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Love in the Time of COVID-19: Sexual Function and Quality of Life Analysis During the Social Distancing Measures in a Group of Italian Reproductive-Age Women



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ABSTRACT

Background: The beginning of 2020 was characterized by the COVID-19 pandemic. The world governments have adopted restrictive measures to reduce the spread of infection. These measures could affect the sexual function and quality of life of women living with their partner.

Aim: The aim is to assess the impact of the social distancing measures caused by the COVID-19 pandemic on sexual function and quality of life of noninfected reproductive-age women, living with their sexual partner.

Methods: Observational analysis on sexually active women, living with their partner, and without COVID-19 infection was performed. The population previously answered FSFI, FSDS, and SF-36 questionnaires. 4 weeks after the introduction of the restrictive measures, these women were invited to complete the same questionnaires by e-mail for an evaluation during the COVID-19 outbreak.

Main Outcome Measures: The primary endpoint was the assessment of the women's sex function change during the social restriction period, by analyzing the FSFI and FSDS questionnaires. The secondary endpoint was the evaluation of the impact on the quality of life calculated by the SF-36 questionnaire.

Results: 89 patients were considered. The median age was 39 (28–50) years. Mean sexual intercourse/month decreased from 6.3 ± 1.9 to 2.3 ± 1.8 , mean difference: -3.9 ± 1.2 . FSFI decreased significantly (29.2 ± 4.2 vs 19.2 ± 3.3 , mean difference: -9.7 ± 2.6) and FSDS increased significantly (9.3 ± 5.5 vs 20.1 ± 5.2 , mean difference: 10.8 ± 3.4). The SF-36 showed a significant change from 82.2 ± 10.2 to 64.2 ± 11.8 4 weeks after the introduction of the restrictive measures; mean difference: -17.8 ± 6.7 . The univariable analysis identified working outside the home, university educational level, and parity ≥ 1 as predictive factors of lower FSFI. In multivariable analysis, working outside the home and combination of working outside the home + university educational level + parity ≥ 1 were the independent factors of a lower FSFI.

Clinical Implication: The negative impact of the COVID-19 epidemic period on sexual function and quality of life in women shows how acute stress might affect the psychological state. Thus, psychological or sexual support could be useful.

Strengths and Limitations: To our knowledge, this study is the first that analyzes the change in sexual activity in women during the COVID-19 outbreak period. The limitations were the low number of the analyzed participants, psychological tests were not included, and no data were collected on masturbation, self-heroism, solitary, and nonpenetrative sex.

Conclusion: The COVID-19 epidemic and the restrictive social distancing measures have negatively influenced the sexual function and quality of life in not-infected reproductive-age women who live with their sexual partners.

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INTRODUCTION

The coronavirus-2019 (COVID-19) represents the cause of the pandemic that is currently affecting worldwide. Since the first reports of cases from Wuhan, a city in the Hubei Province of China, at the end of 2019, the disease has spread rapidly across the world.¹ COVID-19, similarly to the virus responsible for severe acute respiratory syndrome (SARS), is a beta-coronavirus that can be spread to humans through intermediate hosts such as bats.² The coronavirus (COVID-19) pandemic is the defining global health crisis of our time and the greatest challenge we have faced since World War II. Actually, more than 3,800,000 confirmed cases of COVID-19, with 265,000 new deaths, have been reported.³

The mortality rate declared by WHO is around 2%. Unfortunately, older age was associated with increased mortality, with a case fatality rate of 8–15% among those aged 70 to 79 years and 80 years or older, respectively.^{4,5} COVID-19 is much more than a health crisis. It has the potential to create devastating social, economic, and political crises that will leave deep scars.

To date, in Italy, a total of 215,000 positive cases of coronavirus and 30,000 people dead have been recorded with an evident increasing trend.^{3,6}

Italy is, therefore, the third most affected country in the world for the number of infected and dramatically the second for the number of deaths after the United States. Among the first containment measures implemented by our government, 11 municipalities in the north of Italy were quarantined. Despite this, the spread continued aggressively, and on 11th March, the restriction and social distancing measures were extended to the whole nation.

These measures aimed to ensure the social distance between people avoiding the people aggregation. Most of the services and commercial activities have been closed, and in open services, the social distance between individuals of at least 1 meter must be guaranteed with protective masks.^{7,8} However, although these procedures serve to decrease the spread of the virus, people are experiencing, suddenly, a change in their daily routine, limiting many personal and work activities.

