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Original Research

Evaluation of Women's Sexual Functions After COVID-19 Infection

Fatma Ketenci Gencer,[1] Semra Yuksel,[2] Suleyman Salman,[1] Serkan Kumbasar,[1] Neslihan Kobaner[3]

[1]Department of Obstetrics and Gynecology,University of Health Sciences Türkiye, Istanbul Gaziosmanpasa Training and Research Hospital, İstanbul, Türkiye
[2]Department of Obstetrics and Gynecology, University of Health Sciences Türkiye, Istanbul Çam and Sakura City Hospital, İstanbul, Türkiye
[3]Department of Obstetrics and Gynecology, Babaeski State Hospital, Kirklareli, Türkiye

Abstract

Objectives: Sexual health is an essential component of life quality. In this study, we aim to compare the sexual dysfunction of women who had a history of COVID-19 and those who did not have been infected by COVID-19.

Methods: This study was conducted in a tertiary center between May 2020 and December 2020. Our study group included 50 women treated for COVID-19 at home, and control group included 51 women with no history of COVID-19. Female Sexual Functioning Index (FSFI) was used to assess of these patients' sexual dysfunctions.

Results: Sexual dysfunction in women with a history of COVID-19 was found to be significantly higher than those with no history of COVID-19. Sexual dysfunction development risk in women with a history of COVID-19 (study group) was 3.4 times higher compared to women with no history of COVID-19 (control group) (p=0.008). In addition, high number of children and low economic status were found to be predictive for sexual dysfunction after recovery (p=0.02 and p=0.024, respectively). Arousal, orgasm, satisfaction subscale scores, and total FSFI scores in women with a history of COVID-19 were significantly lower than those with no history of COVID-19 (p=0.011, p=0.002, p=0.028, and p=0.008, respectively).

Conclusion: Sexual dysfunction in the patients with a history of COVID-19 seems to be higher than in women with no history of COVID-19. Increased parity and low economic status are predictive for sexual dysfunction after treatment. There is a need for future studies relating to the effect of the COVID-19 infection in women's sexual functions.

Keywords: Coronavirus, pandemic, sexual dysfunction, sexual health, women's health

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The infectious disease known as Coronavirus disease-2019 (COVID-19) is still effective worldwide.[1] Although vaccine programs have started in many countries, there was no effective treatment for COVID-19 up to now.[2]

Within the description that health is "a complete physical, mental, and social welfare," many physical and mental modalities may be expected due to the pandemic and the measures against the pandemic.[3] Among them, sexual health is one of the essential indicative factor of human welfare.[4] In spite of unprecedented efforts, it is foreseen that COVID-19 outbreak raised to pandemic level will cause potential long-term negative conclusions, global fatigue, mental health, and sexual health.[5]

There are only few studies on sexual dysfunctions from the previous clinic pandemic experiences.[4] An early study in China showed a decrease in sexual activity between young

Address for correspondence: Fatma Ketenci Gencer, MD. Saglik Bilimleri Universitesi Istanbul Gaziosmanpasa Egitim ve Arastirma Hastanesi, Kadin Hastaliklari ve Dogum Anabilim Dali, İstanbul, Türkiye
Phone: +90 541 611 64 69 **E-mail:** fathma_k@hotmail.com

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men and women during the Covid-19 outbreak.[6] Among women in Turkey, decreased sexual intercourse frequency, sexual abstinence, and increased separated sexual behavior were observed compared to the pre-pandemic period. In the same study, better sexual function scores were reported between couples who spent more time together during the pandemic.[7] Fuchs et al. (2020) have reported similar results among Polish women.[8]

The results confirmed that the pandemic affects sexual and reproductive health diversely at personal and social levels.[9] Economic and mental effects may cause important changes in sexual behavior.[10] Even though there is no evidence that COVID-19 is sexually transmitted, suggested social distance and fear may cause avoidance from sexuality.[11] In addition, patients survived COVID-19 and their partners may exhibit avoiding sexuality behavior due to mental reasons. Besides these economic, social, and cognitive reasons, COVID-19 infection's long-term effects on sexual behavior-regulating issues and hormones of the survivors are unknown.

From the early stages of the pandemic, health systems and research focused on mortalities and short-term morbidities. Although there are similar studies about the effects of the pandemic on sexual behaviors of the general community, there is no comparative study about the effects on sexual functions of women survived from COVID-19 and women without COVID-19 history yet. This study aims to compare characteristics of women survived from COVID-19 and women who have not been infected by COVID-19 in terms of sexual dysfunction.

