

The Effect of Pandemic of Covid -19 on Female sexual Function: a systematic review and meta-analysis

Asma Zalpour ¹, Elham Zare ^{2*}, Malihe Nasiri ³

¹ Student Research Committee, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

² Midwifery and Reproductive Health Research Center, Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

³ Department of biostatistics, school of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract

Introduction: Since sexual function is significantly influenced by tension, fear, and melancholy, all of which are intensified throughout epidemics, the COVID-19 globally can also affect individuals' sexual function and life. The strong relationship between sexual dysfunction and quality of life disorders has made it an important public health concern. Thus, the current study was conducted to assess female sexual function throughout the COVID-19 quarantine.

Method: The researchers searched in Science direct, Web of Sciences, PubMed, Scopus, and Google Scholar databases, with no language limitations. Two independent researchers reviewed all relevant articles published until November 30, 2021. Finally, 22 articles were included in the study, 13 of which were capable of meta-analysis. Study data were combined using meta-analysis and random effect model. Begg's funnel plot and Egger's test were used to check the potential bias of publication.

Results: The mean score of Female Sexual Function Index (FSFI) was 23.34 (95%CI: 21.17- 25.52) using the random effect model. Out of the six studies that reported the FSFI scores before and throughout the COVID-19 crisis, five indicated a statistically significant drop in the mean scores of female sexual function throughout COVID-19 contrast to before. Most studies comparing the repetition of sexual activity before and through the COVID-19 epidemic reported a diminish in the repetition of sexual activity throughout the epidemic.

Conclusion: Adverse psychological outcomes and restrictions caused by the COVID-19 crisis weaken female sexual function and the repetition of sexual activity. Health policy-makers worldwide should scheme and execute helpful syllabus and interventions to reduce the adverse impact of the COVID-19 epidemic on the sexual health of people.

Keywords: COVID-19, Sexual health, Sexual dysfunction, Systematic review

Introduction

COVID-19 is an infectious illness caused by a new strain of Coronavirus (1). On January 2020, the World Health Organization notified the spread formed a Public Health Emergency of International Concern (PHEIC) (2). The data related to the corona virus led to some strict and unprecedented preventive measures (3). These methods contributed significantly to reducing the spread of the virus but also increased socio-economic instability, global despair, and negative consequences on the mental and sexual health of societies (4, 5). Since biological, psychological, social, economic, political, cultural, and legal factors affect sexual function (6), the COVID-19 may adversely affect female sexual function due to the fear of contagion, stressful conditions, and changes in daily life (5). Sexual health is an chief sector of women's standard of lifetime (7) and necessary for the overall health and well-being of individuals, couples and families. Satisfactory sexual activity also enhances physical health and overall quality of life (4). On the other hand, Female Sexual Dysfunction (FSD) results in anxiety, depression, communication breakdown, and disruption in interpersonal relationships (8). FSD is defined as an ongoing or frequent disorder of sexual interest/desire, mental and genital arousal disorders, orgasm disorders, and/or sexual pain and discomfort (9). The strong relationship between sexual dysfunction and quality of life disorders has made it an important public health concern (10), with a significant economic burden on the health system of societies (11).

Given the impact of the COVID-19 quarantine on sexual health on the one hand, and the adverse effects of female sexual dysfunction on the family and society on the other hand, awareness of the healthcare staff of the prevalence of this problem and influential factors on it can enable the healthcare team to take appropriate preventive or mitigation measures. Unmerable surveies have considered the impulse of the COVID-19 quarantie on female sexual dysfunction so far. Thus, the current study aim was to evaluate the effect of the COVID-19 pandemic on women's sexual function.

Methodology

Search strategy

The population of the current systematic review study included all observational studies on female sexual function throughout the COVID-19 quarantine. The researchers searched in Web of Science, Scopus, PubMed, Science direct and Google Scholar databases, with no language limitations. Two independent researchers reviewed all relevant articles published until November 30, 2021. Searching in databases was done using English keywords. The search keywords were selected based on the MeSH system and included "sexual function", "sexual dysfunction", "sexual health", "sexual activity", "sexual activities", "sexual behavior", "sex behavior", and "COVID-19", combined with AND/OR Boolean operators.

The search in the mentioned databases resulted in retrieving 438 articles, which were then entered into the Endnote software. Using Endnote software, 161 duplicate articles were identified and removed, after which the headline and abstraction of 277 papers were examined, and 57 papers were selected for full text investigation according to the objectives of the present research, all of which were published in English. When the full text of an article was not available, contact was made with the corresponding author to access the full file of the article. However, the full texts of two articles were not available, and 33 more did not comply with the inclusion criteria, leading to their exclusion. Finally, 22 articles were included in the study, the quality of which was evaluated by two independent authors (E.Z and A.Z), which used the Newcastle-Ottawa quality assessment scale (NOS) adapted by Herzog et al. for cross-sectional studies (12). Scale of (NOS) for cross-sectional studies consists of seven questions and three domains: Selection of participants (questions 1-4), comparisons (question 5), and results and statistics (questions 6 and 7). The scores vary from 0 to 10, where 9-10, 7-8, 5-6, and 0-4 mean very good, good, satisfactory, and unsatisfactory, respectively (13). A consensus approach was used to determine the quality score for each study. Figure 1 shows the selection process of the articles.

