

Effect of COVID-19 Pandemic on the Sexual Function of Women and Men

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Abstract

Background: COVID-19 pandemic resulted in a global social isolation and personal distress, which may affect sexual function of both women and men. **Aim:** This study aimed to assess the effect of COVID-19 pandemic on the sexual function of women and men. **Design:** A descriptive cross-sectional research design was utilized. **Setting:** The research was conducted at two health centers located in Senbellawein City, Dakahlia Governorate, Egypt. **Subjects:** A non-probability purposive sample of 202 participants (105 women and 97 men) was included. **Tools:** Three tools were used: A structured interview questionnaire, Arabic versions of the Female Sexual Function Index and the International Index of Erectile Function questionnaires. **Results:** The current study findings revealed that there was a significant increase in sexually avoidant behaviors and taking precautions during intercourse such as using condoms and avoidance of kissing during the COVID-19 pandemic. Also, there was a highly significant reduction in sexual intercourse frequency of both women and men. In addition, a highly significant decline in arousal, lubrication, orgasm, and satisfaction domains were observed among women. Furthermore, a significant decline in erectile and orgasmic functions, intercourse satisfaction, and overall satisfaction scores among men. **Conclusion:** The sexual function of both women and men was affected, probably, due to the worldwide stressors of the emergent COVID-19 pandemic. **Recommendation:** Psychological support should be provided to all couples to enhance coping with COVID-19 related stressors. Counseling couples that the active sexual relation should be maintained during the pandemic while following the recommended protective measures.

Keywords: COVID-19, Men, Sexual Function, Women.

Introduction

The novel coronavirus (COVID-19) was a global emergency that was initially identified in Wuhan, Hubei, China in December 2019 (Alradhawi, Shubber, Sheppard & Ali, 2020). World Health organization (WHO) labeled this as a Public Health Emergency on January 31, 2020 and officially declared it as a pandemic on March 11, 2020. Over 16,600 individuals have died from the virus as of March 24, 2020, and more than 380,000 cases of infection have been confirmed, more than 10,000 of which were serious (Hua & Shaw, 2020).

The world has experienced a rapid spread of COVID-19, which led to unexpected changes in people's lives. The causative virus spreads through the respiratory system or through direct contact with infected

objects or surfaces (Van Bilsen et al., 2021). Despite numerous vaccination and medication research projects, a specific agent with significant antiviral effectiveness is currently lacking. As a result, measures had been taken to control the global pandemic; these included ensuring that sick persons were isolated globally, wearing masks in public, focusing on personal hygiene practices, and adhering to social distance rules (Karsiyakali, Sahin, Ates, Okucu & Karabay, 2021).

All of these behaviors, especially social isolation, have influenced everyone's quality of life and contributed to the formation of a novel and a typical lifestyle. Social isolation results in feelings of anxiety, panic, and fear, all of which have a detrimental impact on one's quality of life,

such as depression and sexual dysfunction (**Baran & Aykac, 2021**).

According to the WHO, sexual health is not considered just the absence of disease, dysfunction, or infirmity but also a condition of sexually-related physical, emotional, mental, and social well-being (**Luria & Neshar, 2020**). Sexual health is a crucial to maintain the overall health and satisfaction of every individual in the community. The ability to sense, recognize, and express emotions more clearly; high level of love, intimacy, and trust, in relationships; and a decrease in the use of immature psychological defense mechanisms are all associated with higher satisfaction during sexual relation (**Ibarra et al., 2020; Paoli et al., 2020**).

A sexual dysfunction is known as a clinically significant disturbance in an individual's capacity to respond sexually or to enjoy with his or her sexual activity. Erectile dysfunction (ED), orgasmic and ejaculatory disorders, and genitopelvic penetration pain disorders are a few examples of distinct sexual dysfunction (**Masoudi, Maasoumi & Bragazzi, 2022**).

The possibility of sexual transmission of COVID-19 remains unproven. However, close physical contact during sexual activity might affect sexual behavior negatively and raise the chance of viral transmission (**Güzel & Döndü, 2021; Pennanen-Iire et al., 2021**). In order to maintain the safety of sexual activity during the pandemic, the International Society for Sexual Medicine developed a set of recommendations which included; allowing healthy couples to engage in a regular sex while maintaining the hygienic precautions, and promoting communication and sexual creativity. Couples can engage in a safe sex under quarantine by avoiding kissing, oral, and anal intercourse; increasing hygiene precautions and employing posterior coital penetrative postures. However, those with respiratory problems or immune system issues were advised to stay away from practicing the sexual activities (**Culha, Demir, Sahin, & Altunrende, 2021**).

Significance of the study:

According to the WHO (2022), there had been over 422 million confirmed cases and over 5.8 million deaths worldwide as a result from the COVID-19 pandemic. In Egypt, there had been 452,821 confirmed cases of COVID-19 and 23,292 deaths. Indeed, the COVID-19 pandemic has a direct and indirect impact on the sexual life of many couples because of the concern about COVID-19 infection risk. The fear of being contagious and catching the disease has led to increasing rates of anxiety and depression, which could lead to rising levels of psychogenic sexual dysfunction (**Bhambhani et al., 2021**).

