Post-Recovery Sexual Function of Women with COVID-19 and Associated Factors

COVID-19'lu Kadınların İyileşme Sonrası Cinsel İşlevleri ve İlişkili Faktörler

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ABSTRACT

This study was conducted to investigate the sexual function status and related factors in women after contracting COVID-19. The study comprised 261 women who had been infected with COVID-19. Data were collected using the Personal Information Form, the Female Sexual Function Scale, and the State-Trait Anxiety Inventory. Sub-dimension scores for desire (3.80 ± 1.16, 3.66 ± 1.17), arousal (4.25 ± 1.40, 4.11 ± 1.41), orgasm (4.36 ± 1.25, 4.29 ± 1.26), and sexual satisfaction (4.50 ± 1.49, 4.40 ± 1.49) in women, as well as the Female Sexual Function Scale total score (26.50 ± 6.79, 26.00 ± 6.93), decreased following COVID-19 infection. Moreover, the frequency of weekly intercourse decreased (2.78 ± 0.90; 2.60 ± 0.92) compared to the pre-infection levels, and the frequency of sexual dysfunction increased (FSFI < 26 = 38.7%, 46.0%). In this study, advanced age, high body mass index (BMI) value, low education, income level, unemployment, smoking, lack of physical activity, anxiety, decreased coital frequency, and COVID-19 infection were identified as risk factors for sexual dysfunction. There was no significant relationship between the time elapsed after recovery from COVID-19 and sexual function. In conclusion, this research suggests that COVID-19 infection may lead to sexual dysfunction in women. Based on these research findings, health practitioners should assess the sexual health of female patients who have had COVID-19 infections, ensuring that women feel comfortable discussing their sexual health issues and referring them to appropriate treatment and counseling services when needed.

Keywords: COVID-19, sexual function, women sexual health, anxiety

ÖZ

Bu çalışma, COVID-19 hastalığı sonrası kadınların cinsel işlev durumunu ve ilişkili faktörleri incelemek amacıyla gerçekleştirilmiştir. Çalışmaya COVID-19 enfeksiyonu geçiren 261 kadın dahil edilmiştir. Veriler Kişisel Bilgi Formu, Kadın Cinsel İşlev Ölçeği ve Durumluk-Süreklilik Kaygı Envanteri kullanılarak toplanmıştır. Kadınların istek (3,80 ± 1,16, 3,66 ± 1,17), uyarılma (4,25 ± 1,40, 4,11 ± 1,41), orgazm (4,36 ± 1,25, 4,29 ± 1,26) ve cinsel doyum (4,50 ± 1,49, 4,40 ± 1,49) alt boyut puanları ile Kadın Cinsel İşlev Ölçeği toplam puanı (26,50 ± 6,79, 26,00 ± 6,93) COVID-19 sonrası azalmıştır. Ayrıca haftalık ilişki sıklığı (2,78 ± 0,90; 2,60 ± 0,92) enfeksiyon öncesine göre azalmış, cinsel işlev bozukluğu sıklığı (FSFI < 26 = %38,7, %46,0) artmıştır. Çalışmada ileri yaş, yüksek beden kitle indeksi (BKİ) değeri, düşük eğitim seviyesi, gelir düzeyi, çalışmama, sigara içme, spor yapmama, anksiyete, azalmış cinsel ilişki sıklığı ve COVID-19 enfeksiyonu cinsel işlev bozukluğu için risk faktörleri olarak belirlenmiştir. COVID-19'dan iyileştikten sonra geçen süre ile cinsel işlev arasında anlamlı bir ilişki bulunmamaktadır. Bu araştırmanın sonucuna göre, COVID-19 enfeksiyonu kadınlarda cinsel işlev bozukluğuna yol açabilir. Bu araştırma sonuçlarına dayanarak, sağlık çalışanları COVID-19 enfeksiyonunu geçirmiş olan kadın hastaların cinsel sağlığını değerlendirmeli ve kadınların cinsel sağlık sorunlarını rahatça konuşmalarını sağlamalı, gerektiğinde uygun tedavi ve danışmanlık hizmetlerine yönlendirmelidir.

Anahtar sözcükler: COVID-19, cinsel işlev, kadın cinsel sağlığı, anksiyete

Introduction

The coronavirus infection (COVID-19) spread from the city of Wuhan, China, to the whole world in 2019, causing a global health crisis, the COVID-19 pandemic. In order to reduce the spread of primarily respiratory infections, the World Health Organization (WHO) has led to unpredictable changes in our lives by taking unprecedented strict measures in modern history such as transportation restrictions, border closures, social

isolation, social distance and quarantine (Cheng et al. 2020). Despite all the measures taken, the infection infects approximately 645 million people, causing the death of more than 6 million people (WHO 2022).