Exclusion and Inclusion criteria

The inclusion criterias obtain cross-sectional observational, cohort, and control-case published articles, with a research unit of women who had no history of mental illnesses, chronic systemic diseases, and urogenital diseases and did not take neuropsychiatric or any other drugs affecting sexual function. Articles whose research unit was women with COVID-19, those with no availability of the full text, qualitative research, reviews, abstracts, letters to the editor, and clinical trials were cut off.

Data extraction

Informations were extracted using a researcher-made form, which included information such as author's name, year of publication, place of research, number of samples, participants' characteristics (demographic, age, etc.), data collection tools, findings, and the results of evaluating the quality status of the articles.

Assesment of the status of quality of articles

The quality state of all studies was evaluated using the NOS (12). Based on the NOS checklist, six articles received scores of 9-10 (very good), 11 had scores of 7-8 (good), and five articles had scores of 5-6 (satisfactory). It is noteworthy that none of the studies received scores of 0-4 (unsatisfactory). All studies receiving scores of ≥ 5 were entered into the research (Table 1).

Statistical analysis

The current study used the effect size to interpret and analyze the results. The random effects model was used for data heterogeneity. Begg's funnel plot and Egger's test were also used to check bias of publication.

Findings

The current study reviewed all published articles in electronic databases matching to the research objectives. In the first step, 438 articles (Google scholar=236; Web of science=41; Scopus=87; Science direct=22; Pubmed=52) were extracted through primary search using relevant keywords. Removal of duplicate articles and review of the titles, abstracts, and then the full text of the remaining articles resulted in 22 final articles with a total sample size of 12409 for assesment (Figure 1). All included studies were cross-sectional, except for one longitudinal and one case-control study. These studies were conducted in 10 different countries, including 8 in Turkey, 3 in Iran, 3 in Italy, 2 in Poland, and 1 in each of Greece, Portugal, America, Ecuador, Egypt, and China. Based on the NOS checklist, all studies were of high quality. FSFI was used in 21 studies to evaluate women's sexual performance, while one study used the Arizona sexual experiences scale (ASEX) (14). Table 2 shows the specification of the studies consisted in the current systematic review.

The consequences of the COVID-19 on female sexual function

Nine studies was shown the prevalence of sexual dysfunction throughout the epidemic (Table 2), ranging from 17.6% in Greece to 87.4% in Turkish pregnant women. Six studies reported female sexual function scores before and throughout the COVID-19 period. In the study of Bhambhani (No. 14), Schiavi (No. 16) and Fuchs (No. 21), the before and after evaluation was used on the same samples. In the study of Ilgen (15) and Yuksel (No. 4), the data of a previous study that was conducted for another purpose was used, and healthy people or the control group of these studies were invited to participate in the new study. In Karagöz's study (No. 5), participants were asked to complete questionnaires based on their past experiences before the epidemic the first time, and to answer questionnaires based on their experiences during the epidemic the second time. All of these six studies revealed a drop in the mean FSFI scores throughout contrast to before the crisis. Findings were statistically significant in five studies (5, 16-19) and insignificant in one study (20). Eight studies investigated the alternation of sexual activity throughout the covid-19 epidemic, the majority of which (n=6) reported a decline in the repetition of sexual activity compared to before the COVID-19 outbreak (5, 17, 19, 21-23). On the other hand, one study reported an increase in the mean repetition of sexual activity in Turkish women (2.4 vs 1.9, $P=0.001$) (16), while another study in America reported no changes in the repetition of sexual activity (18). One of the studies, conducted on healthcare workers in Turkey, reported a drop in the repetition of weekly sexual activity ($P<0.001$) and sexual desire ($P=0.003$) of the participants throughout the epidemic (21).

Influential factors on female sexual function throughout the COVID-19 epidemic

Relied on the detections of the present studies, various items can affect female sexual function throughout the COVID-19 pandemic (Table 1). The main risk factors for reducing female sexual function mentioned in the studies were anxiety (n=8), depression (n=5), unemployment or variable employment status (n=5), lower income or economic status (n=3), older age (n=3), and fear (n=3). Education level was examined in 5 studies, three of which reported a relationship between lower level of education and lower scores of sexual function (14, 17, 24), while two articles reported such a relationship for university

education (5, 25). Multiparity and pregnancy were associated with less female sexual function in two (5, 25) and three (14, 25, 26) studies, respectively. Research conducted on pregnant women in Iran also showed that higher gestational age was associated with higher prevalence of sexual dysfunction (27). In Turkey, healthcare staff reported better sexual function scores throughout the covid-19 crisis compared to pregnant and other women ($P=0.001$) (24). A study conducted on 200 Chinese couples found that the overall score of sexual function was lower in the women of azoospermia's husband compared to the women with normal husband (25.12 ± 5.56 vs. 26.75 ± 4.82 , $t = -2.22$, $p = 0.03$) (28). Three studies also mentioned factors that positively affected female sexual function throughout the crisis, including spending more time with their spouses (19), higher sexual double standards (SDS), sexual and relationship satisfaction (29), and mild stress, the type of spouse's occupation, live in family, higher marital contentment, and higher gestational age (27).