It is understandable that during this time, people may experience increased anxiety and stress levels as they limit social interactions and spend long periods at home.⁹ Previous research has shown a significant psychosocial impact on people during times of global epidemic.¹⁰

Anxiety and fear over personal health or the health of loved ones are typical reactions to a global pandemic. Other feelings can include anger, frustration, and boredom over the uncertainty of when life will return to “normal.” In high-stress situations and loneliness, some people may experience symptoms of depression or post-traumatic stress disorder.¹¹

Sexual function is influenced by multiple factors that impact the emotional or hormonal aspect.¹² Furthermore, in several studies, parity, level of education, lifestyle, and work are some of the characteristics who could influence sexual life. Currently, in the literature, there are no data regarding the change in sexual

function during the social restriction period. However, the stressful period has been linked to female reproduction. By contrast, much less research attention has been focused on the relationship between stress and sexual functioning.

Both psychological and physiological components can potentially be involved in the relationship between stress and sexual function.¹³ The evidence of the negative effects of stress on sexual function is consistent, and the mechanisms involved in this relationship are not well defined.¹⁴ Several studies document the hormonal mechanisms involved in the suppression of reproductive function by both acute and chronic stressors. Psychologically, stress can interfere with sexual activity through both emotional and cognitive changes that distract the individual from focusing on sexual cues. This distraction from sexual stimuli would result in lower levels of arousal because the women experiencing higher levels of stress may not be attending to the sexual stimuli at the same level of participants with lower levels of stress. Distraction from sexual cues has been shown to have deleterious effects on both genital and subjective arousal in women.¹⁵ Probably the fear of contagion, the stressful situation, and the change in daily life may hurt the sexual activity of the women examined.¹⁶ This study aims to evaluate the modification of sexual function in an Italian reproductive-age women group during COVID-19 pandemic period.

MATERIALS AND METHODS

Is an observation analysis of reproductive age women referred to the Department of Gynecological and Obstetric of Sandro Pertini Hospital of Rome, to Physiopathology of Reproduction and Andrology Unit, Sandro Pertini Hospital of Rome, and to Pelvic floor surgery and Proctology department of Campus Biomedico, University of Rome, between February 2018 and February 2020, who had completed specific questionnaires to assess sexuality and quality of life during their first visit.

4 weeks after the introduction of the social distancing measures due to the COVID-19 outbreak, they were invited to respond to the questionnaires again. All data were evaluated from a Gynecological and Urogynecological internal database. The research was conducted according to Good Clinical Practice Guidelines, Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guidelines. The Institutional Review Board approved the study.

The women enrolled in the study were visited, for the first time, at the aforementioned departments for several reasons: gynecological check-up, urogynaecological diseases, contraception required, infertility, and pelvic control ultrasound. All women had completed the specific sexual function and quality of life questionnaires: Female Sexual Function Index (FSFI) and the Female Sexual Distress Scale (FSDS) questionnaires for the sexual function evaluation and the 36-Item Short Form Survey (SF-36) for the quality of life assessment at the time of the visit as we usually propose.^{17–19}

During the COVID-19 epidemic period (at least 4 weeks after the introduction of the restrictive measures), given the impossibility of returning to the specific outpatient, these women were invited to answer the same questionnaire to re-evaluate sexual function and quality of life. Questions were sent by e-mail, to avoid the telephone interview that could influence the answers of the women interviewed. A time limit of 3 days was offered to respond to the questionnaires. The inclusion criteria were as follows: women in reproductive age (18–45 years old); sexually active women who live with them; not infected with COVID-19 virus; a compilation of FSFI, FSDS, and SF-36 previously (at least 4 weeks before the COVID-19 epidemic period and the introduction of the restrictive measures); signature of informed consent; and consent to the processing of health data for research purposes.

The exclusion criteria were as follows: no sexually active women; under the age of 18 or over 45; COVID-19 positivity; sexual partner with COVID-19 infection; superficial and profound dyspareunia; women with chronic pelvic pain; deep endometriosis or interstitial cystitis/bladder pain syndrome; neurogenic bladder; gynecological cancer or urological cancer; history of pelvic radiotherapy; pelvic organ prolapse \geq grade 3 (according to POP-Q classification); pregnancy; menopause; premature ovarian failure (POF); all the gynecological, urological, and oncological diseases diagnosed in the period between the first and the second compilation of the questionnaires, which may have influenced sexual life and quality of life; no signature of informed consent. The definition of sexual activity was as follows: sexual intercourse between women and the partner, defined as penile penetration of the vagina. We have not rated solitary sex or nonpenetrative sex. Unfortunately, the data related to auto-eroticism and nonpenetrative sex were missing in the pre-Covid period and therefore were not collected for analysis. Nonsexually active women mean the absence of sexual intercourse during the analyzed period. All the e-mails containing the questionnaires were received by a single author (M.C.S.) who systematically entered the data in a shared database anonymously for the patients, respecting the current privacy rules.

Demographic and individual characteristics (age, work, educational level, contraception, parity, smoking) were analyzed to assess the possible correlation with the change in sexual function during the epidemic period. All the women analyzed live in the same house with their partner.