Due to the changes experienced during the COVID-19pandemic, fear of death, and uncertainties about the future, adapting to the new order was difficult. Individuals' physical and mental health problems increased (Şimşir et al. 2022). With the increase in time spent at home, there has been a deterioration in family communication, and some problems have been experienced. In this process, among the difficulties encountered within the family are the problems related to sexual health (Alpalhao and Filipe 2020, Hensel et al. 2020, Grabovac et al. 2020, Li et al. 2020). Sexuality is one of the basic needs of people. Quality and satisfying sexual life positively affect social and close relationships (Flynn et al. 2016, Van Lankveld et al. 2018, Ford et al. 2019). In the active periods of the pandemic, when restrictions were intense, changes in sexual behaviors (masturbation, online sexuality, etc.) and deterioration in sexual functions have been observed, along with the anxiety that sexuality may be a transmission route for COVID-19 infection, as well as the process of staying at home (Alpalhao and Filipe 2020, Hensel et al. 2020, Grabovac et al. 2020, Li et al. 2020). This has affected interpersonal relationships, intimacy, and sexual activity, leading to conflicts and emotional distance between couples (Bavel et al. 2020). In a study by NBC News, 47% of the participants stated that the COVID-19 pandemic negatively affected their sex lives (Ossola and Frost 2020). With this, it was concluded that the risks of sexual dysfunction and sexual dissatisfaction are higher because women are more exposed to anxiety and depression than men (Omar et al. 2021). According to Fucks et al. (2020), the pandemic could negatively affect all sexual functionalities of women. A study conducted in Türkiye revealed that the quality of sexual life decreased in women during the COVID-19 pandemic (Yuksel and Ozgor 2020). The results of the meta-analysis examining the sexual function status of women before and during the COVID-19 outbreak also support these findings. During the epidemic, sexually active women have been shown to have a deterioration in their sexual functions. The most affected areas of sexual function were arousal, orgasm, pain, and satisfaction (Hessami et al. 2022). It is known that sexual dysfunctions such as hypoactive sexual desire disorder, arousal, dyspareunia, and difficulty in reaching orgasm are more common in people with psychological health problems (anxiety, stress, depression, and so forth) (Basson and Gilks 2018). It is thought that sexual dysfunctions experienced during the pandemic period are also caused by stress (Shivananda and Rao 2016).

Issues such as depression, anxiety, posttraumatic stress disorder, and sleep disorders, which are among the effects of the COVID-19 pandemic, have been studied in depth. However, although it is known that stress can affect sexual life and impair sexual health, there are deficiencies in the literature on sexual health and sexual function (Panzeri et al. 2020, Hessami et al. 2022). There are multiple studies to determine the effects of the pandemic process on women's sexual function post-convalescent (Alpalhao and Filipe 2020, Hensel et al. 2020, Grabovac et al. 2020, Li et al. 2020). However, studies evaluating sexual functions and stress levels together are relatively limited. In this study, the relationship with the time elapsed after recovery was not assessed in evaluating the sexual function of women (Lagha et al. 2022a, 2022b). Nurses should assess patients' sexual health risk factors and provide appropriate counseling when necessary. This is especially important in cases such as sexually transmitted infections, sexual abuse or relationship problems (Resmi Gazete 2010). For that reason, it is important to clarify the effects of COVID-19 infection on women's sexual function. In this context, it is thought that the information obtained from the study will guide both clinicians and academicians working in the field of obstetrics.

In this context, our study aimed to examine the factors associated with women's sexual function status after the COVID-19 disease. In the study, the distribution of women's post-COVID-19 FSFI scores according to their socio-demographic characteristics; Women's FSFI score averages, their distribution according to FSFI cut-off score, and whether there is a change in the frequency of sexual intercourse compared to before COVID-19 will be examined. Additionally, the relationship between women's post-COVID-19 FSFI scores and STAI-1, STAI-2 and pre-COVID-19 FSFI scores and some of their characteristics will be investigated.

Method

Sample

This descriptive study was conducted with a cross-sectional method. The data were collected in the Pandemic Polyclinic of Kayseri City Training and Research Hospital between October 25th 2021 and February 27th 2022. The population consisted of women who applied to the Pandemic Polyclinic during the pandemic process and were diagnosed with COVID-19 and recovered. The study's sample size was calculated based on the sexual

function scale mean score by Aygin and Eti Aslan (2005). Using this result, when the effect size was 0.20, d:0.20, 1-β:0.05, a:0.95, the study sample consisted of 261 women.

