

Effect of the COVID-19 pandemic on female sexual behavior

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Abstract

Objective: To evaluate the effect of the COVID-19 pandemic on female sexual behavior in women in Turkey.

Methods: An observational study using data from a previous study conducted prior to the pandemic. We compared frequency of sexual intercourse, desire for pregnancy, Female Sexual Function Index (FSFI) score, contraception type, and menstrual abnormalities among women during the pandemic with 6–12 months prior to the pandemic. Participants were contacted by telephone for questioning.

Results: Average frequency of sexual intercourse was significantly increased during the pandemic compared with 6–12 months prior (2.4 vs 1.9, $P=0.001$). Before the pandemic 19 (32.7%) participants desired to become pregnant, whereas during the pandemic it had decreased to 3 (5.1%) ($P=0.001$). Conversely, use of contraception during the pandemic significantly decreased among participants compared with prior (24 vs 10, $P=0.004$). Menstrual disorders were more common during the pandemic than before (27.6% vs 12.1%, $P=0.008$). Participants had significantly better FSFI scores before the pandemic compared with scores during the pandemic (20.52 vs 17.56, $P=0.001$).

Conclusion: Sexual desire and frequency of intercourse significantly increased during the COVID-19 pandemic, whereas quality of sexual life significantly decreased. The pandemic is associated with decreased desire for pregnancy, decreased female contraception, and increased menstrual disorders.

KEYWORDS

Coronavirus; COVID-19; Female sexual function index (FSFI); Pandemic; SARS-CoV-2; Sexual behavior; Turkey

1 | INTRODUCTION

Coronaviruses are a group of RNA viruses that primarily affect the respiratory system and cause the common cold, fever, and coughs in mammals and birds. However, in some cases, coronaviruses are associated with more serious and lethal conditions, such as pneumonia, bronchitis, and severe acute respiratory syndrome.¹ Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) originating from Wuhan, China, led to a global health crisis. At the time of writing, SARS-CoV-2 had infected more than 3.5 million people, resulting in almost 260 000 deaths. The World Health Organization (WHO) declared coronavirus disease 2019 (COVID-19), the infectious disease caused

by SARS-CoV-2, a pandemic, and many states enacted strict rules, such as border closures, transportation restrictions, and quarantine.²

The term “sexual behavior” encompasses a large spectrum of actions. Previous reports have analyzed the effect of mass disasters on female sexual behavior. Kissinger et al.³ reported the reduction of birth control and genital hygiene, following the Katrina disaster. Similarly, Liu et al.⁴ investigated the effect of the Wenchuan earthquake on women's reproductive health and found reductions in the frequency of sexual intercourse, degree of satisfaction with sexual life, and desire for children following the earthquake. Furthermore, Hannoun et al.⁵ determined menstrual abnormalities ranging from 10%–35% in women in conflict zones.

Many studies in the literature have described the relationship between mass disasters and female sexual behavior; however, none have specifically investigated the COVID-19 pandemic. Therefore, the aim of the present study was to evaluate the effect of the COVID-19 pandemic on female sexual behavior.

2 | MATERIALS AND METHODS

From February 1, 2018 to September 30, 2019, two studies were conducted to investigate female incontinence at Haseki Training and Research Hospital and Esenler Maternity and Children's Hospital. The first study was undertaken to clarify the incontinence ratio among the female population, and the second was to investigate the relationship between female incontinence and female sexual dysfunction. Both studies are under consideration but as yet unpublished. For the present study, data from the healthy cohorts of these studies were used. Female patients admitted to the urology and gynecology outpatient polyclinics were invited to participate in these two studies. For each participant, a detailed medical history was obtained, including age, body mass index (BMI), education and income level, presence of comorbidities, and number of previous deliveries. Other details noted were menstrual status of patients, frequency of sexual intercourse, and desire for pregnancy. All patients were asked to complete the Female Sexual Function Index (FSFI) form.⁶ Patient data were recorded prospectively in the electronic data system.

To identify the effect of the COVID-19 pandemic on female sexual behavior, we conducted an observational study using previously collected data from the studies described above to compare the frequency of sexual intercourse, desire for pregnancy, FSFI score, contraception type, and presence of vaginal infection during a period of the pandemic (March 11 to April 12, 2020) with the 6–12 months prior to the pandemic. Ethical approval was obtained from Haseki Training and Research Hospital Ethics Committee, and all participants gave verbal consent to participate in the study.

A power analysis revealed that a sample of 58 patients was required to achieve a power of 0.95 in a test based on $\alpha=0.05$. Married patients who were older than 18 years and not menopausal were selected as participants. To obtain a homogenous group, we used strict exclusion criteria. Patients were excluded if they had a history of urinary incontinence, gynecological operation or pelvic surgery, pelvic organ prolapse, any malignancy, any psychiatric or neurological disease, pelvic radiation, heart disease, renal impairment, hepatitis B, hepatitis C, or HIV infections. We also excluded patients currently experiencing marital relationship problems, and patients who had tested positive for COVID-19 or were living with someone who had tested positive or were suspected to have COVID-19.