Methods

Settings, Participants

This prospective case control study was conducted in a tertiary state hospital between May 2020 and December 2020 to compare the sexual function of women who survived COVID-19 infection without hospitalization and women with no history of COVID-19.

Fifty women previously diagnosed with mild-medium symptoms of COVID-19 infection who had ambulatory care and 51 women with no history of COVID-19 were enrolled. Participants were required to have sexual activity within the past 4 weeks and to be of reproductive age. In addition, study groups were required to complete quarantine at home and have two negative PCR tests. Women with a psychiatric disease or using drugs that might cause sexual dysfunction, malignancy, endometriosis, previous gynecologic surgery, and previous sexual dysfunction diagnosis were excluded from the study.

Data Collection

In obtaining women's sociodemographic data, the study form which included questions generated by researchers was used. The sexual dysfunction was screened using Female Sexual Functioning Index (FSFI). FSFI, a Likert-type scale, includes desire, arousal, lubrication, orgasm, sexual success, and pain sub-scales. Higher scores mean better sexual function. Cutoff value for women with and without sexual dysfunction in total scale was given as 26.55.[12] To prevent false positives, in FSFI-using studies, it is suggested to include women reporting sexual activity within the past 4 weeks.[13]

Procedure

Women were notified of the study verbally and invited to participate. Fifty women with a history of COVID-19 were treated (symptomatic treatment and favipiravir treatment) at home quarantine and two consecutive negative PCR results were included in the study. The study form and FSFI scale were applied to women in a private room reserved for the study. The variable "chronic disease" used in the study refers to any systemic disease (cardiovascular, endocrine, autoimmune, etc.) lasting for more than 6 months. Body mass index (BMI) (BMI). B2 was used to define obesity.

Ethics

Ethics committee approval for the study was obtained from the ethics committee of the hospital, where the study was conducted (Date: 02/06/2020, No: 88). The study was performed in accordance with World Medical Association's Helsinki Declaration (2013, Brazil, Fortaleza). Written and verbal consent were requested from women. Identification data were not recorded in scales and forms, all information was collected anonymously.

Statistical Analysis

Data analysis was performed using SPSS version 21 (IBM corp., Armonk, NY). Data values were stated as mean±SD or number, %. Chi-square test was used for testing the relation between categoric variables. To compare the mean of numerical data between the groups, an independent sample t-test was used for the data with the normal distribution, while Mann–Whitney U-test was used for those with no normal distribution. Binomial logistic regression analysis was performed to evaluate possible variables effect on sexual dysfunction. $P<0.05$ was accepted as significant statistically.

Results

Fifty women with COVID-19 history and 51 healthy women included in the study. The age, BMI, and parity of all par-

ticipants were 38.7±3.8, 26.3±4.5, and 2.4±2, respectively. The findings related to sociodemographic, obstetric, and general health status of the study and control groups were similar (Table 1). There was no difference among groups regarding demographic properties.

Table 2 shows comparisons related to FSFI scores among two groups. Sub-scale scores of the arousal, orgasm, satisfaction, and total scores were significantly lower in the study group than in the control group. According to FSFI cutoff score, the frequency of the sexual dysfunction in the study group (n=30, 63.8%) was significantly higher than the control group (n=17, 36.2%) (p=0.007).

Binomial logistic regression was performed to determine the effects of COVID-19 history, age, the number of children, education, contraception method, sharing same bedroom, economic status, and working status variables on sexual dysfunction in women ($\chi^2(8) = 22.868$, p=0.04). The model explained 27.1% of the variance in sexual dysfunction (Nagelkerke R2) and classified 74.3% of cases correctly. Model's sensitivity was found as 70.2%, specificity 77.8%,

Table 2. Comparison of the study and control groups' FSFI scores

	Control group (n=51) Mean±SD	Study group (n=50) Mean±SD	p*
FSFI			
Desire	3.8±1.1	3.4±1.2	0.10
Arousal	4.4±0.9	3.7±1.3	0.01
Lubrication	4.6±0.8	4.4±1.0	0.30
Orgasm	4.9±0.9	4.3±1.0	0.002
Satisfaction	4.9±1	4.4±1.2	0.03
Pain	4.7±1.2	4.5±1.5	0.44
Total Sexual Function Score	27.3±4.1	24.7±5.5	0.008

SD: Standard deviation; *Independent t-test was used.