The study included women who had no communication problems, had been diagnosed with COVID-19 and recovered at least one month previously, were at least 18 years of age, sexually active, and had not entered menopause. In addition, conditions that could negatively affect sexual health and diseases diagnosed by a physician were excluded. HIV/Hepatitis B/Hepatitis C positivity, kidney failure, heart disease, pelvic radiation history, pelvic organ prolapse, pelvic surgery, incontinence, neurological or psychiatric disorders, pregnant and lactating women, self or a partner with active COVID-19 test positive, those who used drugs that reduce libido (anticonvulsants, antidepressants, antipsychotic drugs, beta blockers, benzodiazepines, statins) during the last three months were not included in the study (Bilgi and Bilge 2021, Marita et al. 2015).

Procedure

To conduct the study, written Institutional Permission (54/2021) from Kayseri City Training and Research Hospital Medical Specialization Education Board and written Ethics Committee Permission from the Clinical Research Ethics Committee (533/2021) were obtained. After informing the participants about the content and purpose of the study by phone, their verbal consent was obtained. In addition, the online questionnaires ensured that the women ticked the checkbox regarding their voluntary participation in the study.

Contact information of women diagnosed with COVID-19 was obtained at least one and at most 12 months before the outpatient clinic. The women were informed about the work by calling them by phone. The women who agreed to participate in the study were asked to answer the questionnaire sent as a link to their phones. The data were collected with Google Forms to prevent transmission due to the current situation regarding the COVID-19 outbreak in Türkiye. It took about 10-15 minutes to fill out the forms. While creating the form, standardization was ensured by limiting one answer per IP address.

Four hundred-eleven women were contacted during the data collection process. Of the women, 21 were under the age of 18, 22 had menopause, 21 had a heart/kidney/psychiatric disease, 24 were pregnant/breastfeeding, 4 had an active covid-19 patient, 9 did not want to participate and 38 of them could not be reached, a total of 149 people could not be included in the study. As a result of post-power calculation, the effect size was estimated as 1.16.

Measures

The study's data were collected via the Personal Information Form, Female Sexual Function Scale (FSFI), and the State-Trait Anxiety Inventory (STAI-1, STAI-2).

Personal Information Form

In the form created by the researchers, there are 12 questions related to socio-demographic characteristics.

Table 1. Female sexual function scale question coefficients and scoring			
Sub-dimension	Related Items	Scoring of questions	Sub-dimension coefficient
Desire	1-2 items	1-5	0.6
Arousal	3-6 items	0-5	0.3
Lubrication	7-10 items	0-5	0.3
Orgasm	11-13 items	0-5	0.4
Sexual satisfaction	14-16 items	0-5	0.4
Pain	17-19 items	0-5	0.4

Female Sexual Function Scale (FSFI)

This scale was created by Rosen et al. (2000) to evaluate the sexual dysfunction of women in the previous four weeks. The Turkish validity and reliability study of the scale was performed by Aygin and Aslan (2005). The scale comprises 19 items and six sub-dimensions (desire, arousal, lubrication, orgasm, sexual satisfaction, and pain). The raw score that can be obtained from the scale varies between 4 and 95. According to the formula created by the researchers who developed this scale, the FSFI subgroup score is obtained by multiplying the item score and the coefficient of the item. The sum of the subgroup scores gives the total scale score (Figure 1). The total score is between 2 and 36, and scores below 26 indicate sexual dysfunction (Weigel et al. 2005). While Cronbach's alpha coefficient of the scale was 0.95, it was determined as 0.97 for both measurements in this study.

State-Trait Anxiety Inventory (STAI-1, STAI-2)

The State Anxiety Inventory by Spielberger et al. (1970) determines the level of anxiety experienced by individuals. The Turkish validity and reliability study of the scale was conducted by Öner and Le Compte (1998). There are 40 statements on the scale. The first twenty items measure the level of anxiety related to the situation, and each item is answered with a four-point Likert (1: Never, 2: A little, 3: A lot, 4: Completely). Items 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20 in the scale are reverse coded. State anxiety scores are obtained by subtracting the total score of reverse-coded items from the total score of the directly coded items and adding the constant value of 50, the constant value of the state anxiety scale, to the value obtained. Each item is answered with a four-point Likert scale (1: Not at all, 2: A little bit, 3: A lot, 4: Completely). Items from 21 to 40 on the scale measure the Trait Anxiety Level Inventory (STAI-2) of the individual. In this section, seven items, 21, 26, 27, 33, 36, and 39, are reverse coded. The trait anxiety level of the individual is obtained by subtracting the total score of the reverse-coded items from the total score of the directly coded items and adding 35, which is the constant value of the trait anxiety scale. The total score obtained from both scales varies between 20 and 80. An increase in the score obtained from the scale indicates an increase in the level of anxiety. The Cronbach's alpha coefficient of the State and Trait Anxiety Inventory was 0.90 for the Trait Anxiety Inventory and 0.96 for the State Anxiety Inventory (Öner and Le Compte 1998). In this study, Cronbach's alpha coefficients were determined as 0.84 for the Trait Anxiety Inventory and 0.81 for the State Anxiety Inventory.

