients scheduled for IVF. Our study showed that there was no difference in sexual dysfunction between the two groups. Interestingly, it was revealed that there was a correlation between FSH levels and satisfaction and pain. It was also interesting that the rate of sexual dysfunction was extremely high in both groups.

Keywords: Decreased ovarian reserve; sexual dysfunction; unexplained infertility; ovarian reserve.

INTRODUCTION

Sexual function in females is very complex and is affected by many factors. The prevalence of sexual dysfunction is higher in infertile patients compared to the normal population (1,2). It may be the cause of infertility or may be a symptom or result that may be associated with infertility.

Sexual dysfunction affects the quality of life as it has an impact on the marital life and psychology of patients. The sexual dysfunction is caused by psychological stress due to inability to have children, hormonal status and treatments. The recommendation for timely intercourse solely for conception has a negative effect on sexual life.

The current studies revealed that anorgasmia (83.7%) and decreased libido (80.7%) were observed in patients

with infertility (3). Another study demonstrated that dyspareunia, decreased libido, and orgasmic failure were observed in patients with infertility (4). In a meta-analysis, it was observed that most infertile patients were affected in terms of lubrication, orgasm and satisfaction (5).

However, it is necessary to evaluate these patients individually determining the problems clearly and to plan appropriate psychiatric or medical treatment for the patients since female sexual dysfunction is a highly complex subject and more prevalent in the infertile population.

The high scores of FSFI indicate better sexual function. The FSFI is considered to be the gold standard for the assessment of sexual dysfunction (6). In addition, a FSFI score of 26.55 and below is defined as sexual dysfunction in the literature (7).

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In this study, we aimed to investigate the prevalence of sexual dysfunction in infertile patients, who were particularly scheduled for IVF. In addition, it was aimed to evaluate the correlation between ovarian reserve and sexual dysfunction in these patients. As far as we know, there have been no studies published in the literature, in which the correlation between ovarian reserve tests and FSFI was investigated.

MATERIAL and METHODS

The present study was conducted at the IVF center of Ondokuz Mayıs University between November 2018 and January 2019 (Samsun, Turkey) after obtaining the approval from the hospital's ethics committee. All patients provided written informed consent. Patients aged between 18-40 years were included in the study. The groups were classified as the group with unexplained infertility and the group with poor ovarian reserve.

Inclusion Criteria: Only the patients undergoing IVF were included in the study. In the unexplained infertility group, the inclusion criteria for patients were as follows; aged between 18 and 40, no conception despite unprotected intercourse for a period of at least 1 year, regular menstruation, normal uterine cavity, at least one patent fallopian tube and unremarkable semen analysis results. The group with poor ovarian reserve was determined upon either the detection of ≤ 3 oocytes with conventional stimulation or abnormal ovarian reserve test (AMH <1.1 ng/mL).

Exclusion criteria: The exclusion criteria for patients were as follows; those with a history of endocrinological and psychiatric diseases, hypertension, hyperlipidemia, cardiovascular disease, thyroid dysfunction and diabetes mellitus, endometriosis, polycystic ovary syndrome, patients with a history of uterine anomaly, male factor, secondary-infertile, premature ovarian insufficiency and patients who did not have coitus at least once in the previous month.

The spouses of all patients underwent urological examination and their spermograms were examined. The patients underwent IVF based on two indications.

The Female Sexual Functioning Index

The FSFI is a reliable test for the assessment of sexual function in women. The Turkish version of this test, translated by Turkish Andrology Association, was used. The FSFI is comprised of six domains (desire, arousal, lubrication, orgasm, satisfaction, and pain) with score ranges of 0 (or 1) to 5. The total FSFI score ranges from 2.0 to 36. The translated version of the FSFI test was used in this study. All questions in the FSFI questionnaire were explained by the physician one by one, and they were filled in a suitable and silent environment where patients could comfortably share such intimate information.

Statistical Analysis

The mean, standard deviation, median, highest and lowest frequency and percentages were used to present the

descriptive statistics of the data. The Kolmogorov Smirnov test was used for the distribution of variables. The Mann-Whitney u test was used for the analysis of quantitative independent variables. The Chi-square test was used for the analysis of qualitative independent variables, and the Fisher's test was used when the Chi-square test conditions were not provided. The effect level was examined using single variable and multivariable logistic regression. The SPSS 22.0 software was used for the analysis.