Table 1. Comparison of the study and control groups' sociodemographic findings

	Control group (n=51) Mean±SD/n (%)	Study group (n=50) Mean±SD/n (%)	p
Age	38.5±3.9	39±3.8	0.5[a]
BMI	25.6±3.8	27±5	0.1[a]
Duration of time for marriage (years)	14.4±7.2	13.5±8	0.54[a]
Number of pregnancies	2.3±1.6	2.5±2.4	0.54[a]
Number of live births	1.1±1.1	1.56±1.4	0.09[a]
Number of in-utero mort fetus	0.019±0.14	0.06±0.4	0.52[a]
Spontaneous abortus	0.39±0.85	0.46±1.5	0.78[a]
Number of children	1.64±0.91	1.7±1.2	0.74[a]
Menarche	13.1±1.4	13.2±1.46	0.61[a]
Smoker (n, %)	21 (55.3)	17 (44.7)	0.46[b]
Education			
Preliminary-secondary	34 (68)	33 (64.7)	0.73[b]
Higher Education	16 (32)	18 (35.3)	
Employment (n, %)	33 (64.7)	24 (48)	0.09[b]
Economic status			
Poor	7 (13.7)	10 (20)	0.39[b]
Medium-Good	44 (86.3)	40 (80)	
Non-family members living at home	45 (88.2)	37 (74)	0.07[b]
Primary cesarean section*	20 (44.4)	17 (41.5)	0.78[b]
History of episiotomy*	4 (16)	2 (8.7)	0.67[b]
Contraception	45 (88.2)	40 (80)	0.26[b]
Couples sharing same bedroom	46 (92)	49 (96.1)	0.44[b]
Drug usage	14 (27.5)	11 (22)	0.53[b]
Chronic disease	16 (59.3)	11 (40.7)	0.29[b]
Status of relation with spouse**			
Good	36 (55.4)	29 (44.6)	0.33[b]
Medium	11 (45.8)	13 (54.2)	
Poor	4 (33.3)	8 (66.7)	

*In women previously gave birth; **According to women's own perception; BMI: Body mass index; [a]Independent t-test; [b]Pearson chi-square were used.

positive predictive value 70.2%, and negative predictive value 77.7%. Three of nine precursor variables were statistically meaningful: COVID-19 history, economic status, and the number of children (Table 3). The probability of exhibiting sexual dysfunction in women with COVID-19 history was 3.44 times higher than women without COVID-19 history. In addition, an increased number of children were associated with sexual dysfunction risk. Economically disadvantaged level was associated with a 0.2 times increased risk compared to medium-good economic level.

Discussion

Negative effects of sexual dysfunction on life quality were a widespread problem in the pre-pandemic period.[14] While there is an increased number of studies about the effects of the pandemic on sexual dysfunction in women, there is no evidence for its frequency among women with COVID-19 history. The frequency of sexual dysfunction in women with COVID-19 history determined in this study was higher than the rate of 40% reported in previous studies for women of reproductive age worldwide.[15-17] However, the previous studies were conducted in the pre-pandemic period.

This study aimed to compare sexual dysfunction between women with and without COVID-19 history. Sexual dysfunction frequencies for the study and control group were 63.8% and 36.2%, respectively. In addition, the logistic regression model showed that COVID-19 history increases sexual dysfunction risk 3.4 times. The frequency of sexual dysfunction in women with no COVID-19 history is similar to women in the pre-pandemic period. Therefore, it seems that women with COVID-19 history are more sensitive to sexual dysfunction compared to the control group.

Table 3. Binominal logistics regression model related to sexual dysfunction in women during the Covid-19 pandemic period

	B	Sig	Exp (B)	95% CI for EXP(B)	
Covid-19	1.237	0.008	3.44	1.37	8.64
Number of children	0.573	0.02	1.77	1.09	2.87
Age	0.020	0.77	1.02	0.89	1.17
Education	0.246	0.65	1.28	0.45	3.65
Contraception	0.714	0.34	2.04	0.47	8.92
Sharing same bedroom	1.464	0.18	4.32	0.51	36.64
Economic status	−1.270	0.02	0.28	0.09	0.84
Employment	0.417	0.40	1.52	0.57	4.05
Constant	−2.675	0.35	0.07		

COVID-19: Women having COVID-19 history compared to those with no COVID-19 history. Education: Women have a preliminary/secondary education level compared to those having higher education level. Economic status: women with poor economic level compared to those with medium-good economic level Employment: unemployed women compared to employed women.