Statistical Analysis

Statistical analyses were performed using the IBM SPSS Statistics Standard Concurrent User V 25 (IBM Corp., Armonk, New York, USA). Descriptive statistics were given as several units (n) and mean ± standard deviation ($\bar{x}$ ± SD). The normal distribution of the data of numerical variables was evaluated for normality with the Shapiro-Wilk test and QQ plots. The homogeneity of variances was evaluated with Levene's test. Independent Sample t-test was performed in two groups whose post COVID-19 FSFI scores were normally distributed according to socio-demographic characteristics, and Mann-Whitney U test was performed in groups that were not normally distributed. One Way ANOVA test was used in three or more groups. Paired sample t-test was used to compare FSFI scores of women before and after COVID-19. Distribution of women according to FSFI cut-off score before and after COVID-19 was done with chi square test and paired sample t test was used to compare the frequency of sexual intercourse. In examining the relationship and some features between women's post-COVID-19 FSFI scores and STAI-1, STAI-2 and pre-COVID-19 FSFI scores, the Pearson Correlation test was used in normally distributed data, while the Spearman correlation test was used in the analysis of non-normally distributed data.

Results

The mean age of the women participating in the study was 33.87 ± 7.76 years. It was determined that women experienced sexual intercourse for the first time at an average age of 22.96 ± 3.78 years, they were married for 9.85 ± 8.58 years, and the mean gravida was 1.77 ± 1.16.

Table 2 shows the comparison of women's socio-demographic characteristics and FSFI scores. Women aged 40 and over with high BMI had lower FSFI total scores and total scores for all subscales of the scale (respectively; p= <0.001, p= <0.001). Women who were primary school leavers were unemployed, had a lower income than the other groups, and had lower FSFI total scores and total scores for all sub-dimensions of the scale (respectively; p=<0.001, p= <0.001, p= <0.001). Women who smoked had lower FSFI total scores than women who did not smoke (p= <0.001). In addition, it was determined that the total scores of the FSFI and the subscales of desire, arousal, and pain were lower in the women who did not do sports than those who did sports (p=0.016, p=0.016, p=0.011, p=0.010, respectively).

A comparison of women's pre- and post-COVID-19 FSFI scores and frequency of intercourse is given in Table 3. The total mean score of the women's FSFI was 26.50 ± 6.79 before COVID-19 and 26.00 ± 6.93 after COVID-19. In addition, when the total scores of the pre-COVID-19 FSFI sub-dimensions of the women were examined, the desire sub-dimension was 3.80 ± 1.16, the arousal sub-dimension 4.25 ± 1.40, the lubrication sub-dimension 4.50 ± 1.20, the orgasm sub-dimension 4.36± 1,25, the sexual satisfaction was 36 ± 1.25, the sub-dimension of sexual satisfaction was 4.50 ± 1.49, and the sub-dimension of pain was 5.07 ± 1.19. When the total scores of the women's FSFI sub-dimensions after COVID-19 were examined, it was seen that the desire sub-dimension was 3.66 ± 1.17, the arousal sub-dimension 4.11 ± 1.41, the lubrication sub-dimension 4.48 ± 1.21, the orgasm sub-dimension 4,29 ± 1,26, the sexual satisfaction was 4.40 ± 1.49, and the sub-dimension of pain was 5.04 ± 1.25

Table 2. Distribution of women's Post-COVID-19 FSFI scores according to their socio-demographic characteristics (N=261)