Meta-analysis

Sexual desire

The mean sexual desire score was 3.91 and 3.62 using the fixed (95%CI: 3.88-3.94) and random (95%CI: 3.38-3.86) methods, respectively. Considering the data heterogeneity in Cochran's Q test ($Q=273.915$, $p<0.001$), the random method provided more accurate estimations.

Begg's funnel plot and Egger's test were used to check the potential bias of publication in all domain. The results of the test confirmed the bias of publication ($t=3.08$, $p=0.01$) and the significant slope of the line ($t=26.82$, $p<0.001$). Thus, the Trim and Fill analysis was used for estimations, the results of which did not change, which can indicate none of the studies have led to a high bias.

Arousal

The mean arousal score was 4.27 and 3.67 using the fixed (95%CI: 4.23- 4.03) and random (95%CI: 3.30- 4.04) methods, respectively. Considering the data heterogeneity in Cochran's Q test ($Q=998.896$, $p<0.001$), the random method provided more accurate estimations.

The results of test confirmed the bias of publication ($t=4.68$, $p=0.001$) and the significant slope of the line ($t=26.56$, $p<0.001$). Thus, the Trim and Fill analysis was used for estimations, the results of which did not change, which can indicate none of the studies have led to a high bias.

Lubrication

The mean Lubrication score was 4.86 and 4.19 using the fixed (95%CI: 4.82- 4.89) and random (95%CI: 3.83- 4.56) methods, respectively. Considering the data heterogeneity in Cochran's Q test ($Q=895.711$, $p<0.001$), the random method provided more accurate estimations.

The results test confirmed the bias of publication ($t=4.55$, $p=0.001$) and the significant slope of the line ($t=34.11$, $p<0.001$). Thus, the Trim and Fill analysis was used for estimations, the estimation result was 4.231 (4.202-4.261) with fixed method and 4.098 (3.495-4.701) with random method.

Orgasm

The mean orgasm score was 4.26 and 3.89 using the fixed (95%CI: 4.22- 4.30) and random (95%CI: 3.53- 4.25) methods, respectively. Considering the data heterogeneity in Cochran's Q test ($Q=766.076$, $p<0.001$), the random method provided more accurate estimations.

The results of test confirmed the bias of publication ($t=2.38$, $p=0.036$) and the significant slope of the line ($t=18.10$, $p<0.001$). Thus, the Trim and Fill analysis was used for estimations, the estimation result was 3.617 (3.586- 3.649) with fixed method and 3.608 (3.138- 4.077) with random method.

Satisfaction

The mean satisfaction score was 4.43 and 4.04 using the fixed (95%CI: 3.39- 4.47) and random (95%CI: 3.78- 4.30) methods, respectively. Considering the data heterogeneity in Cochran's Q test ($Q=478.350$, $p<0.001$), the random method provided more accurate estimations.

The results of test confirmed the bias of publication ($t=3.23$, $p=0.008$) and the significant slope of the line ($t=29.50$, $p<0.001$). Thus, the Trim and Fill analysis was used for estimations, the estimation result was 4.016 (3.985- 4.046) with fixed method and 3.908 (3.527 - 4.290) with random method.

Pain

The mean pain score was 4.70 and 4.18 using the fixed (95%CI: 4.67- 4.74) and random (95%CI: 3.65- 4.72) methods, respectively. Considering the data heterogeneity in Cochran's Q test ($Q=2031.31$, $p<0.001$), the random method provided more accurate estimations.

The findings showed no bias in publication ($t=2.04$, $p=0.066$) but a significant slope of the line ($t=14.88$, $p<0.001$). Thus, the Trim and Fill analysis was used for estimations, the estimation result was 4.085 (4.056- 4.114) with fixed method and 4.087 (3.421- 4.754) with random method.

Overall score of female sexual function index

The mean FSFI score was 25.36 and 23.34 using the fixed (95%CI: 25.20- 25.52) and random (95%CI: 21.17- 25.52) methods, respectively. Considering the data heterogeneity in Cochran's Q test ($Q=2391.20$, $p<0.001$), the random method provided more accurate estimations.

The results of the Egger's test showed no bias of publication ($t=2.18$, $p=0.048$) but a significant slope of the line ($t=15.96$, $p<0.001$). Thus, the Trim and Fill analysis was used for estimations, the outcomes of which did not change, which can indicate none of the studies have led to a high bias.