Fuchs et al., pointing to the increase of sexual dysfunction frequency in the COVID-19 pandemic, showed that women's FSFI scores were significantly lower than the pre-pandemic period. Maximum FSFI decrease was reported in housewives.[8] Another study associated COVID-19 pandemic with decreased sexual satisfaction for both genders and showed higher risk with a higher frequency of anxiety and depression in these women.[18] However, these studies did not include women with COVID-19 history. At the same time, they may reflect the effects of pandemic conditions such as social isolation, quarantine, and social distance on sexual dysfunction. The only study investigating women with COVID-19 history within the context of sexual function has shown that weekly sexual intercourse frequency and FSFI satisfaction sub-scale average after COVID-19 infection have significantly decreased compared to pre-pandemic period.[19] Although not having any information about pre-infection sexual function status of women with COVID-19 history, this study showed a significant decrease in arousal, orgasm, satisfaction, and total FSFI scores compared to women with no COVID-19 history.

Sexual dysfunction may be caused by biological or organic, psychological, and social conditions.[20] For women with COVID-19 history, one or more of these mechanisms may have a role in sexual dysfunction. It is known that stress and anxiety disorders may continue in patients even after recovery. About 40% of the patients who survived from Middle East Respiratory Distress Syndrome have shown the post-traumatic stress disorder after 3 years.[21] In a study evaluating 62,354 patients who survived from COVID-19, any diagnosis of psychiatric disease incidence in 14–90 days after COVID-19 infection was reported as 18.1%. This frequency is higher than estimated frequencies for influenza, other respiratory tract infections, skin infections, cholelithiasis, and urolithiasis.[22] In one of the early studies in China, it was reported that mental health problems were significantly higher for the patients survived from COVID-19 compared to the general population of Hubei state in the 5th month of recovery. Female gender, living alone, accompanying chronic diseases, low educational status, and lower income were indicated as risk factors for serious mental disorders.[23] Therefore, women survived from COVID-19 are potentially at risk of mental disorder, and this may cause an increase in the frequency of sexual dysfunction. In addition, antidepressant drugs used in case of mental or psychiatric disorders also may cause difficulties in sexual desire, arousal, and orgasm.[24]

Quarantine, social distance, social isolation applications, protections, and treatments related to the COVID-19 pandemic also lead to social discrimination. Therefore, Inter-

national Red Cross Federation, World Health Organization, and UNICEF have issued a guide to increase awareness of and avoid the social stigmatization related to COVID-19.[25] It is known that fear of unknown infections and uncertainty affect human behavior significantly and may cause behaviors such as panic, illogical beliefs, aggression, blame and "othering."[26] Social stigmatization related to individuals affected from COVID-19 imposes a burden on the mental health of those after recovery.[27] This social boycott, isolation, and stigmatization may increase anxiety, depression, and feeling of loneliness.[26] The stigmatization related to the possible mental disorders in combination with the stigmatization exhibited toward individuals survived from COVID-19 may cause deterioration of health-seeking behaviors and double stigmatization, which, as a result, increased morbidity. Therefore, these can contribute to the high frequency of sexual dysfunction in COVID-19 survivors. Supporting the aforementioned interrelations, in our study, we also found high frequency of sexual dysfunction in COVID-19 survivors.

There is no clear evidence about COVID-19 causing sexual dysfunction through a biological-organic mechanism in women. There is some evidence that COVID-19 may cause testicular involvement and decrease testosterone levels in men. However, there is no similar evidence for gonadal involvement in women.[28] There is no reported data related to the side effects on sexual functions for the ambulatory favipiravir treatment for COVID-19.[29] Another possible mechanism was mentioned in a study, and it was supposed that COVID-19 might cause direct or indirect (spinal cord) gonadal damage through immune complex-mediated vasculitis. Vasculitis-related cardiac and central nervous system dysfunction and the medications used for these morbidities may contribute to sexual dysfunction.[30]

Conclusion

The risk of sexual dysfunction in women with COVID-19 history is higher than women with no COVID-19 history, and COVID-19 infection history is predictive for sexual dysfunction in women. Specifically, sexual dysfunction in terms of arousal, orgasm, and satisfaction is significantly worse in women with COVID-19 history. There is a need for investigation regarding the frequency and etiology of sexual dysfunction in women after COVID-19 infection.

Disclosures

Ethics Committee Approval: Ethics committee approval for the study was obtained from the ethics committee of the hospital, where the study was conducted (Date: 02/06/2020, No: 88). The study was performed in accordance with World Medical Association's Helsinki Declaration (2013, Brazil, Fortaleza).

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Conflict of Interest: None declared.

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