Characteristics	n	Desire		Arousal		Lubrication		Orgasm		Sexual Satisfaction		Pain		Total	
		$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Age															
19-29	94	4.16[a]	0.95	4.74[a]	1.05	5.03[a]	0.89	4.80[a]	0,98	5,09[a]	1,09	5,34[a]	1,03	29,18[a]	5,22
30-39	97	3.80[b]	1.07	4.28[b]	1.33	4.54[b]	1.18	4.49[a]	1,17	4,56[b]	1,37	5,05[a]	1,20	26,75[b]	6,41
40 and above	70	2.81[c]	1.12	3.03[c]	1.33	3.64[c]	1.17	3.34[b]	1,18	3,24[c]	1,45	4,61[b]	1,46	20,68[c]	6,61
Test		F=34.570 p=<0.001		F= 39.494 p=<0.001		F= 33.511 p= <0.001		F= 36.7594 p= <0.001		F= 41.912 p= <0.001		F= 7.143 p= <0.001		F= 40.567 p= <0.001	
Body Mass Index (BMI)															
<18.5	9	4.33[a]	1.02	4.70[a]	0.70	5.66[a]	0.69	4.75[a]	1,04	5,15[a]	1,15	5,82[a]	0,29	29,83[a]	4,20
18.5-24.99	121	3.97[ab]	1.02	4.47[a]	1.18	4.82[ab]	1.01	4.65[a]	1,07	4,78[ab]	1,23	5,21[ab]	1,06	27,94[ab]	5,71
25-29.99	71	3.55[bc]	1.12	4.07[ab]	1.49	4.42[bc]	1.25	4.19[ab]	1,27	4,33[bc]	1,57	4,96[b]	1,33	25,55[bc]	7,31
30-39.99	60	3.11[c]	1.28	3.41[b]	152	3.82[c]	1.29	3.66[b]	1,33	3,65[c]	1,61	4,69[b]	1,46	22,38[c]	7,34
Test		F= 9.379 p=<0.001		F= 9.002 p=<0.001		F= 11.081 p=<0.001		F= 9.916 p=<0.001		F= 9.414 p=<0.001		F= 3.741 p=0.012		F= 10.927 p=<0.001	
Educational status															
Primary school	50	2.80[a]	1.12	2.98[a]	1.30	3.68[a]	1.16	3.29[a]	1,17	3,12[a]	1,48	4,63[a]	1,45	20,53[a]	6,68
Middle school	82	3.71[b]	1.28	4.12[b]	1.43	4.47[b]	1.25	4.27[b]	1,30	4,36[b]	1,48	4,94[ab]	1,31	25,90[b]	7,03
High school and up	129	3.96[b]	0.95	4.55[c]	4.55	4.79[b]	1.05	4.69[c]	1,02	4,92[c]	1,18	5,25[b]	1,07	28,19[c]	5,70
Test		F=20.207 p=<0.001		F= 26.408 p=<0.001		F=17.067 p=<0.001		F=26.727 p=<0.001		F=32.105 p=<0.001		F=5.007 p=0.007		F=26.289 p=<0.001	
Employed status															
Employed	153	3.88	1.05	4.45	1.25	4.74	1.04	4.61	1,06	4,81	1,25	5,30	1,01	27,82	5,82
Unmployed	108	3.35	1.27	3.64	1.48	4.10	1.33	3.84	1,38	3,81	1,61	4,65	1,44	23,43	7,55
Test		t=3.674 p=<0.001		t= 4.771 p=<0.001		t= 4.316 p=<0.001		t= 5.043 p=<0.001		t= 5.604 p=<0.001		t= 4.269 p=<0.001		t=5.298 p=<0.001	
Income status															
Low	78	3.26[a]	1.21	3.51[a]	1.44	4.05[a]	1.30	3.73[a]	1,29	3,68[a]	1,57	4,64[a]	1,35	22,88[a]	7,13
Average	92	3.69[b]	1.18	4.15[b]	1.36	4.46[b]	1.13	4.34[b]	1,19	4,43[b]	1,36	5,13[b]	1,28	26,23[b]	6,63
High	91	3.98[b]	1.03	4.60[c]	1.24	4.86[c]	1.08	4.72[c]	1,11	4,98[c]	1,29	5,28[b]	1,03	28,44[c]	6,01
Test		F= 10.98 p=<0.001		F= 13.903 p=<0.001		F= 10.182 p=<0.001		F= 14.309 p=<0.001		F= 17.750 p=<0.001		F= 6.252 p=0.002		F= 15.045 p=<0.001	
Smoking status															
Yes	41	3.49	1.32	3.76	1.57	4.49	1.17	4.06	1,40	4,23	1,52	5,09	1,25	25,05	7,35
No	220	3.70	1.14	4.18	1.37	4.47	1.22	4.33	1,22	4,43	1,49	5,03	1,25	26,17	6,85
Test		WU= -1.136 p= 0.256		WU= -1.510 p= 0.131		WU= -0.060 p= 0.952		WU= -1.018 p= 0.309		WU= -0.811 p= 0.417		WU= 0.424 p=0.671		WU= -0.857 p=<0.001	
Regular exercise status															
Yes	28	4.22	0.97	4.73	1.20	4.86	1.03	4.64	1,23	4,78	1,30	5,61	0,73	28,86	5,64
No	233	3.6	1.18	4.04	1.41	4.43	1.22	4.25	1,25	4,35	1,51	4,97	1,28	25,66	7,00
Test		WU= 2.412 p=0.016		WU= 2.536 p=0.011		WU= 1.785 p=0.074		WU= 1.693 p=0.090		WU= 1.346 p=0.178		WU= 2.559 p=0.010		WU= 2.405 p=0.016	
Time after recovery from COVID-19 (months)															
1-4	74	3.70	1.17	4.15	1.38	4.56	1.20	4.36	1,22	4,50	1,42	4,98	1,31	26,28	6,79
5-8	85	3.66	1.15	4.12	1.48	4.58	1.24	4.34	1,34	4,35	1,58	4,22	1,18	26,29	7,20
9-12	102	3.64	1.20	4.08	1.38	4.33	1.19	4.20	1,22	4,37	1,47	4,92	1,24	25,55	6,83
Test		F= 0.063 p=0.938		F= 0.059 p=0.942		F= 1.277 p=0.280		F= 0.486 p=0.615		F= 0.231 p=0.793		F= 1.405 p=0.247		F= 0.350 p=0.705	