In addition, the COVID-19 pandemic has caused a lot of people to experience economic and financial issues, as unemployment, greater poverty, and decreased incomes and earnings; all of these had a significant negative impact on sexual activity and functioning (**Masoudi et al., 2022**). Moreover, safe sex measures, such as condom use and avoidance of kissing, may exacerbate existing sexual dysfunction, especially in an individual at risk or already sexually dysfunctional (**Ilgen, Kurt, Aydin, Bilen & Kula, 2021**). Having a meaningful and satisfied sexual life well known to positively impact intimate relationships, daily interactions, and social relationships. The medical community must be aware of such events and provide a proper sexual counseling because available traditional psychological support modalities are few at this time (**Arafat, Alradie-Mohamed, Kar, Sharma & Kabir, 2020**). In addition, only few studies had investigated to what extent that the COVID-19 pandemic affects the sexual function of both women and men. Therefore, the researchers decided to conduct this study.

Aim of the Study

The present study aimed to assess the effect of COVID-19 pandemic on the sexual function of women and men

Research question

- What is the effect of COVID-19

pandemic on the sexual function of women and men?

Operational definitions in the context of the current research

Female sexual function:

Sexual function in women was measured using the Female Sexual Function Index (FSFI), which comprises the following six domains: desire, arousal, lubrication, orgasm, satisfaction, and degree of pain.

Male sexual function:

The International Index of Erectile Function (IIEF), which includes the five domains of erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction was used to assess sexual function in men.

Subjects and Methods

Research Design

A descriptive cross-sectional study design was utilized in the current study.

Study Setting

The present study was conducted at two health centers (i.e., El-Salam Health Center and Senbellawein First Health Center) that were located in Senbellawein City, Dakahlia Governorate, Egypt. El-Salam Health Center is a building that has two floors; the first floor includes a big waiting hall and seven rooms (a room for providing family planning services, a room for examination, a room for laboratory investigations, a room for pharmacists, a room for physicians, a room for dental care, and a room for employees, respectively); the second floor includes a big room for child vaccination. Nearly 60 Women and men visit the center daily. Senbellawein First Health Center has an admission room, a waiting hall, and five rooms (examination room, a room for family planning service, laboratory room, room for births and deaths documentation, and a room for child vaccination). About 40–50 men and women visit the centers daily to receive different healthcare services, such as dental examination, laboratory investigations, obtaining artificial milk for infants, births and deaths documentation, and family planning service utilization.

Sampling

The study included a total of 202 participants (105 women and 97 men) who were admitted to the previously mentioned study settings and were selected according to the set criteria.

Inclusion criteria:

- Married women and men aged from 18 to 50 years.
- Read and write.
- Sexually active.
- Free from diseases that affect sexual health, as diabetes mellitus and neurological disorders.
- Women and men who accepted to participate in the current research.

Exclusion criteria:

- Men receiving treatment for erectile dysfunction (ED).
- Women and men suffering from sexual dysfunction that inhibited sex before the pandemic.
- Men and women with mental illnesses, including depression and personality disorders, or those who used drugs that can reduce sexual desire
- Women and their partners who were being suspected or treated for COVID-19.
- Pregnant women and their husbands.

Sample Size:

According to the study of Karagöz et al. (2020), the sample size was calculated as $[(Z_{1-\alpha/2})^2 \text{ with precision/absolute error of } 5\% \text{ and type 1 error of } 5\%. P(1-P)]/d^2$, where P is the expected proportion based on the prior studies population, and the absolute error or precision. $Z_{1-\alpha/2}$ at 5% type 1 error ($p=0.05$) is 1.96. Sample size is therefore $[(1.96)^2] \cdot (0.155) \cdot (1-0.155)/(0.05)^2 = 201.3$. The calculation states that 202 samples are needed for the study.

Data Collection Tools: Three tools were used for collecting the data as the following:

Tool I: A structured interview questionnaire

This instrument was designed by the researchers after reviewing the relevant national and international literature (Karagöz et al., 2020; Masoudi et al., 2022) and comprised of two parts:

Part (1): Covered the demographic data, such as age, educational level, residence, duration of marriage, income, and negative effect of the pandemic on income.

Part (2): It contained information about changes in sexual behaviors during the COVID-19 pandemic. These included spending more time with partner, sexual avoidance behaviors toward the partner, considering infection during intercourse, taking precautions during intercourse, and frequency of intercourse per week.

Tool II: Arabic version of the Female Sexual Function Index questionnaire (FSFI):

This tool was adopted from Anis et al. (2011), composed of a 19-item self-reported questionnaire of female sexual function and included six sexual domains. The **first domain** assessed desire (two items); the **second domain** assessed arousal (four items); the **third domain** described lubrication (four items); the **fourth domain** described orgasm (three items); the **fifth domain** described satisfaction (three items); and the **sixth domain** described pain (three items).