The value of $p < 0.05$ was accepted as statistically significant.

The primer outcome was to compare the FSFI scores between two groups as well as evaluating the correlation between FSH, AMH and the FSFI.

RESULTS

The demographic features of both study groups are shown in Table 1. In the poor reserve group, the partner's age was significantly higher compared to the unexplained fertility group ($p < 0.05$). In the poor ovarian reserve and unexplained infertility groups, there were no significant difference in patients' age and body mass index (BMI). ($p > 0.05$). There were no significant differences in educational background, monthly income and rate of smokers between the poor ovarian reserve and unexplained infertility groups ($p > 0.05$). Between the groups with poor reserve and unexplained infertility, there was no significant difference in duration of marriage, feelings about their spouses, and marriage background. ($p > 0.05$). There was no significant difference in duration of infertility and history of in vitro fertilization between the groups with poor ovarian reserve and unexplained infertility. ($p > 0.05$) FSH was significantly higher in the group with poor ovarian reserve compared to the group with unexplained infertility. ($p > 0.05$) In the low ovarian reserve group, antral follicle count (AFC) and AMH were significantly lower ($p > 0.05$) compared to the unexplained infertility group. (Table 1).

There was no statistically significant difference between the patients with unexplained infertility and patients with poor ovarian reserve in regard to each domain of desire, arousal, lubrication, orgasm, satisfaction, and pain; and total scores made up by the total values of these domains ($p = 0.838$ for total score).

In the unexplained infertility group, total FSFI was below 26.55 in 93.9% of the patients, whereas only 6.1% had above 26.55. In patients with poor ovarian reserve, total FSFI was below 26.55 in 89.6%, whereas only 10.4% had above 26.55. There was no difference between the two groups (Table 2).

The groups with the FSFI below 26.55 and above 26.55 showed no significant difference in spouses' age, patients' age and BMI ($p > 0.05$). The groups with the FSFI below 26.55 and above 26.55 showed no significant difference in educational background, monthly income and rate of smokers ($p > 0.05$). The groups with the FSFI below 26.55 and above 26.55 showed no significant difference in duration of marriage, feelings about spouses, and marriage

background ($p>0.05$). The groups with the FSFI below 26.55 and above 26.55 showed no significant difference in duration of infertility and history of IVF treatment ($p>0.05$). The groups with the FSFI below 26.55 and above 26.55 showed no significant difference in pregnancy rates after the transfer ($p>0.05$). The groups with the FSFI below 26.55 and above 26.55 showed no significant difference in FSH, AFC and AMH values ($p>0.05$). (Table 3)

In the table 4, "the correlation coefficients between values (overall) in all individuals" are presented. The coefficients found to be significantly correlated with each other are shown with the symbol of "*" ($p<0.05$). Accordingly, there was a statistically significant correlation between "FSH-Satisfaction" and "FSH-Pain" ($p<0.05$). On the other hand, there was no statistically significant correlation between AMH and BMI and other variables ($p>0.05$).