BMI, Body Mass Index; FSFI, Female Sexual Function Scale; F, One-way analysis of variance test statistic; t, independent samples t-test statistic. WU, Mann-Whitney U test statistic. a,b superscripts show statistical difference between the groups at p < 0.05 level..

Table 3. Comparison of women's pre- and post-COVID-19 FSFI mean scores. (N=261)			
FSFI sub-dimensions	pre-COVID-19 Mean ± SD	post-COVID-19 Mean ± SD	Test p
Desire	3.80 ± 1.16	3.66 ± 1.17	t: 4.098 <0.001
Arousal	4.25 ± 1.40	4.11 ± 1.41	t: 3.729 <0.001
Lubrication	4.50 ± 1.20	4.48 ± 1.21	t:.601 .549
Orgasm	4.36 ± 1.25	4.29 ± 1.26	t: 2.306 .022
Sexual Satisfaction	4.50 ± 1.49	4.40 ± 1.49	t: 3.318 .001
Pain	5.07 ± 1.19	5.04 ± 1.25	t: 1.247 .214
Total	26.50 ± 6.79	26.00 ± 6.93	t: 3.697 <0.001

FSFI: Female Sexual Function Scale; t: Paired sample t test; SD: standard deviation.

When the total and sub-dimension scores of the women included in the study were compared according to the pre-COVID-19 and post-COVID-19 periods, it was found that the total score of the FSFI, desire, arousal, orgasm, and sexual satisfaction sub-dimension scores decreased after COVID-19. This difference was statistically significant (respectively p<0.001, p<0.001, p<0.001, p=0.022, p=0.001).

Table 4. Comparison of women's distribution and frequency of sexual intercourse according to the pre- and post-COVID-19 FSFI cut-off score (N=261)			
	pre-COVID-19 n (%)	post-COVID-19 n (%)	Test p
FSFI< 26	101 (38.7)	120 (46.0)	x2:159.734 <0.001
FSFI>26	160 (61.3)	141 (54.0)	
Frequency of sexual intercourse (weeks) (mean ± SD)	2.78 ± 0.90	2.60 ± 0.92	t: 4.825 <0.001

FSFI, Female Sexual Function Scale, t: Paired sample t test; x2: chi square test.

The comparison of the distribution of women according to the pre- and post-COVID-19 cut-off score and the frequency of sexual intercourse is given in Table 4. It was determined that the number of women with a pre-COVID-19 FSFI score <26 increased after COVID-19, and there was a statistically significant difference (p <0.001). The frequency of intercourse for women was determined as 2.78±0.90 per week before COVID-19 and 2.60±0.92 after COVID-19. This difference in the frequency of intercourse among women was statistically significant (p <0.001. Table 4).