Scoring system of the FSFI

The subscale scores for items 1, 2, 15, and 16 ranged from 1 to 5. The range for the other questions was 0 to 5, with the additional option of "no sexual activity". The total FSFI score was obtained by adding the six domain scores. The overall FSFI score ranged from 2 to 36. A total score more than 26.55 was classified normal sexual function, and a total score less than 26.55 was classified as sexual dysfunction.

Tool III: Arabic version of the International Index of Erectile Function (IIEF):

This tool, which was adopted from El Zoheiry (2011), is a 15-item self-reported questionnaire on male sexual function and

comprised of five domains. The **first domain** assessed erectile function (6 items); the **second domain** assessed orgasmic function (2 items); the **third domain** described sexual desire (2 items); the **fourth domain** described intercourse satisfaction (3 items); and the **fifth domain** described overall satisfaction (2 items).

Scoring system of the IIEF

The subscale ratings for items 11, 12, 13, 14, and 15 ranged from 1 to 5, whereas those for all other items ranged from 0 to 5, with the additional option of "no sexual activity" in two questions, "did not attempt intercourse" in six questions, and "no sexual stimulation/ intercourse" in two questions. A score of 1 on a certain IIEF item indicated poor sexual function, whereas a score of 5 indicated higher sexual function. On the IIEF, the domain scores were derived by adding the scores for each item in each domain. Therefore, the possible domain scores ranged from 1 to 30 for erectile function, 0 to 10 for orgasmic function, 2 to 10 for sexual desire, 0 to 15 for intercourse satisfaction, and 2 to 10 for overall satisfaction.

Tools validity and reliability

The validity of the study tools was confirmed by a panel of three experts in the field of woman's health and midwifery to be ensured that the questions were consistently conveyed the anticipated meaning. The tools reliability for internal consistency was verified by Cronbach's alpha. It was (0.894, 0.905 & 0.892,) for the first, second and third tool respectively, which indicated a high reliability of the study tools.

Pilot study

In order to ensure the clarity, applicability, and objectivity of the research process, a pilot study was conducted on 10% (21 participants) of the total study sample. The results of the pilot study showed that the tools were understandable, applicable, and relevant. In addition, no problems were found that interfered with the data collection process, and no changes were made.

Ethical considerations

Ethical approval was taken from the Faculty of Nursing ethical committee at Mansoura University. Participants received a clear explanation regarding the aim and the scope of the study. Participation in the study was voluntary and everyone has the right to discontinue the study at any moment and without any consequences. All participants gave a written informed consent for the study participation. Participants received assurances regarding the confidentiality, anonymity, security, and privacy of the data collected.

Research process

The current research was done through the following two processes: preparation of the work and collecting data.

I. Preparation of the work

This process was started by obtaining approval from the concerned authorities in the previous mentioned health centers. Thereafter, the researchers prepared the study tools after examining relevant and recent national and international literature, and their validity and reliability were assessed. A pilot study was conducted on 21 participants before collecting the actual sample. This process lasted approximately one month from the beginning of November to the beginning of December 2021.

II. Data collection process

This process started from the beginning of December 2021 to the end of February 2022. The researchers went to the previously mentioned settings three days weekly from 9:00 AM to 12:00 PM. First, the researchers introduced themselves to the participants and checked if the participants met the inclusion criteria of the study. Each eligible participant received a clear explanation of the study aim and scope. A written informed consent was obtained from each one who accepts to participate.

Accordingly, an individual interview was carried out with each participant in a private area after the participants received the intended care or while they were waiting for the result of specific investigation or examination.

The researchers collected the data first from the women as the structured interview questionnaire was completed by the researchers, then the self-administered FSFI questionnaire was given to every woman to be completed. At the same manner, after completing the data collection from the women, the researchers turned to men. The self-administered IIEF questionnaire was given to be completed.

The participants were instructed to complete each questionnaire twice. The first time to check their pre-pandemic sexual experiences and the second time included their sexual experiences during the pandemic.

Each interview took about 25 to 30 minutes. The researchers followed the recommended protective measures for the COVID-19 pandemic during the data collection process. The researchers continued to go the health centers until the sample size was completed.

Statistical Analysis:

Statistical Analysis

SPSS for Windows version 20.0 was used to perform all statistical analyzes (SPSS, Chicago, IL). Continuous data were reported as mean and standard deviation (SD) and had a normally distributed distribution. Numbers and percentages were used to express categorical data. One-way analysis of variance (ANOVA) was used to compare more than two variables with continuous data, while Student's t-test was used to compare two variables with continuous data. The chi-square test was used to compare variables using categorical data. Statistical significance was set at $p < 0.05$ and highly statistical significance at $p < 0.001$.