Table 1. Demographic and surgical characteristics

	Unexplained Infertility			Poor Ovarian Reserve			P
	Mean±s.d.	n-%	Median	Mean±s.d.	n-%	Median	
Partners' ages	32.3±5.0		32.0	36.7 ±8.5		36.0	0.002 _m
Patient' ages	29.8±4.6		29.0	31.0 ±5.7		30.5	0.226 _m
BMI	26.1±5.6		25.3	25.1 ±4.4		24.3	0.415 _m
Educational Status	primary school	14	14.3%	10	20.8%		0.619 ^{x2}
	middle School	14	14.3%	4	8.3%		
	high school	30	30.6%	15	31.3%		
	University	40	40.8%	19	39.6%		
Smoking	(-)	88	89.8%	44	91.7%		0.718 ^{x2}
	(+)	10	10.2%	4	8.3%		
Monthly income (Turkish Liras)	2651±2875		2000	2348±667		2000	0.716 _m
Duration of marriage	4.4±3.3		3.0	5.3±4.7		4.0	0.393 _m
Feeling against partner	little love	0	0.0%	3	6.3%		0.142 ^{x2}
	love	37	37.8%	22	45.8%		
	very love	61	62.2%	23	47.9%		
Decide to marry		69	70.4%	30	62.5%		0.337 ^{x2}
		29	29.6%	18	37.5%		
Duration of infertility	3.7±3.1		3.0	4.3±3.6		3.5	0.168 _m
IVF Treat-ment	None	68	69.4%	38	79.2%		0.352 ^{x2}
	1	22	22.4%	6	12.5%		
	>2	8	8.2%	4	8.3%		
Pregnancy rate after transfer	(-)	89	90.8%	47	97.9%		0.111 ^{x2}
	(+)	9	9.2%	1	2.1%		
FSH	6.3±3.2		6.1	25.3±13.4		24.5	0.000 _m
AFC	7.6±1.5		8.0	1.8±1.5		1.0	0.000 _m
AMH	2.2±0.4		2.2	0.3±0.3		0.2	0.000 _m

Kolmogorov smirnov test/_m Mann whitney u/x Chi-square test

Table 2. Distribution of FSFI parameters the patients with unexplained infertility and patients with poor ovarian reserve

	Unexplained Infertility			Poor Ovarian Reserve			P
	Mean±s.d.	n-%	Median	Mean±s.d.	n-%	Median	
Desire	3.0±1.0		3.0	3.2±1.0		3.3	0.574 _m
Arousal	4.6±4.0		4.2	4.2±1.2		4.8	0.902 _m
Lubrication	3.6±1.0		3.6	3.7±1.0		3.6	0.796 _m
Orgasm	3.8±0.9		4.0	3.6±0.9		3.6	0.131 _m
Satisfaction	5.0±1.2		5.2	4.8±1.1		4.8	0.136 _m
Pain	2.5±1.5		2.2	2.9±1.3		2.8	0.080 _m
Total	22.4±3.5		22.9	22.4±3.3		22.9	0.838 _m
FSFI	26.55	92	93.9%	43	89.6%		0.356 ^{x2}
	26.55	6	6.1%	5	10.4%		

_m Mann-whitney u test /^{x2} Chi-square test

Table 3. The results of variables according to FSFI score

	FSFI < 26.55		FSFI > 26.55		p
	Mean±s.d. n-%	Median	Mean±s.d. n-%	Median	
FSH	11.8±10.6	8.0	21.5±22.3	16.0	0.297 ^m
AFC	5.8±3.0	8.0	4.1±3.5	2.0	0.131 ^m
AMH	1.6±1.0	2.1	1.1±1.2	0.5	0.165 ^m
FSFI					
Desire	3.0±1.0	3.0	3.5±0.8	3.6	0.049 ^m
Arousal	4.4±3.5	4.2	5.4±0.6	5.4	0.000 ^m
Lubrication	3.6±0.9	3.6	4.5±0.7	4.8	0.001 ^m
Orgasm	3.7±0.9	4.0	4.3±0.8	4.4	0.046 ^m
Satisfaction	4.9±1.2	5.2	5.6±0.6	6.0	0.022 ^m
Pain	2.5±1.3	2.4	4.7±1.1	4.8	0.000 ^m
Total	22.0±3.2	22.6	27.9±1.4	27.7	0.000 ^m

^m Mann-whitney u test / ^{x2} Ki-kare test (Fischer test)

Table 4. The correlation coefficients between the values in all subjects (overall)

	FSH	AMH	BMI	Total FSFI scores
Total FSFI scores	-.015	.008	.018	1.000
Desire	.063	-.084	-.068	.001
Arousal	.062	.004	.016	.556***
Lubrication	.037	-.033	.021	.565***
Orgasm	-.146	.086	.019	.630**
Satisfaction	-.195*	.134	.028	.497**
Pain	.188*	-.129	-.082	.506**

The Spearman's Rho correlation coefficients; **p<0.01 ; *p<0.05

DISCUSSION

Sexual dysfunction is more frequent in infertile couples than in the normal population. However, it was shown that there were also many factors affecting sexual dysfunction in infertile patients. For example, sexual dysfunction was more frequently observed in secondary infertile patients (8).