Table 5. Examination of the relationship between women's post-COVID-19 FSFI scores and STAI-1, STAI-2 and pre-COVID-19 FSFI scores and some characteristics (N=261)							
	post-COVID-19 FSFI						
	Desire	Arousal	Lubrication	Orgasm	Sexual Satisfaction	Pain	Total
pre-COVID-19 FSFI r p	0.8494 <0.001	0.9076 <0.001	0.8445 <0.001	0.8771 <0.001	0.8907 <0.001	0.6654 <0.001	0.9488 <0.001
STAI-1 Rho p	-0.2061 <0.001	-0.2128 <0.001	-0.2334 <0.001	-0.2445 <0.001	-0.2218 <0.001	-0.1649 0.008	-0.2482 <0.001
STAI-2 r p	-0.1467 0.018	-0.1377 0.026	-0.1625 0.009	-0.1509 0.015	-0.1444 0.020	-0.0704 0.257	-0.1527 0.014
Frequency of intercourse after COVID-19 recovery r p	0.521 <0.001	0.570 <0.001	0.496 <0.001	0.512 <0.001	0.533 <0.001	0.262 <0.001	0.510 <0.001
Time after COVID-19 recovery r p	0.0053 0.932	-0.0013 0.983	-0.0658 0.289	-0.0408 0.512	-0.0205 0.742	-0.0616 0.321	-0.0339 0.586

FSFI, Female Sexual Function Scale; STAI-1, The State Anxiety Inventory; STAI-2, the Trait Anxiety Level Inventory; r, Pearson correlation coefficient; rho, Spearman correlation coefficient..

Women's mean STAI-1 and STAI-2 scores were 42.67 ± 7.02 (30 (20-72)) and 33.21 ± 10.20. respectively. As can be seen in Table 5, there was a positive correlation between the women's pre-COVID-19 FSFI total score and post-COVID-19 FSFI total score and all sub-dimensions (p<0.001). There was a negative correlation between the STAI-1 total score and the post-COVID-19 FSFI total score and all its sub-dimensions (p<0.05). On the other

hand, a negative correlation was found between the STAI-2 total score and the post-COVID-19 FSFI total score, and the sub-dimensions of desire, arousal, lubrication, orgasm, and sexual satisfaction (p<0.05) (Table 4). In other words, as women's anxiety levels increase, sexual functions decrease. In addition, there was a positive correlation between the frequency of intercourse after recovery from COVID-19 and the post-COVID-19 total score and all sub-dimensions of the women included in the study (p<0.001) (Table 4).

Discussion

This study was conducted to determine the sexual function of women after COVID-19 and related factors. Sexual dysfunctions such as sexual interest/arousal disorder, hypoactive sexual desire disorder, genito-pelvic pain/penetration disorder, and female orgasm disorder are common conditions that negatively affect the lives of many women (Shaeer et al. 2020). Women frequently experience sexual dysfunction, and the pandemic process increases this risk (McCool et al. 2016, Alpalhao and Filipe 2020, Hensel et al. 2020, Grabovac et al. 2020, Li et al. 2020). It is a matter of curiosity whether having a COVID-19 infection negatively affects sexual functions after recovery. As a result of this study, a significant decrease was found in the sub-dimensions of desire, arousal, orgasm, sexual satisfaction, the total score of the scale, and weekly intercourse frequency of the post-convalescent FSFI scale of women who had COVID-19 infection compared to the pre-infection. Although there was a quantitative decrease in lubrication and pain sub-dimension scores, the difference was not statistically significant. However, there was an increase in the percentage of women with a total score below 26 (46.00%) on the FSFI after COVID-19 infection compared to the pre-infection period (38.70%). In the literature, no study evaluates the sexual functions of people before and after having a COVID-19 infection. However, Kaplan et al. (2022) conducted a study involving 1443 men and women to determine the symptoms experienced by COVID-19 patients after recovery. In the study, some women stated that they had deterioration in their sexual functions after recovery. Lagha et al. (2022a) evaluated the sexual functions of women in a study that included 30 women who had recovered from COVID-19 infection and 30 women who had not had the disease. Accordingly, it was determined that the percentage of women who recovered after COVID-19 infection and had an FSFI score of <26.5 (63.33%) was higher than the women in the control group (53.33%) (p=0.009). The general opinion is that there is sexual dysfunction for scores below 26 in the FSFI (Weigel et al. 2005).

Another area that is adversely affected by COVID-19 infection is the frequency of weekly sexual intercourse. While women stated that they experienced coitus an average of 2.78 times a week before infection, this number decreased to an average of 2.60 afterward. The frequency of sexual intercourse is one of the main factors that determine the sexual satisfaction of individuals (Gillespie 2017, Palha-Fernandes et al. 2019). These results support the study's findings and show that having a COVID-19 infection has adverse effects on many sexual functions of women. Sexuality, which has psychological, social, and physiological dimensions, can be negatively affected by dysfunctions in these areas (McCabe et al. 2016). In addition to the social tension and stress experienced due to the pandemic conditions, physical health problems may cause sexual dysfunction in women. Also, a study found that changes in sex hormones can be seen due to ovarian damage in women with COVID-19 infection (Ding et al. 2021). This may be one of the other factors that can explain the current situation. During the pandemic, women should be screened for sexual health after recovery, and sexual and reproductive health issues should be included in the COVID-19 treatment protocol.