Results

Table 1 shows that the mean age of the studied men and women (32.9 ± 7.4 years and 33.4 ± 7.4 years, respectively). More than two thirds (68.0% and 68.6%, respectively) of the participants were from the rural area. More than one third of the studied men and women (37.1% & 35.2%, respectively) were from 1–5 years of

marriage. Among the participants, 59.8% men and 60.0% women reported not having enough income.

Figure 1. illustrates that the degree of the negative effect of the pandemic on income among men and women was mild in (33.0% and 30.5%, respectively), moderate in (20.6% and 24.8%, respectively), and severe in (6.2% and 10.5%, respectively).

Table 2. shows that there was a highly statistically significant difference in sexual behaviors between men and women during the COVID-19 pandemic. In particular, men and women reported sexual avoidance toward a partner in (19.6% and 69.5%, respectively), considering infection during sex in (21.6% and 62.9%, respectively), and taking precautions, such as using condoms or avoiding kissing, in (22.7% and 49.5%, respectively) ($p < 0.001$). On the other hand, men and women had no significant differences in terms of spending more time with a partner and increased approach to solitary sexual satisfaction ($p > 0.05$).

Figure 2. illustrates that the daily and emotional relationships in men and women during the COVID-19 pandemic were not different in nearly half of the participants (43.3% and 42.9%, respectively); were positive in (38.1% and 41%, respectively); and were negative in only (18.6% and 16.1%, respectively).

Table 3. Shows that there was a highly statistically significant reduction in the frequency of sexual intercourse among men and women before and during the COVID-19 pandemic.

Table 4. Presents that during the pandemic, the levels of arousal, lubrication, orgasm, and satisfaction decreased significantly in women ($p < 0.001$). Meanwhile, there was no significant decline in the domains of sexual desire ($p = 0.191$) and pain ($p = 0.119$).

Table 5. Demonstrates that in men, there was a highly statistically significant

decrease in the IIEF domain scores for erectile function, orgasmic function, intercourse satisfaction, and overall satisfaction between the pre-pandemic and pandemic periods. On the other hand, there was no significant decrease in the sexual desire domain score during the pandemic ($p = 0.396$).

Figure 3. Presents that there was a highly statistically significant decrease in the total score of FSFI during the pandemic, compared with that before the pandemic ($p < 0.001$). Moreover, the total IIEF score decreased from 56.0 ± 3.6 pre-pandemic to 39.6 ± 4.1 during the pandemic ($p < 0.001$).

Table 6. shows that the sexual function in men and women during the pandemic had highly statistically significant associations with duration of marriage, income, and negative effect of the pandemic on income.

Table 7. shows that there was a highly statistically significant association between spending more time with partner and the sexual function of men and women during the pandemic. In particular, men and women who spent more time with their partners had better overall IIEF and FSFI scores, compared with the scores of those who did not spend more time with their partners. On the other hand, the total IIEF and FSFI scores were lower in men and women who had sexual avoidance behaviors toward their partner and in those who took precautions during intercourse than in those who did not. The sexual function of men and women during the pandemic had highly statistically significant associations with sexual avoidance behaviors toward the partner and taking precautions during intercourse.

Table 1. Sociodemographic characteristics of the studied sample (n = 202)

Variables	Men (n = 97)		Women (n = 105)		Significance test	
	No.	%	No.	%	X ²	P
Age (years)						
<30	33	34.0	35	33.3		
30 to <40	46	47.4	48	45.7		
40 to ≤50	18	18.6	22	21.0	0.185	0.912
Mean ± SD	32.9 ± 7.4		33.4 ± 7.4		0.367	0.714
Education Level						
Basic education	26	26.8	27	25.7		
Middle education	49	50.5	52	49.5		
High education	22	22.7	26	24.8	0.125	0.940
Residence						
Urban	31	32.0	33	31.4		
Rural	66	68.0	72	68.6	0.007	0.936
Duration of marriage (years)						
<1	18	18.6	17	16.2		
1 –< 5	36	37.1	37	35.2		
5 – <10	24	24.7	29	27.6		
≥10	19	19.6	22	21.0	0.417	0.937
Income						
Enough	39	40.2	42	40.0		
Not enough	58	59.8	63	60.0	0.001	0.974