Discussion

Since sexual function is significantly influenced by stress, anxiety, and depression, all of which are amplified through epidemics, the COVID-19 epidemic can also affect individuals' sexual function and life (27). Sexual activity affects immune response, mental health, and cognitive function positively and can reduce psychosocial stress (4). The existing study investigated female sexual function and the influential factors on it throughout covid crisis. FSFI was used as the golden standard utilized to measure women's sexual activity (30). This tool has 19 items scored on a Likert scale from 0 (or 1) to 5. FSFI consists of six subscales, with the upmost score of 6 for each area and 36 for the total scale. superior scores indicate better sexual functioning, and a overall score of 26.0 has been validated as the cut-off point for diagnosis with female sexual dysfunction (FSD) (31). In our study, the mean FSFI score throughout the epidemic was 23.34 using the random effects method. Besides, the scores of sexual tendency, arousal, lubrication, orgasm, satisfaction, and pain were 3.62, 3.67, 4.19, 3.89, 4.04, and 4.18, respectively, using the random effects method. Out of the six studies that reported the FSFI scores before and through the covid-19 pandemic, five indicated a statistically significant drop in the mean scores of female sexual function throughout compared to before the epidemic (5, 15-18). Most studies comparing the repetition of sexual activity before and as long as the covid-19 crisis reported a diminish in the repetition of sexual activity throughout the crisis (5, 16, 18, 20-22). However, a study in Turkey reported an increase in the repetition of sexual activity, which could be attributed to spending more time at home (16). The COVID-19 epidemic can have different impacts on female sexual function worldwide because quarantine and mental stress can aggravate sexual disorders such hypoactive sexual desire disorder (HSDD) on the one hand, while increasing the intimacy of couples due to spending more time at home on the other hand (4). In addition, stress is a factor that can be associated with both increased sexual activity and decreased sexual desire. The findings of a study conducted on women aged 18 to 20 showed that the frequency of sexual activity in women is associated with stress, and the frequency of sexual activity in women with stress is higher than women without stress (32).

Rely on the current study, anxiety, depression, unemployment, or unstable employment status were among the main influential factors on female sexual function. In the study of Chatterjee et al. (2022), female gender and depression were associated with sexual dysfunction during the quarantine related to the COVID-19 pandemic. These findings show the

impact of poor mental health on sexual dysfunction and the importance of paying attention to women's mental health during the epidemic (33). Artymuk et al. (2020) concluded that the COVID-19, along with the lifestyle changes, quarantine, and income reduction, imposed significant stress and affected the reproductive and sexual health of women worldwide, leading to a general reduction in female sexual activity by up to 40%. Most studies also reported the reduction in sexual desire and arousal (34). The product of a review study by Masoudi et al. (2022) marked that restrictions due to the COVID-19 could be associated with grater amount of sexual weakness and diminish sexual activity (35). As regards, a review study conducted by Dashti et al. (2021) showed no significant drop in the scores of female sexual function and other areas compared to before the epidemic (36). These contradictory outcomes can be ascribing to the narrow number of studies conducted in this field, and lack of reports of the illness peak and the level of life setting and public stress in literature. Sexual health is a momentous part of somatic and mental health. Since crises such as the COVID-19 can lessen the quality of sexual life and limit access to services, health policy-makers are recommended to consider screening in terms of sexual function while also focusing on improved access to services. According to the results of this study and the high risk of sexual dysfunction in women and especially in female health care workers, it seems necessary to conduct more studies to evaluate and compare the prevalence of sexual dysfunction in women before, during and 1 or 2 years after the COVID-19 pandemic.

Grate sample size and the homogeneity are some of the strengths of this study. Conducting studies in various countries and the extensive geographical diversity can be another strength of the study. Limitations in the number of studies comparing female sexual function before and trough the COVID-19 crisis was the main limitation of the study, making it difficult to draw decisive conclusions.

Conclusion

Adverse psychological outcomes and restrictions caused by the COVID-19 crisis abate female sexual function and the repetition of sexual activity. Health policy-makers worldwide should layout and fulfillment effective programs and interventions to reduce the adverse effects of the COVID-19 on the sexual health of people.