The selection of women characteristics who can influence sexual function has been extrapolated from the available data in the database.

The primary endpoint was the assessment of change in women's sexual function during the government-imposed social restriction period due to the COVID-19 virus epidemic, by analyzing the frequency of sexual intercourse, FSFI, and FSDS questionnaires. The secondary endpoint was the evaluation of the impact of these social restriction rules on the quality of life calculated with the SF-36 questionnaire. Women who did not

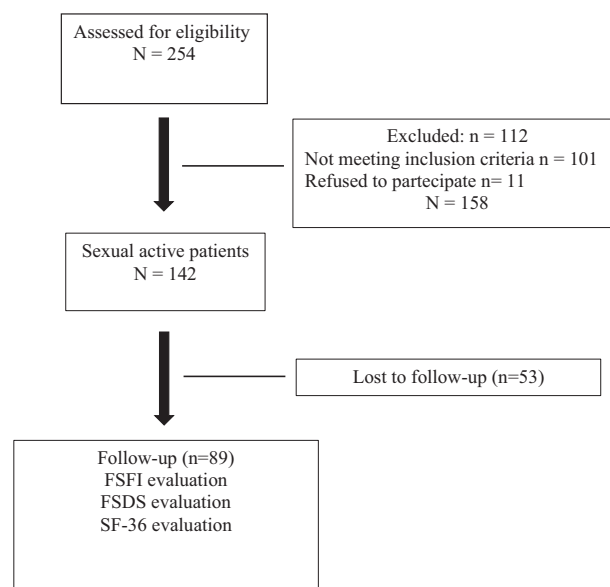


Figure 1. Eligible patients in the study. FSDS = Female Sexual Distress Scale; FSFI = Female Sexual Function Index; SF-36 = The Short-Form (36) Health Survey.

respond to all parts of the questionnaires were excluded from the analysis.

The incidence of events was analyzed for statistical significance by using the Fisher exact test. Odds ratio (OR) and 95% confidence intervals (CIs) were calculated for each comparison. The t-test and Mann-Whitney *U* test were used to compare continuous parametric and nonparametric variables (when the data do not fit into the normal distribution), respectively. Correlations between numerical parameters were computed using the Spearman rank correlation coefficient. Paired t-test was applied to determine the change in questionnaires (FSFI, FSDS, and SF-36) values. Univariable and multivariable analysis through a logistic regression (ANOVA) was used to assess the predictive value and relative risk of specific variables. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) 22.0 for Mac (SSPS, Chicago, IL). Significance was set at a *P*-value of $<.05$.

RESULTS

254 patients were enrolled in the study; 101 were excluded from the analysis because they did not meet the proposed inclusion criteria, 11 refused to participate and 53 were lost to follow-up (Figure 1). Therefore, 89 patients were considered for the final analysis. The median age was 39 (28–50) years. The other baseline demographic and clinical characteristics of the patients are shown in Table 1. Overall, the mean number of sexual intercourses/month decreased significantly from 6.3 ± 1.9 to 2.3 ± 1.8 (-3.9 ± 1.2) ($P < .0001$), and 8 (9%) women did not have sexual intercourse during the month of social restriction. The number of women who practiced ≥ 4 sexual intercourses/month, 4 weeks after the introduction of the social

Table 1. Clinical and demographic characteristics in 89 patients

Variables	n
Age, y (range)	39 (28–50)
BMI (range)	25 (22–29)
Parity (%)	
0	21 (22.5)
1	43 (48.3)
2	23 (25.9)
3	2 (2.3)
Previous pelvic surgery (%)	10 (11.2)
Smoke (%)	15 (16.8)
Educational level	
Primary schools (%)	2 (2.2)
High school (%)	46 (51.7)
College or university (%)	41 (46.1)
Work	
Working outside the home (%)	60 (67.4)
Working in the home (%)	29 (23.6)
Hormonal contraception (%)	35 (39.3)
Intercourses in the previous month*	
≥8 times (%)	31 (34.8)
≤8 times (%)	58 (65.2)

BMI = body mass index; SD = standard deviation.

*The analysis was calculated until the month before the governmental social restriction decree.

distancing measures due to the COVID-19 outbreak, decreased from 89 (100%) to 52 (58.4%), $P = .023$ and the women who had ≥8 sexual intercourses/month decreased from 31 (34.8%) vs 8 (9%) ($P = .0007$). Median FSFI was 28.5 before the COVID-19 period, while during the containment measures, it was 19.7.

The total FSFI score decreased significantly [29.2 ± 4.2 vs 19.2 ± 3.3 (-9.7 ± 2.6); $P < .0001$]; the change of specific items (Desire, Arousal, Lubrication, Orgasm, Satisfaction, and Pain) is shown in Table 2.