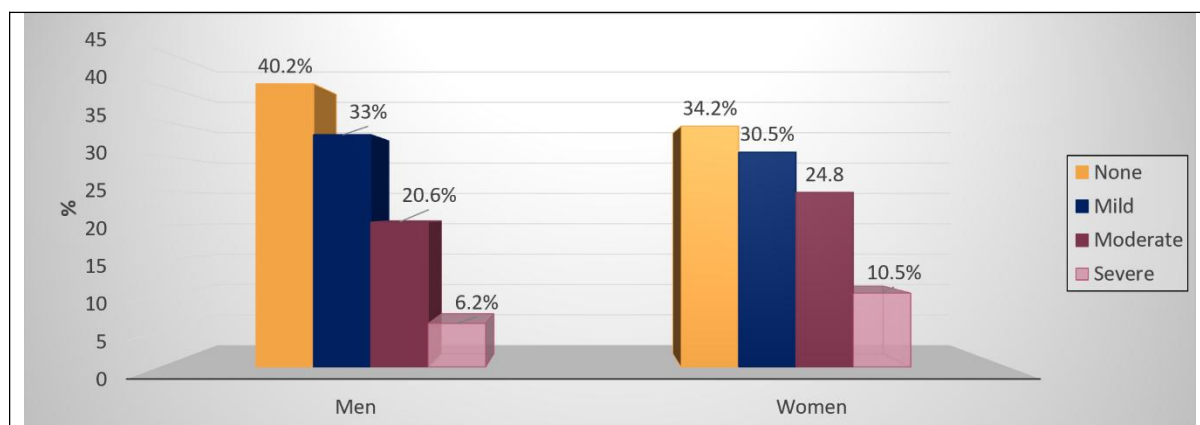


Figure 1. Negative effect of the pandemic on income

Table 2. Sexual behaviors changes of the studied sample during the COVID-19 pandemic

Items	Men		Women		Significance test	
	No.	%	No.	%	X ²	P
Spending more time with partner	69	71.1	74	70.5	0.011	0.918
Sexual avoidance behaviors toward partner	19	19.6	73	69.5	50.695	<0.001**
Considering infection during intercourse	21	21.6	66	62.9	34.918	<0.001**
Taking precautions during intercourse	22	22.7	52	49.5	15.651	<0.001**
Increase in solitary sexual satisfaction approach	6	6.2	2	1.9	2.429	0.119

****Highly Statistically Significant at P<0.001 #Multiple responses allowed**

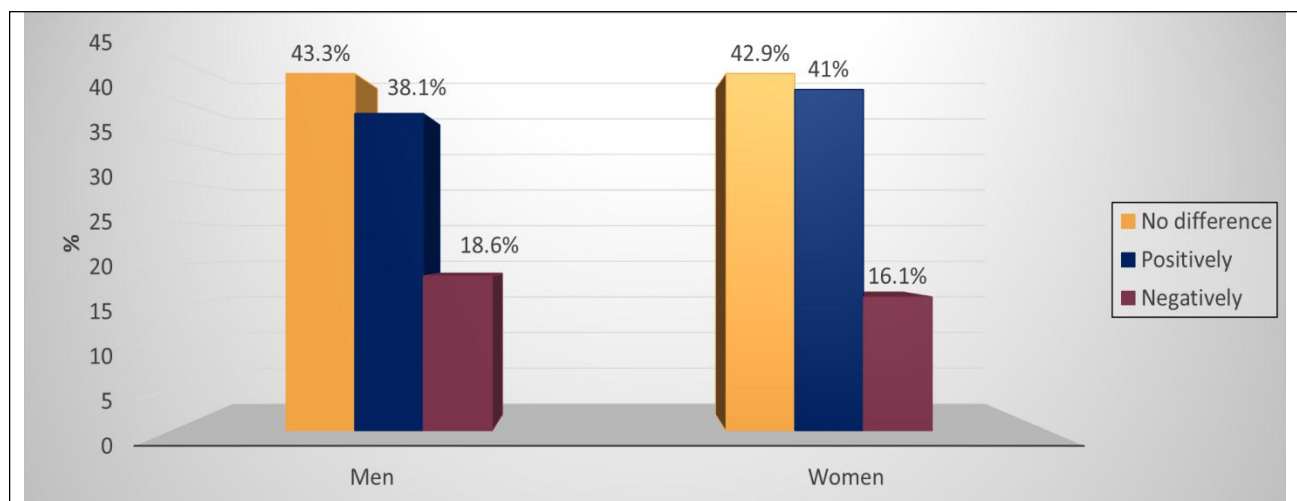


Figure 2. Effect of the COVID-19 pandemic on the daily and emotional relationships of the studied sample

Table 3. Frequency of weekly sexual intercourse before and during the COVID-19 pandemic among the studied sample (n = 202)

Items	Before the pandemic		During the pandemic		Significance test	
	No.	%	No.	%	X ²	P
Frequency in men (n = 97)						
≤1	11	11.3	54	55.7		
2	25	25.8	23	23.7		
3-5	39	40.2	11	11.3		
>5	22	22.7	9	9.3	49.661	<0.001**
Frequency in women (n = 105)						
≤1	15	14.3	67	63.8		
2	34	32.4	23	21.9		
3-5	42	40.0	10	9.5		
>5	14	13.3	5	4.8	59.053	<0.001**

****Highly Statistically Significant at P<0.001**

Table 4. Mean scores of the sexual function among women before and during the COVID-19 pandemic (n = 105)