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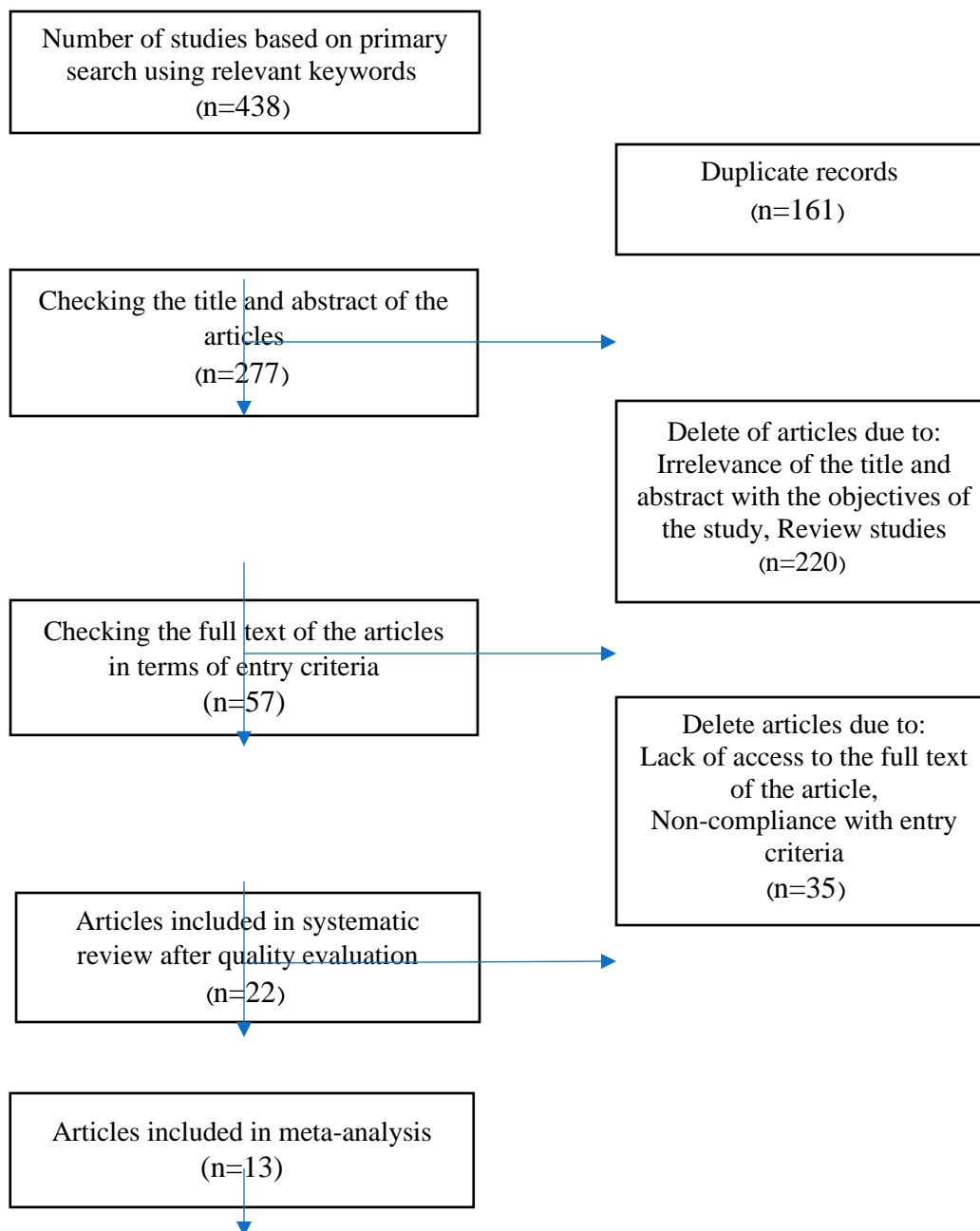


Figure 1- PRISMA flowchart for the study selection process.



Study (first author)	Selection				Comparability According to method and analysis	Outcome		Total score
	Representativeness of the sample	Sample size	Non- respondents	Ascertainment of exposure		Assessment of outcome	Statistical test	
Ilgen, O et al.				+	++	++	+	6
KÜÇÜKYILDIZ, İ et al.				+	++	++	+	6
Mirzaei, N et al.	+	+	+	+	++	++	+	9
Yuksel, B et al.	+	+	+	+	++	++	+	9
Karagöz, M et al.	+		+	+	++	++	+	8
Mohammadi, A et al.	+	+		+	++	++	+	8
Karakas, L et al.	+	+		+	++	++	+	8
Costantini, E et al.			+	+	++	++	+	7
Sotiropoulou, P et al.			+	+	++	++	+	7
Carvalho, J et al.	+	+	+	+	++	++	+	9
Effati-Daryani, F et al.	+	+	+	+	++	++	+	9
Mollaioli, D et al.	+	+	+	+	++	++	+	9
Karsiyakali, N et al.		+	+	+	++	++	+	8
Bhambhvani, H et al.				+	++	++	+	6
Hidalgo, D et al.	+			+	++	++	+	7
Schiavi, M et al.	+		+	+	++	++	+	8
Szuster, E et al.	+		+	+	++	++	+	8
Omar, S et al.	+	+	+	+	++	++	+	9
Dong, M et al.			+	+	++	++	+	7
Culha, M et al.			+	+	++	++	+	7
Fuchs, A et al.				+	++	++	+	6
Denizli, R et al.				+	++	+	+	5

assesment of elected articles based on the NOS.

Table
1-
Quality

Table 2- Characteristics of involved articles in a systematic review.