Current studies demonstrated that sexual dysfunction was more frequent in patients with premature ovarian failure (POF) than in normal patients. It was shown that they had lower scores in satisfaction, lubrication, orgasm, pain, and arousal while there was no difference in desire (9). However, desire is the main issue in postmenopausal patients. And it is also affected by age (10).

In their study, Van Der Stege et al. revealed that poorer arousal and lubrication and more dyspareunia were observed in these patients, although there was no significant difference in sexual desire and contact with sexual partner compared to the control group (11).

In a previous study, patients with POF using (hormone replacement therapy) HRT were compared with patients with normal ovarian reserve; and it was shown that total scores of patients' with POF were within normal limits, but they had lower scores than the normal population (12).

A study demonstrated that psychological stress caused by the diagnosis of POF, androgen and estrogen deficiency,

menopausal symptoms and loss of fertility are the major causes of sexual dysfunction in patients with POF (13).

Decreased ovarian reserve associated with infertility leads to a further complexity in sexual function. A relevant study showed that sexual functions were disrupted due to reduced estrogen and testosterone in infertile patients with decreased ovarian reserve (14). This study demonstrated that there was a correlation between sexual dissatisfaction and low AMH/high FSH. However, sexual dysfunction was not evaluated in this study. Only sexual dissatisfaction was questioned. In this study, ovarian volume was examined along with inhibin and androgens, but it was shown that they were not associated.

In our study, we distinctively compared the patients with poor ovarian reserve to the patients scheduled for IVF with unexplained infertility. In our study, there was no difference in sexual dysfunction between the patients with unexplained infertility and the patients with poor ovarian reserve. Interestingly, it was revealed that there was a correlation between FSH levels and satisfaction and pain. However, we did not find a statistical correlation between the parameters of AMH levels and sexual dysfunction, which is another marker of ovarian reserve. It was also interesting that the rate of sexual dysfunction was extremely high in both groups. In our study, all of the female patients were comprised of Muslim and Turkish women. We think that the high rates in both groups were due to religious and regional cultural differences. In the eastern countries, it is known that families generally take part in the decision of marriage, which frequently leads to problems such as climax and low sexual desire in these countries (15-17).

We attributed the low FSFI scores in both groups to the following causes; low socioeconomic status, low level of education, insufficient religious and cultural knowledge, impaired sexual knowledge, low expectation of success, feelings of frustration as a result of repeated failure cycles.

In their study including Turkish patients, Oskay et al. found that sexual dysfunction was observed in 61.7% of

the infertile patients and 42.9% of the fertile patients (18). In addition, the total FSFI score was 24.58 in the infertile group and 26.55 in the control group. In another study including a Turkish patient group conducted by Turan et al., sexual dysfunction was observed in 32.9% of the infertile group and 17.2% of the control group. However, the study included patients with high socioeconomic status who lived in the west of Turkey. Only about 40% of the population was from the east of Turkey. We believe that the high rates in our study were due to the patients scheduled for IVF. Both of these two studies including the Turkish population consisted of patients in the infertile group. However, our study included patients who were scheduled for IVF treatment. Such difference could be attributed to the fact that there was a prolonged history of medication resulting in a longer period of discomfort in patients scheduled for IVF, as well as considering the characteristics of our patient population, as described above. The study results showed that the sexual dysfunction was very high in IVF patients and this value was significantly higher compared to the other studies in which infertile patients were evaluated (18,19). In conclusion, the decision for IVF treatment may cause immense anxiety in infertile patients. And such decision leads them to think of it as a process that cannot be achieved through other treatment steps. These consequences can be due to the highly intensive and challenging nature of the treatment.

One of the limitations of the study was the use of FSFI only once at the beginning of treatment and the absence of a fertile patient population in the same age group as a control group. In addition, we do not know the effects of androgens and other sexual hormones in this study. In fact, it is known that androgens and other hormones also affect sexual functions. However, one of the distinctive features of the study is that it only included patients undergoing IVF.