Female Sexual Function Index Domains	Before the pandemic		During the pandemic		Significance test	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	T	P
- Desire	4.3 ± 0.5	4.2 ± 0.6	4.2 ± 0.6	4.2 ± 0.6	1.312	0.191
- Arousal	4.6 ± 0.6	2.3 ± 0.4	2.3 ± 0.4	2.3 ± 0.4	32.682	<0.001**
- Lubrication	4.6 ± 0.5	2.3 ± 0.4	2.3 ± 0.4	2.3 ± 0.4	36.807	<0.001**
- Orgasm	4.8 ± 0.7	2.9 ± 0.7	2.9 ± 0.7	2.9 ± 0.7	19.666	<0.001**
- Satisfaction	4.0 ± 0.5	2.4 ± 0.5	2.4 ± 0.5	2.4 ± 0.5	23.186	<0.001**
- Pain	4.2 ± 1.9	3.8 ± 0.5	3.8 ± 0.5	3.8 ± 0.5	1.564	0.119

****Highly Statistically Significant at P<0.001**

Table 5. Mean scores of the sexual function among men before and during the COVID-19 pandemic (n = 97)

International Index of Erectile Function Domains	Before the pandemic	During the pandemic	Significance test	
	Mean \pm SD	Mean \pm SD	t	P
- Erectile function	25.5 \pm 2.8	16.2 \pm 2.4	24.837	<0.001**
- Orgasmic function	6.5 \pm 1.0	5.2 \pm 1.2	8.196	<0.001**
- Sexual desire	6.9 \pm 0.8	7.0 \pm 1.0	0.851	0.396
- Intercourse satisfaction	10.0 \pm 1.2	6.1 \pm 1.2	22.786	<0.001**
- Overall satisfaction	7.1 \pm 1.0	5.2 \pm 1.2	12.429	<0.001**

****Highly Statistically Significant at P<0.001**

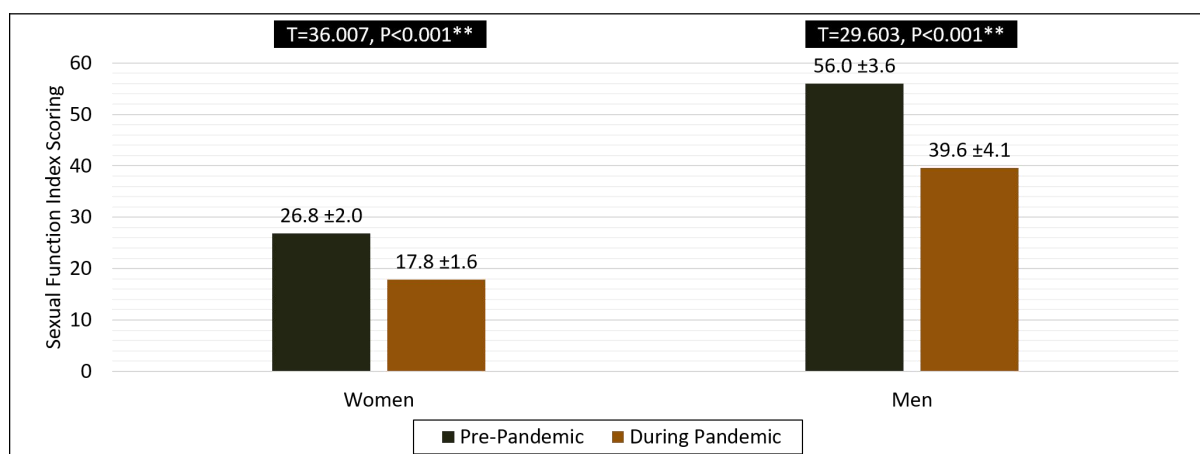
**Figure 3.** Total scores of sexual function in women and men before and during the COVID-19 pandemic

Table 6. Association between sociodemographic characteristics and sexual function in men and women during the pandemic

Items	Mean scores of Male Sexual Function	Mean scores of Female Sexual Function
Age (years)		
<30	40.2 ± 3.9	18.0 ± 1.5
30 to <40	39.7 ± 4.4	17.7 ± 1.8
40 to ≤50	38.1 ± 3.0	17.6 ± 1.4
ANOVA test	F = 1.724, P = 0.184	F = 0.450, P = 0.639
Education Level		
Basic	40.0 ± 4.3	17.9 ± 1.6
Middle education	39.2 ± 4.0	17.6 ± 1.7
High education	40.1 ± 3.9	17.8 ± 1.6
ANOVA test	F = 0.540, P = 0.585	F = 0.327, P = 0.721
Residence		
Urban	39.8 ± 4.2	17.9 ± 1.5
Rural	39.5 ± 4.0	17.7 ± 1.6
Student's t-test	T = 0.308, P = 0.759	T = 0.738, P = 0.462
Duration of marriage (years)		
≤1	41.6 ± 4.5	19.4 ± 1.0
1-<5	37.8 ± 3.8	17.9 ± 2.0
5-<10	37.9 ± 4.7	17.5 ± 1.6
≥10	37.9 ± 3.0	17.6 ± 1.4
ANOVA test	F = 4.199, P = 0.008*	F = 5.925, P < 0.001**
Income		
Enough	40.0 ± 3.4	18.0 ± 1.7
Not enough	37.6 ± 4.3	16.7 ± 1.5
Student's t-test	T = 7.119, P = 0.009*	T = 13.938, P < 0.001**
Negative effect of the pandemic on income		
None	41.4 ± 3.5	19.7 ± 1.8
Mild	40.5 ± 4.7	18.8 ± 1.6
Moderate	38.6 ± 2.7	17.7 ± 1.6
Severe	37.3 ± 3.0	16.8 ± 1.7
ANOVA test	F = 5.594, P < 0.001**	F = 12.067, P < 0.001**