Study	Author time location	meth od	size of the sample	(mean/ range) of age	Assessment tool	Results	Influential factors on female sexual function
1. female sexual function and COVID-19 pandemic (20)	Ilgen, O et al. 2021 Turkey	cross-section al	99	35.1± 5.8	1. FSFI, 2. (BAI), 3. (BDI)	FSFI scores showed high status of disfunction even before the pandemic, finding was not shown differences before and after. (21.8 vs 21.0, p = 0.27). High level of Anxiety and depression were found in the study (11.2 vs 13.3, p < 0.01; 10.0 vs 13.7, p < 0.01; respectively). Pandemic did not affect female sexual status. However, anxiety and depression were associated with the pandemic	Negative factors: • Anxiety
2. A hospital-based, prospective, cross-sectional comparative study of dysfunction in sexual of women throughout COVID-19: (24)	KÜÇÜKYİ LDİZ, İ et al. 2021 Turkey	cross-section al	150 1: 50 pregnant women 2: 50 healthcare women 3: 50 other women	18-53	FSFI	The median FSFI score was obtained 23.50. 68.7 % of women were diagnosed as having sexual dysfunction. Group 2 had significantly elevated FSFI score (p: 0,001), and higher FSFI score in the areas of Orgasm, Arousal, Lubrication, and Pain compared to rest.	Negative factors: • Unemployment • Lack of university education • Sexual pain was higher in women who had normal vaginal delivery
3. Mental health, and quality of life and Sexual function under strain of COVID-19 pandemic in Iran:cross-sectional study (26)	Mirzaei, N et al. 2021 Iran	cross-section al	604 women contain: Pregnant: 200 lactating :203 normal:201	20.81± 5.92	1. (HADS) 2. FSFI 3. Short-Form Health Survey (SF-12)	Anxiety and depression score in pregnant and lactating women were higher than normal group (P < 0.001). In addition, score of QOL and FSFI in pregnant and lactating women were lower than normal women (P < 0.001).	Negative factors: • Pregnancy • Lactation



4. female sexual action under the COVID-19 pandemic (16)	Yuksel, B et al. 2020 Turkey	cross-sectional	58	27.6±4.4	1. FSFI 2. a researcher designed questionnaire	mean of sexual intercourse repetition increased throughout the Pandemic in comparison to 6–12 last months (2.4 vs 1.9, P=0.001). FSFI scores were better before the pandemic In comparison to the pandemic (20.52 vs 17.56, P=0.001).	–
5. A cross-sectional study among couples in Turkey: COVID-19 influences on sexuality (19)	Karagöz, M et al. 2020 Turkey	cross-sectional	97 women and 148 men	34.7 6.67±	1. FFSFI 2. IIEF 3. GAD-7 4. PHQ-9 5. PSS	FSFI were lower in male and female Throughout pandemic compared to before. (p = 0.001 and p = 0.027, respectively). Throughout pandemic compared to prepandemic period, the repetition of sexual relation dropped in male (p = 0.001) and womenfemale (p = 0.001) while sexual prevention and solitary sexual approach action(masturbation or exposing to sexual videos, etc.) elevated in male (p = 0.001) and female (p = 0.022).	Negative factors: • Older age • Anxiety • Depression • Stress perception Positive factors: • Spending more time with partner
6. Sexual Dysfunction prevalence and Related Factors in Iranian Pregnant Women Throughout the COVID-19 Pandemic (37)	Mohammadi, A et al. 2021 Iran	cross-sectional	205 pregnant women	29.3±5.5	FSFI	FSFI mean (SD) of the overall score was 21.54 (8.37), and 80% of participants suffered from sexual dysfunction.	Negative factors: • Husband over 35 years old • Living in private homes compared to living in parents' homes • Moderate marital satisfaction compared to high or extremely high marital satisfaction • Husband blue-collar worker compared to husband white-collar worker