CONCLUSION

In conclusion, the prevalence of sexual dysfunction is quite high in the infertile population. Our study showed that there was no difference in sexual dysfunction between the two groups. Interestingly, it was revealed that there was a correlation between FSH levels and satisfaction and pain. It was also interesting that the rate of sexual dysfunction was extremely high in both groups. Sexual dysfunction problems should be determined individually and appropriate treatment should be provided. This treatment should be considered in the evaluation of infertile couples. Studies with larger scales are needed as sexual dysfunction in females is a very complex subject.

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REFERENCES

1. Millheiser LS, Helmer AE, Quintero RB, et al. Is infertility a risk factor for female sexual dysfunction? A case-control study. *Fertil Sterile* 2010;94:2022–6.
2. Ercan C, Coksuer H, Aydogan U, et al. Sexual dysfunction assessment and hormonal correlations in patients with polycystic ovary syndrome. *Int J ImpotRes* 2013;25:127–32.
3. Naeimeh T, Ardakani Seyed Mojtaba Yassini. Incidence and prevalence of the sexual dysfunctions in infertile women. *Eur J Gen Med* 2009;6:74–7.
4. Jain K, Radhakrishnan G, Agrawal P. Infertility and psychosexual disorders: relationship in infertile couples. *Indian J Med Sci* 2000;54:1–7.
5. Carolina R de Mendonçaa, Jalsi T Arrudaa, Matias Nollb, et al. Sexual dysfunction in infertile women: A systematic review and meta-analysis. *Eur J Obstet Gynecol Reprod Biol* 2017;215:153-63.
6. Oksuz E, Malhan S. Reliability and validity of the Female Sexual Function Index in Turkish population. *Syndrome* 2005;17:54.
7. Yaylali GF, Tekekoglu S, Akin F. Sexual dysfunction in obese and overweight women. *Int J ImpotRes* 2010;22:220–6.
8. Keskin U, Coksuer H, Gungor S, et al. Differences in prevalence of sexual dysfunction between primary and secondary infertile women. *Fertil Steril* 2011;96:1213–7.
9. de Almeida DM1, Benetti-Pinto CL, Makuch MY. Sexual function of women with premature ovarian failure. *Menopause*. 2011;18:262-6.
10. Palacios S, Castaño R, Graziotin A. Epidemiology of female sexual dysfunction. *Maturitas* 2009;63:119-23.
11. van der Stege JG, Groen H, van Zadelhoff SJ, et al. Decreased androgen concentrations and diminished general and sexual well-being in women with premature ovarian failure. *Menopause* 2008;15:23-31.
12. Kalantaridou SN, Vanderhoof VH, Calis KA, et al. Sexual function in young women with spontaneous 46,XX primary ovarian insufficiency. *Fertil Sterile* 2008;90:1805-11.
13. Graziottin A, Basson R. Sexual dysfunction in women with premature menopause. *Menopause* 2004;11:766-77.
14. Pal L, Bevilacqua K, Zeitlian G, et al. Implications of diminished ovarian reserve (DOR) extend well beyond reproductive concerns. *Menopause*. 2008;15:1086-94.
15. Qadir F, De Silva P, Prince M, et al. Marital satisfaction in Pakistan: a pilot investigation. *Sex Relationship Therapy* 2005;20:195-209.
16. Segraves KB, Segraves RT. Hypoactive sexual desire disorder: prevalence and comorbidity in 906 subjects. *J Sex Marital Therapy* 1991;17:55–8.
17. Talakoub L, Munarriz R, Hoag L, et al. Epidemiological characteristics of 250 women with sexual dysfunction who presented for initial evaluation. *J Sex Marital Therapy* 2002;28:217-24.
18. Oskay UY, Beji NK, Serdaroglu H. The issue of infertility and sexual function in Turkish women. *Sex Disabil* 2010;28:71-9.
19. Turan V, Kopuz A, Ozcan A, et al. Sexual dysfunction in infertile Turkish females: prevalence and risk factors. *Eur J Obstet Gynecol Reprod Biol*. 2014;182:128-31.