*Statistical Significant at P<0.05 **Highly Statistically Significant at P<0.001

Table 7. Association between changes in sexual behaviors and sexual function in men and women during the pandemic (n = 202)

Items	Mean scores of Male Sexual Function	Mean scores of Female Sexual Function
Spending more time with partner		
Yes	42.4 ± 4.0	20.3 ± 1.9
No	39.9 ± 4.3	17.9 ± 1.5
Significance test	T = 4.193, P < 0.001**	T = 10.159, P < 0.001**
Sexual avoidance behaviors toward partner		
Yes	36.9 ± 2.9	17.7 ± 1.6
No	39.2 ± 4.1	18.8 ± 1.6
Significance test	T = 4.511, P < 0.001**	T = 4.981, P < 0.001**
Considering infection during intercourse		
Yes	38.6 ± 3.4	17.7 ± 1.7
No	39.9 ± 4.2	17.8 ± 1.6
Significance test	T = 1.298, P = 0.197	T = 0.088, P = 0.766
Taking precautions during intercourse		
Yes	38.0 ± 3.4	17.7 ± 1.6
No	40.3 ± 4.2	18.8 ± 1.6
Significance test	T = 2.653, P = 0.009*	T = 12.406, P < 0.001**
Increase in solitary sexual satisfaction approach		
Yes	38.3 ± 4.5	17.8 ± 1.6
No	39.7 ± 4.0	19.6 ± 1.0
Significance test	T = 0.778, P = 0.438	T = 2.483, P = 0.118

*Statistical Significant at $P < 0.05$ **Highly Statistically Significant at $P < 0.001$

Discussion

The aim of the present study was to assess the effect of COVID-19 pandemic on the sexual function of women and men. Within the framework of the current study, the findings handled the answer of the study question and showed that the sexual function of women and men was affected during the COVID-19 pandemic.

According to the current study, during the COVID-19 pandemic, sexual avoidance behaviors and thoughts of infection were three times higher in women than in men. Moreover, women preferred using a

condom during sexual contact and avoided kissing two times more than what the men did.

The findings of this study were in agreement with those of **Karagöz et al. (2020)**, who examined the effect of the COVID-19 pandemic on the sexuality of couples in Turkey. They reported that sexual avoidance behaviors were twice higher in women than in men. In addition, precautions, such as avoidance of kissing, were followed more by women than by

men. These results can be explained by the fact that the stress and fear of being infected during sexual intercourse were significantly higher in women than in men. In addition, couples were less likely to engage in full sexual activity or even in simple kissing because of the fear of contracting the disease.

This present study showed that sexual intercourse frequency was significantly decreased in both men and women during the COVID-19 pandemic. Similarly, **Schiavi et al. (2020)** reported a decreased sexual activity frequency during the pandemic when they examined the sexual function and quality of life of a group of reproductive-aged women during social distancing measures associated with the COVID-19 pandemic.

Another recent study by **Li, Li, Xin, Wang & Yang, (2020)** on the difficulties in the practice of sexual medicine during the COVID-19 pandemic in China, found a dramatic decrease in the total sexual activity and frequency among young men and women. These results might be

explained by the fear of infection during the pandemic.

On the contrary, **Bhambhvani et al. (2021)** concluded that there was no change in the frequency of sexual intercourse among women during the pandemic COVID-19 in the United States. In addition, **Chen et al. (2021)** reported that after the pandemic, men had more sexual encounters. The researchers explained that the increase in sexual frequency was caused by people spending more time at home with their partners during the COVID-19 pandemic. Concerning the sexual function of women, this present study found a highly significant decrease in the levels of arousal, lubrication, orgasm, and satisfaction during the pandemic. While, there was no significant decline in the domain scores for sexual desire and pain. In addition, the overall FSFI score decreased significantly during the pandemic, compared with that pre-pandemic.

These results were congruent with those of **Bhambhvani et al. (2021)**, who stated that the overall FSFI significantly decreased during the pandemic, with domain-specific decreases in arousal, lubrication, and satisfaction. In addition, **Karsiyakali et al. (2021)** reported low FSFI scores among people in Turkey. These results can be linked to the isolation laws enforced by the national authorities throughout the pandemic; these laws may have led to anxiety and unsafe feelings of infection, as well as detrimental impact on sexual behavior. Moreover, changes in daily routine, limitations on personal activities, and unpredictability of the future were other variables that may have an impact on these results.