7. Assessment the risk factors of sexual dysfunction in pregnant women throughout the COVID-19 (25)	Karakas, L et al. 2021 Turkey	cross-section al	180 (135 pregnant women and 45 non-pregnant women)	20-40	FSFI	FSFI scores were significantly lower in pregnant women (P=0.002). Healthy pregnant women showed decreased level in the sexual function because of quarantine measures, throughout the COVID-19 pandemic.	Negative factors: <ul style="list-style-type: none"> • Having university degree • Multiparity • Pregnancy • Unplanned pregnancy
8. Lockdown Impact of on Couples' Sex Lives (38)	Costantini, E et al. 2021 Italy	cross-section al	1112 women and 1037 men	43 ± 12.5	1. FSFI 2. IIEF-15 3. Hamilton Anxiety Rating Scale (HAM) 4. marital adjustment test (MAT)	49% rise were diagnosed in sex live of participants, particularly room mate ones ; for 29% it deteriorated, while for 22% of participants it did not change. Women with decline sex lives actually had no sexual dysfunction, but they had tension, anxiety, fear, and insomnia.	Negative factors: <ul style="list-style-type: none"> • Anxiety • Tension • Fear • Insomnia • Being unemployed or smart working • having sons
9. COVID-19 Social separation Measures on Sexual Function and Relationship Quality of Greek Couples (39)	Sotiropoulou, P et al. 2021 Greece	cross-section al	213 women and 86 men	18 years and older	1. FSFI 2. IIEF 3. Sexual activity 4. Relationship quality 5. Mood and anxiety	Small or no harmful effect detected on sexual function. Those who have no access to their partner detected upraised anxiety and deficient temper. Who have stable connection with their partner but no child; evolve with emotional security and satisfactory sexual activity. Quarantine and distant socializing have not affected Sexual function and relationship quality.	Negative factors: <ul style="list-style-type: none"> • Anxiety
10. The link between COVID-19 restriction , psychological settlement, and sexual functioning, in a sample of Portuguese male and female (40)	Carvalho, J et al. 2021 Portugal	cross-section al	417 women and 245 men	34.3± 10.97	1. FSFI 2. IIEF 3. psychological adjustment	While limitation measure were not directly related with most sexual functioning areas, psychological adjustment throughout lockdown did predict lower sexual functioning in both genders.	Negative factors: <ul style="list-style-type: none"> • Increasing psychological adjustment
11. The relation between mental health and sexual function	Effati-Daryani, F et al. 2021	cross-section al	437 pregnant women	29.7± 5.5	1. FSFI 2. stress, depression, and	The mean (SD) of FSFI was 20.0 (8.50) from the accessible range of 2 to 36. The mean (SD) of depression, stress, and anxiety scale was 4.81 (5.22), 5.13 (4.37), and 7.86 (4.50)	Negative factors: <ul style="list-style-type: none"> • Stress • Anxiety • Depression



in pregnant women throughout the COVID-19 pandemic in IRAN (27)	Iran				anxiety scale (DASS)	(possible score ranging from 0 to 21), respectively.	Positive factors: <ul style="list-style-type: none"> Benign stress type of spouse's job Sufficient household income Living with parents Higher marital satisfaction raise gestational age
12. Sexual Activity advantages on Psychological, Relational, and Sexual Health Throughout the COVID-19 Breakout (41)	Mollaioli, D et al. 2021 Italy	case-control	4177 women and 2644 men	32.83± 11.24	1. FSFI 2. IIEF 3. (GAD-7) for anxiety 4. (PHQ-9) 5 (DAS) for quality of relationship 6. male-female versions of the Orgasmometer	Sexually active persons showed low scores of Anxiety and depression throughout lockdown. However, sexual activity, gender and living alone throughout lockdown significantly affected anxiety and depression grades (P < .0001). No sexual activity throughout lockdown was linked to more danger of developing anxiety and depression (P < .001 and P < .0001, respectively).	Negative factors: <ul style="list-style-type: none"> Older age (for sexual desire and pain)
13. : An Internet-Based Nationwide Survey Study: Evaluation of the individuals Sexual Functioning Living in Turkey Throughout the COVID-19 Pandemic (23)	Karsiyakali, N et al. Turkey	cross-sectional	685 women and 671 men	33.16 ±8.31	Questions for evaluation the sexual intercourse repetition and sexual desire based on B and IIEF	sexual intercourses mean number before the COVID-19 was 1.86 ± 1.67 per week while this declined to 1.35 ± 2.04 throughout the COVID-19 crisis. There was a meaningful decreased in the number of weekly intercourses ,when they were compared in terms of using alcohol and smoking , marital and parental status, working as a health-care, having a stable sexual partner, and the job status throughout the COVID-19 pandemic (P < .05, for each).	Negative factors (for sexual desire): <ul style="list-style-type: none"> Older age Female gender Using siggarett single Not having a child jobless stable partnership
14. COVID-19 Pandemic in the United States and its impact on Female Sexual Function	Bhambhvani , H et al. 2021 United States	Longitudinal	91	43.1 ± 11.8	1. FSFI 2. sexual repetition 3. (PHQ-4)	Generally reduction in FSFI scores revealed throughout the pandemic (27.2 vs 28.8, P = .002), especially in lubrication (4.90 vs 5.22, P = .004), arousal (4.41 vs 4.86, P = .0002) and satisfaction (4.40 vs 4.70, P = .04). Sexual repetition did not change. Risk for	Negative factors: <ul style="list-style-type: none"> Anxiety Depression