Owing to transport restrictions and quarantine, assessment of sexual behavior during the pandemic was conducted by telephone. After evaluation, 288 patients who met the inclusion criteria were contacted by telephone, starting from the last recorded patient to the first. The calls to patients were made by the gynecologist who conducted the original studies and a nurse under their supervision. The target number

of patients ($n=58$) was reached on the 131st call; 21 patients did not answer the telephone, 44 patients declined to participate, and 8 patients were unable to complete the conversation and/or the FSFI form.

The FSFI questionnaire, which includes 19 questions, was used to assess female sexual function. The FSFI evaluates six domains including sexual arousal, sexual desire, satisfaction, lubrication, orgasm, and pain during sexual activity in women. The answers to four of the questions were assigned from 1–5 points, and the answers to the remaining 14 questions from 0–5 points. Additionally, each domain has its own impact on the calculation of the final score. The total FSFI score ranges between 2 and 36, with higher scores indicating better female sexual function.

SPSS version 25 (IBM Corp; Armonk, NY, USA) was used for statistical analysis. The Kolmogorov-Smirnov test was used to evaluate the distribution of normality. The paired sample *t* test and McNemar test were used to compare the averages and percentages. $P<0.05$ was considered statistically significant.

3 | RESULTS

In line with the power analysis outcome, 58 sexually active participants were enrolled in the study. Mean age and BMI of the study population was 27.6 years and 27.9, respectively. Seven participants had completed university education. Mean age at first menstruation was 11.9 years, and mean age at first sexual intercourse was 21.1 years. Alcohol use and smoking were not common in the study group (10.3% and 27.6%, respectively). The demographic characteristics of the study participants are summarized in Table 1.

Average weekly frequency of sexual intercourse was significantly increased during the pandemic compared with the 6–12 months prior (2.4 vs 1.9; $P=0.001$). Before the pandemic, 19 (32.7%) participants intended to become pregnant, however during the pandemic this number decreased to 3 (5.1%) ($P=0.001$). Conversely, use of contraception during the pandemic significantly decreased compared with the time period before (10 participants vs 24 participants, $P=0.004$). Furthermore, menstrual disorders were more common during the pandemic than prior (27.6% vs 12.1%, $P=0.008$) (Table 2).

Participants had significantly better total FSFI scores before the pandemic compared with during the pandemic (20.52 vs 17.56, $P=0.001$) (Table 3). However, the differences in lubrication and pain domains between the time periods were not statistically significant ($P=0.503$ and $P=0.121$, respectively). The domain score for sexual desire was the only parameter that was significantly higher during the pandemic than prior to it (3.94 vs 3.42, $P=0.011$). The other three domain scores for arousal, orgasm, and satisfaction were significantly higher before the pandemic compared with during it (3.34 vs 2.17, $P=0.001$; 3.47 vs 2.02; $P=0.001$; 2.97 vs 2.45; $P=0.045$, respectively) (Table 3).

4 | DISCUSSION

The COVID-19 global pandemic has caused disruption to the health-care system, deterioration of social life, reduction in income, and a high

TABLE 1 Demographic characteristics of the study participants (n=58).^a

Characteristics	
Age, y	27.6 ± 4.4
BMI	27.9 ± 3.7
Education level	
Primary school	19 (32.8)
High school	32 (55.2)
University	7 (12.1)
Socioeconomic status	
Low	17 (29.3)
Middle	37 (63.8)
High	4 (6.9)
Working frequency	
Not working	20 (34.5)
Part time	20 (34.5)
Full time	18 (31)
Age at first menstruation, y	11.9 ± 1.3
Age at first sexual intercourse, y	21.1 ± 2.9
Alcohol use	
Yes	6 (10.3)
No	52 (89.7)
Smoking status	
Yes	16 (27.6)
No	42 (72.4)
Parity	1.5 ± 1.1
No. of abortions	0.1 ± 0.3
No. of cesarean deliveries	0.2 ± 0.4
No. vaginal births	1.2 ± 1.1
Age of partner, y	31.4 ± 4.1

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by square of height in meters).

^aValues are given as mean ± SD and number (percentage).

number of deaths.⁷ We wanted to assess the effects of the pandemic, social restriction, and quarantine on female sexual behavior, quality of female sexual life, and female reproductive health. Our study found that despite the increased frequency of sexual intercourse, quality of sexual life decreased during the pandemic.