On the other hand, **Ilgen et al. (2021)** found that among 89 sexually active women, there were no significant decline in the FSFI scores during the COVID-19 pandemic and no significant differences were discovered in the levels of desire, arousal, lubrication, orgasm, satisfaction, and discomfort before and after the pandemic. In addition, **Yuksel & Ozgor**

(2020) discovered higher sexual desire in women during the COVID-19 pandemic. This difference among the studies can be explained by the different culture and norms of the study populations.

Concerning the sexual function of men during the pandemic, the results of the present study showed a substantial decline in the satisfaction levels for the intercourse, orgasmic function, erectile function, and overall satisfaction domains. While, there was no significant decrease in the domain score for sexual desire. In addition, the overall IIEF score dropped during the pandemic, compared with that pre-pandemic. The study of **Salama & Blgozah (2021)** on COVID-19 and sexual function of men revealed that there was low scores for all IIEF-15 domains, except desire score.

In addition, **Masoudi et al. (2022)** demonstrated that the IIEF score significantly decreased in men during the COVID-19. According to the researchers, the significant negative influence on sexual function and activity in men may be attributed to economic and financial issues, such as unemployment, rising poverty, and diminishing incomes. Moreover, protective measures to guarantee safe sex, such as use of condoms or avoidance of kissing, might have led to sexual dissatisfaction.

On the other hand, **Chen et al. (2021) & Sotiropoulou et al. (2021)** reported no changed in the overall IIEF score or in any of its subdomain scores during the pandemic.

Furthermore, the present study clarified that the sexual function of men and women during the pandemic had highly significant associations with the duration of marriage and the negative effect of the pandemic on income. These findings were supported by **Effati-Daryani et al. (2021)**, who studied the COVID-19 pandemic effects on the mental health and sexual function of expecting mothers in Iran; they found a significant correlation between the score of sexual function and having

enough money to cover the living expenses. In addition, **Omar et al. (2021)** showed that sexual stress was significantly greater in women who had been married for 5–10 years.

The current study demonstrated a highly significant relationship between spending more time with a partner and the sexual function of both men and women during the pandemic, based on the overall IIEF and FSFI scores. These results were in the same line with those in the study of **Karagöz et al. (2020)**, who found significantly higher IIEF scores in all domains in couples who spent more time together throughout the quarantine than in those who did not. In addition, **Panzeri, et al. (2020)** investigated the alterations in sexuality and the quality of couple's relationships during the COVID-19 lockdown. They found that increased free time and time spent with the partner had a significant positive impact on sexuality. It can be explained by the fact that; spending additional time together during the pandemic might counteract the negative consequences.

The current study findings revealed lower total IIEF and FSFI scores in men and women who considered sexual avoidance behaviors toward their partner and took precautions during intercourse than in those who did not. The men and women sexual function during the pandemic had highly significant associations with sexual avoidance behaviors and with taking precautions during intercourse. Similarly, **Karagöz, et al. (2020)** revealed that the sexual avoidance behaviors toward their partner and taking precautions during intercourse negatively affected sexual function and satisfaction.

Finally, it was evident from the present study that the sexual function of both women and men was greatly affected during the COVID-19 pandemic, likely because of social restriction, emotional disruption, fear of being infected and sexual avoidance behaviors.

Strengths and limitations of the study

Adopting adequate sample size and enough power of study of 80% are strengths of the current study. Meanwhile, the limitations of the current study included that self-reporting biases were possible, owing to data collection by questionnaire based on past experiences that varied depending on the individual's motivation and psychological state at the time of assessment.

Conclusions

The current study reported that there was a statistically significant increase in sexual avoidance behavior and taking precautions, such as using condoms and avoiding kissing during the pandemic. These had negative consequences on women and men sexual function. Moreover, there was a highly significant decline in the sexual activity frequency among women and men because of their fear of acquiring COVID-19 infection. Furthermore, among women, there was a highly significant drop in arousal, lubrication, orgasm, and satisfaction was observed throughout the pandemic. In men, a significant decline in erectile function, orgasmic function, intercourse satisfaction, and overall satisfaction scores were observed throughout the pandemic.

Recommendations

- Counseling couples that the active sexual relation should be maintained during the pandemic while following the recommended protective measures.
- Psychological support should be provided to all couples to enhance coping with COVID-19 related stressors.
- Different measures of relaxation techniques should be explained to both women and men to practice regularly before sexual relation.
- Implementing in-service counseling programs for women and men to manage their sexual problems effectively.

Further studies

- Identify the effect of tele-health support system concerning the sexual issues of both men and women during the COVID-19 pandemic.
- Replication of the study to other settings.

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Conflict of Interests

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