Restrictions and disease processes due to changes in lifestyle can lead to mental health problems (Şimşir et al. 2022). Although steps are taken toward the transition to the normalization process at the end of the pandemic period, its psychological effects may continue (Bareeqa et al. 2021, Kaplan et al. 2022). In addition to social changes, the possibility of experiencing physiological health problems is an important stressor in individuals (Bekaroğlu and Yılmaz 2020). In this study, it is seen that women experience mild anxiety after COVID-19 infection. Lagha et al. (2022b) evaluated the anxiety levels of women who had recovered from COVID-19 infection and had not had the disease and determined that COVID-19 was significantly associated with anxiety even in mild symptomatic clinical forms.

Similarly, in another study, one of the four most common problems experienced by people after COVID-19 infection is anxiety (Bareeqa et al. 2021; Kaplan et al. 2022). Women with anxiety and depression tend to experience sexual dysfunction and sexual dissatisfaction (Omar et al. 2021). Although the relationship between sexual dysfunction and psychological problems is not fully understood, it is known to be mutual and multifactorial (Forbes et al. 2012). The addition of sexual dysfunction can exacerbate existing psychological problems and create a vicious circle (Bradford and Meston 2006). The study determined that although the women experienced mild anxiety, there was a weak positive correlation between the state and trait anxiety levels

and FSFI scores, similar to the literature. In this context, evaluating women with COVID-19 infection as holistic bio-psycho-socially after recovery and providing psychological support is essential.

There are multiple predictors of sexual dysfunction (McCabe et al. 2016). In the study, socio-demographic characteristics such as advanced age, high BMI value, low education and income level, not working, smoking and not doing sports, decreased frequency of anxiety, and coitus before COVID-19 infection were evaluated for sexual dysfunction in women recovering from COVID-19 and identified as risk factors. However, a statistically significant effect of the time after recovery from COVID-19 on sexual functions was not detected. In a systematic review that determined the factors associated with sexual dysfunction in women, low immunity, stress, abortion, genito-urinary problems, and relationship dissatisfaction were determined as risk factors. Protective factors are advanced age in marriage, exercise, love, close communication, positive body image, and sexual education. However, the effectiveness of age, education, employment, parity, being in a relationship, frequency of sexual intercourse, race, and alcohol consumption has not been entirely determined (McCool-Myers et al. 2018). The difference in available data may be due to the multifaceted predictors of female sexual dysfunction and the variation from country to country. Identifying potential risk factors in women can help develop strategies to prevent sexual dysfunction and identify at-risk populations.

The present research is one of the few studies evaluating the sexual dysfunctions experienced by women after recovery from COVID-19 infection. Another a strength of the study is that the effect of the time factor on sexual function was evaluated by including a sample group belonging to each month from women within the last year after recovery. The participants were asked to compare the frequency of sexual intercourse and the forms of FSFI with the pre-pandemic period. In addition, because sexuality is considered taboo in Turkish society, online data collection may have contributed to the sincerer responses of the participants to the questionnaires. There are some limitations to the study. Questioning past experiences may cause bias in reporting; it may vary according to the individual's memory, motivation, and psychology. In addition, data were obtained from only one of the spouses. Another limitation is that sexual dysfunction and psychological disorders in women are based on self-report by patients.

Conclusion

After recovery, the sub-dimensions of desire, arousal, orgasm, sexual satisfaction, total scale score, and weekly intercourse frequency of women with COVID-19 infection decreased compared to pre-infection. There has also been an increase in the incidence of sexual dysfunction. In the study, socio-demographic characteristics such as advanced age, high BMI, low education and income level, not working, smoking and not doing sports, anxiety, decrease in coitus frequency, and sexual dysfunction before COVID-19 infection were evaluated for sexual dysfunction in women recovering from COVID-19 are risk factors. However, the time that elapsed after recovery from COVID-19 did not affect sexual functions. By including both men and women in subsequent studies, greater objectivity in the data may be achieved through psychological and sexual screening. Nurses and all mental health professionals collaborating with women should be aware of the many risk factors for women of reproductive age. Future prevention strategies should address modifiable factors, such as access to physical activity and sex education. International efforts to empower women should continue. In this context, women should be screened for sexual health after recovery from the pandemic, and sexual and reproductive health should be included in the treatment of COVID-19. More studies from different countries and cultures should be conducted to clarify the effects of COVID-19 infection on women's sexual functions. In this context, it is thought that the information obtained from the study will guide both clinicians and academicians working in the field of obstetrics.

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