Sexual behavior	6–12 months before the pandemic	During the pandemic (Mar–Apr 2020)	P value
Frequency of sexual intercourse per week	1.9 ± 0.9	2.4 ± 0.9	0.001
Desire to become pregnant	19 (32.7)	3 (5.1)	0.001
Use of contraception	24 (41.3)	10 (17.2)	0.004
Vaginal infections	11 (18.9)	8 (13.8)	0.143
Menstrual disorders	7 (12.1)	16 (27.6)	0.008

^aValues are given as mean ± SD and number (percentage).

Stressful lifestyle is a factor known to impact female sexual desire and frequency of sexual intercourse. However, studies in the literature have contradictory results. Hamilton and Meston⁸ reported that high levels of chronic stress resulted in a decrease in sexual desire. Similarly, Liu et al.⁴ found a decrease in the frequency of sexual intercourse after an earthquake. In contrast, Hall et al.⁹ investigated the influence of stressful lifestyles on sexual behavior and reported significantly greater sexual activity among women in highly stressful times compared with less stressful times (43% vs 35%, $P < 0.001$).⁹ We found significantly higher sexual desire and frequency of sexual intercourse during the pandemic ($P = 0.011$ and $P = 0.001$, respectively). In our opinion, there are two possible reasons: firstly, unlike during floods and earthquakes, which destroy buildings, during the pandemic, there is no loss of living space; and secondly, more time is spent at home.

Previous studies have reported the negative effect of disasters and war on female sexual dysfunction using the FSFI questionnaire, which is a validated and effective tool for evaluating sexual satisfaction. Rawanaka and Dewaraja¹⁰ examined 1093 adults after a tsunami event, finding that 30% of participants were subject to sexual dysfunction. However, they did not use the FSFI questionnaire to evaluate female sexual function. In another study, Gilhooly et al.¹¹ analyzed the effect of armed conflict on female soldiers' sexual function, observing significant reduction in libido, inability to achieve satisfying orgasms, and lack of vaginal lubrication when compared with the normal female population. To our knowledge, the present study is the first to evaluate the relationship between the COVID-19 pandemic and female sexual function using the FSFI questionnaire. We found a significant deterioration in female sexual function (total FSFI score) during the pandemic ($P = 0.001$).

The present study also demonstrated that there was a significant decrease in the rate of women intending to become pregnant during the pandemic (32.7% vs 5.1%, $P = 0.001$). We consider that this may be due to the perceived possible effects of the virus on the fetus, possible difficulties accessing the health system during the outbreak, and economic concerns. Despite this finding, the rate of contraception use by women significantly decreased during the pandemic (41.3 vs 17.2, $P = 0.004$). Kissinger et al.³ noted a significant proportion of women neglecting all forms of birth control during a disaster. Similarly, Hapsari et al.¹² found that 11% of women experienced difficulties in achieving contraception during an earthquake. We believe that the effect of the COVID-19 pandemic on unplanned pregnancies will be clarified in further studies.

TABLE 2 Comparison of participants' sexual behavior before and during the COVID-19 pandemic.^a

TABLE 3 Comparison of participants' FSFI scores before and during the COVID-19 pandemic.^a

	6–12 months before the pandemic	During the pandemic (Mar–Apr 2020)	P value
Desire	3.42 ± 1.20	3.94 ± 1.36	0.011
Arousal	3.34 ± 1.09	2.17 ± 1.01	0.001
Lubrication	2.49 ± 1.15	2.62 ± 1.03	0.503
Orgasm	3.47 ± 0.98	2.02 ± 0.79	0.001
Satisfaction	2.97 ± 1.01	2.45 ± 0.97	0.045
Pain	4.83 ± 0.73	4.36 ± 1.18	0.121
Total FSFI score	20.52 ± 2.82	17.56 ± 2.01	0.001

Abbreviation: FSFI, Female Sexual Function Index.

^aValues are given as mean ± SD and number (percentage).

To our knowledge, no study in the literature has investigated the relationship between infectious outbreaks and menstrual abnormalities although many studies on local or global disasters have shown their negative effect on regular menstrual cycles. Liu et al.¹³ investigated the effect of earthquakes on 587 female students and found that 76% experienced menstrual abnormalities. In another study, Pasternak and Brooks¹⁴ reported amenorrhea in 94.8% of women interned during Holocaust encampment, and 91% of these resumed menstruation on release from captivity. In line with these studies, menstrual abnormalities were significantly higher during the pandemic in the present study ($P=0.008$).

Previous reports have shown that large-scale disasters increase the rate of vaginal infections due to decreased personal hygiene, difficulty in accessing health institutions, and unsanitary living conditions. Kissinger et al.³ reported that women were more vulnerable to vaginal infections in the aftermath of a hurricane. Similarly, Yentur et al.¹⁵ found a significantly higher rate of vaginitis in female refugees when compared with the normal population. In contrast, we found no significant difference in vaginal infection rates ($P=0.143$). The reason for this could be the obligation to stay at home and the continual media emphasis on cleanliness to slow the spread of COVID-19.