						female sexual dysfunction significantly increased throughout the pandemic (P = .002).	
15. Relational, Sociocultural and Individual Determinants of Sexual Satisfaction and Function in Ecuador (29)	Hidalgo, D et al. 2021 Ecuador	cross-sectional	431 women and 159 men	18-58	1. Brief Sexual Opinion Survey 2. Sexual Double Standards Scale 3 (SDBQ) 4. New Sexual Satisfaction Scale 5. FSFI 6. IIEF 7. Couples Satisfaction Index (15)	Quarantine effect showed no significant association with sexual function and satisfaction. Only female sexual satisfaction affected by the perceived effect of quarantine. Mainly in women, Markers of sexual conservatism were related inversely to sexual function and satisfaction.	Negative factors: • Higher score of sexual dysfunctional beliefs Positive factors: • Higher sexual double standards • Higher sexual satisfaction • Higher relationship satisfaction
16. Love in COVID-19 crisis: Quality of Life and Sexual Function Analysis Throughout the Social Distancing Measures in a Group of Italian Reproductive-Age Women (5)	Schiavi, M et al. 2020 Italy	cross-sectional	89	28-50	1. FSFI 2. FSFS 3. SF-36 for the quality of life assessment	Mean sexual intercourse/month dropped from 6.3 ± 1.9 to 2.3 ± 1.8 , mean difference: -3.9 ± 1.2 . FSFI reduced significantly (29.2 ± 4.2 vs 19.2 ± 3.3 , mean difference: -9.7 ± 2.6) and FSFS increased significantly (9.3 ± 5.5 vs 20.1 ± 5.2 , mean difference: 10.8 ± 3.4).	Negative factors: • Working outside the home • University educational level • Parity ≥ 1
17. An Online Survey: Polish Women's Mental and Sexual Health Throughout the COVID-19 Pandemic (22)	Szuster, E et al. 2021 Poland	cross-sectional	1644	25.11 ± 7.09	1. Beck Depression Inventory (BDI) 2. FSFI	Lower repetition of sexual activity were reported (P < .001) and lower libido level (P < .001) throughout the pandemic compared to past. The FSFI and BDI scores were significantly correlated (P < .001).	Negative factors: • Depression • Presence of any comorbid chronic disease • Disease phobia • Health anxiety • Perceived loneliness • News listening



18. Are Women Suffering More? Psychological and Sexual Health Throughout the COVID-19 Pandemic in Egypt: (42)	Omar, S et al. 2021 Egypt	cross-sectional	479 women and 217 men	NR	1. (GAD-7) 2. (PHQ-9) 3. FSFI 4. IIEF-5 5. Index of Sexual Satisfaction (ISS)	Sexual satisfaction was (91.2%, 73.5%) which decreased throughout lockdown (70.5%, 56.2%) in men and women, respectively. more males (70.5%) reported being satisfied with their sexual performance than females Throughout lockdown (56.2%) (P < .001).female has reported more Sexual stress (70.8%) than males (63.1%).	Negative factors (for sexual stress): • jobless • Above 35 Husband's age • 5-10 years of Marriage • Anxiety
19.couples with azoospermia's Sexual and psychological health in the context of the COVID-19 pandemic (28)	Dong, M et al. 2021 China	cross-sectional	200 couples : 100 azoospermia and 100 normal	32.76 ± 4.32 in the wives of patients with azoospermia and 33.51 ± 4.42 in the wives of patients with Normozoospermia.	1. FSFI 2. IIEF-15 3. Premature Ejaculation Diagnostic Tool (PEDT) 4. A researcher designed questionnaire 5. 7-item Generalized Anxiety Disorder (GAD-7) scale 6. PHQ-9	total FSFI scores (25.12 ± 5.56 vs. 26.75 ± 4.82, t = -2.22, p = 0.03) of wives of men with azoospermia were lower than normal couples.	Negative factors: • Anxiety • Depression
20. healthcare Sexual attitudes throughout the COVID-19 outbreak (21)	Culha, M et al. 2021 Turkey	cross-sectional	89 women and 96 men	30.65 ± 5.99	1. FSFI 2. State Anxiety Inventory (STAI-1 and 2) 4. BECK depression inventory	sexual desire of Healthcare workers' (3.49 ± 1.12 vs. 3.22 ± 1.17; p = 0.003), weekly sexual intercourse/masturbation number (2.53 ± 1.12 vs. 1.32 ± 1.27; p < 0.001), foreplay time (16.38 ± 12.35 vs. 12.02 ± 12.14; p < 0.001), sexual intercourse time (24.65 ± 19.58 vs. 19.38 ± 18.85; P < 0.001) diminished compared to the Pre-COVID-19 crisis.	Negative factors: • Male gender • Alcohol using
21. COVID-19 impacts on	Fuchs, A et al. 2021	cross-sectional	764	25.1 ± 4.3	FSFI	FSFI score was 30.1 ± 4.4 before the crisis and changed to 25.8 ± 9.7 throughout it. All	Negative factors: • Stress



Female Sexual Health (17)	Poland					domain scores diminished as well (p < 0.001).	<ul style="list-style-type: none"> • Misunderstandings with partner • Fear of Covid-19 • Lower education • Bad living conditions • Unemployment • Living with their parents
22. Depression and Sexual Function in the COVID-19 Pandemic : Are Pregnant Women Affected More negatively? (14)	Denizli, R et al. 2021 Turkey	cross-sectional	188 (96 pregnant women and 92 non-pregnant women)	30.1±6.4	1. Beck Depression Inventory (BDI) 2. Arizona Sexual Experience Scale (ASEX)	The depression status are the same in both (p=0.846). Pregnant women (p<0.001) showed higher Sexual dysfunction rate.	Negative factors: <ul style="list-style-type: none"> • Lower level of schooling • Lower income • Loss the income in the course of the pandemic • Pregnancy