The present study has some limitations. The number of participants in the study group was relatively small, although we believe that using power analysis reduced the effect of this limitation. In the original studies, FSFI questionnaires were completed via face-to-face conversation with patients. However, in the present study, telephone communication was used owing to transportation restrictions and quarantine. Answering survey questions without the physical presence of the interviewer may have influenced patients' responses. Another possibility was to email the FSFI questionnaire to patients; however, personal email usage was not common among the participants. Finally, the study only focused on female sexual behavior; however, during a pandemic, male sexual behavior may affect female sexual attitude, which is a possible area of future research.

In conclusion, the present study demonstrated that women's sexual desire and frequency of sexual intercourse significantly increased during the COVID-19 pandemic, whereas quality of sexual life significantly decreased. Moreover, the pandemic is associated with decreased intention to become pregnant, decreased female contraception, and increased menstrual disorders. These results should be

supported by further prospective randomized research, with a larger sample size.

AUTHOR CONTRIBUTIONS

BY contributed to conception and design, acquisition of data, drafting and revision of the manuscript. FO contributed to conception and design, analysis and interpretation of data, drafting the manuscript, critical revision of the manuscript, statistical analysis, and supervision.

ACKNOWLEDGMENTS

Special thanks to all our patients who took the time to answer our questions even though they were in quarantine. We also sincerely thank Saide Erturk (Chief of Esenler Maternity of Children's Hospital), Mesut Sonmez (Chief of Haseki Training and Research Hospital), and Omer Sarilar (Chief of Urology Department) for their advice.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

REFERENCES

- Liao X, Wang B, Kang Y. Novel coronavirus infection during the 2019–2020 epidemic: Preparing intensive care units—the experience in Sichuan Province, China. *Intensive Care Med.* 2020;46:357–360.
- Cheng VC, Wong SC, To KK, Ho PL, Yuen KY. Preparedness and proactive infection control measures against the emerging novel coronavirus in China. *J Hosp Infect.* 2020;104:254–255.
- Kissinger P, Schmidt N, Sanders C, Liddon N. The effect of the Hurricane Katrina disaster on sexual behavior and access to reproductive care for young women in New Orleans. *Sex Transm Dis.* 2017;34:883–886.
- Liu S, Han J, Xiao D, Ma C, Chen B. A report on the reproductive health of women after the massive 2008 Wenchuan earthquake. *Int J Gynecol Obstet.* 2010;108:161–164.
- Hannoun AB, Nassar AH, Usta IM, Zreik TG, Musa AA. Effect of war on the menstrual cycle. *Obstet Gynecol.* 2007;109:929–932.
- Rosen R, Brown C, Heiman J, et al. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther.* 2000;26:191–208.

7. World Health Organization. Coronavirus disease 2019 (COVID-19): Situation Report - 72. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200401-sitrep-72-covid-19.pdf?sfvrsn=3dd8971b_2. Accessed April 1, 2020.
8. Hamilton LD, Meston CM. Chronic stress and sexual function in women. *The J Sex Med.* 2013;10:2443–2454.
9. Hall KS, Kusunoki Y, Gatny H, Barber J. Stress symptoms and frequency of sexual intercourse among young women. *J Sex Med.* 2014;11:1982–1990.
10. Ranawaka DS, Dewaraja R. Tsunami counselling project of the Sri Lanka National Institute of professional counsellors. *Int Congr Ser.* 2006;1287:79–81.
11. Gilhooly PE, Ottenweller JE, Lange G, Tiersky L, Natelson BH. Chronic fatigue and sexual dysfunction in female Gulf War veterans. *J Sex Marital Ther.* 2001;27:483–487.
12. Hapsari ED, Nisman WA, Lusmilasari L, Siswihanto R, Matsuo H. Change in contraceptive methods following the Yogyakarta earthquake and its association with the prevalence of unplanned pregnancy. *Contraception.* 2009;79:316–322.
13. Liu X, Yang Y, Yuan P, et al. A study of the relationship between mental health and menstrual abnormalities in female middle school students from post-earthquake Wenchuan. *Biosci Trends.* 2010;4:4–8.
14. Pasternak A, Brooks PG. The long-term effects of the Holocaust on the reproductive function of female survivors. *J Minim Invasive Gynecol.* 2007;14:211–217.
15. Yentür ND, Aksoy M, Şimşek Z, et al. Investigation of the prevalence of *Trichomonas vaginalis* among female Syrian refugees with the complaints of vaginitis aged between 15–49 years [in Turkish]. *Mikrobiyol Bul.* 2016;50:590–597.