The FSDS score increased significantly during the social distancing period from 9.3 ± 5.5 to 20.1 ± 5.2 (10.8 ± 3.4) ($P < .0001$). Quality of life assessment with the SF-36

questionnaire showed a significant change: 82.2 ± 10.2 vs 64.2 ± 11.7 (-17.8 ± 6.7), $P < .0001$.

The subanalysis, in 60 women working outside the home compared with 29 women working in the home, showed a significant difference in the mean number of sexual intercourses/month (2.3 ± 1.3 vs 6.8 ± 2.1 , $P = .04$) for the FSFI score (18.3 ± 3.3 vs 24.4 ± 4.5 ; $P < .0001$); for the FSDS score (21.1 ± 5.1 vs 18.7 ± 4.8 ; $P = .04$) and the SF-36 (62.2 ± 11.8 vs 70.2 ± 11.3 ; $P = .003$) during the COVID-19 outbreak. The subanalysis, in 41 women with university education level compared to 48 women with nonuniversity education level, showed a significant difference in the mean number of sexual intercourses/month (3.1 ± 1.4 vs 5.7 ± 1.9 , $P = .03$) for the FSFI score (18.7 ± 4.3 vs 22.1 ± 4.8 ; $P = .0008$), for the SF-36 (61.1 ± 12.0 vs 67.5 ± 11.8 ; $P = .014$), but no significant difference for the FSDS score (21.7 ± 4.6 vs 19.9 ± 4.3 ; $P = .06$) during the COVID-19 outbreak.

The subanalysis in 68 women, who have ≥1 child, compared with 21 childless women, showed a significant difference for the FSFI score (17.8 ± 4.7 vs 22.4 ± 4.3 ; $P = .002$); and no significant difference in the mean number of sexual intercourses/month (4.6 ± 1.8 vs 5.1 ± 2.2 , $P = .70$) for the FSDS score (22.2 ± 4.4 vs 20.7 ± 4.9 ; $P = .17$) and the SF-36 (62.1 ± 11.7 vs 65.2 ± 10.1 ; $P = .28$) during the COVID-19 outbreak. Finally, women taking oral contraceptives 35 (39.3%) showing no significant difference in sexual function or quality of life compared to 54 (60.7%) women who do not take them. Considering factors influencing the FSFI score, the univariable analysis identified working outside the home, university educational level, and parity ≥1 as predictive factors of lower FSFI score. Independent risk factors for low sexual function by multiple logistic regression analyses are shown in Table 3. After adjusting all those variables, in multivariable analysis, working outside the home and combination of working outside the home + university educational level + parity ≥1 were the independent factors of a lower FSFI after 4 weeks from the beginning of the COVID-19 period.

Table 2. Comparison of the sexual functions and quality of life before and during COVID-19 epidemic period

Variables	Before COVID-period	During COVID-Period*	Mean difference	95% CI	P value
Sexual intercourses/month (mean ± SD)	6.3 ± 1.9	2.3 ± 1.8	-3.9 ± 1.2	(-4.5; -3.2)	<.0001
FSFI total (mean ± SD)	29.2 ± 4.2	19.2 ± 3.3	-9.7 ± 2.6	(-14.3; -6.8)	<.0001
Desire (mean ± SD)	3.8 ± 0.9	3.2 ± 1.1	-0.8 ± 0.5	(-1.2; -0.7)	.0007
Arousal (mean ± SD)	4.8 ± 0.9	3.6 ± 1.1	-1.1 ± 0.9	(-1.6; -0.6)	<.0001
Lubrication (mean ± SD)	4.9 ± 1.6	4.4 ± 1.7	-0.4 ± 0.5	(-0.8; 0.2)	.07
Orgasm (mean ± SD)	4.7 ± 0.8	4.2 ± 1.1	-0.6 ± 0.4	(-1.0; -0.3)	.0009
Satisfaction (mean ± SD)	5.9 ± 1.3	4.2 ± 1.4	-1.6 ± 0.9	(-2.3; -0.9)	<.0001
Pain (mean ± SD)	4.8 ± 1.1	4.5 ± 1.2	-0.3 ± 0.2	(-0.6; 0.2)	.11
FSDS (mean ± SD)	9.3 ± 5.5	20.1 ± 5.2	10.8 ± 3.4	(4.2–14.7)	<.0001
SF-36 (mean ± SD)	82.2 ± 10.2	64.2 ± 11.8	-17.8 ± 6.7	(-18.4; -9.6)	<.0001

FSDS = Female Sexual Distress Scale; FSFI = Female Sexual Function Index; SD = standard deviation; SF-36 = The Short-Form (36) Health Survey.

*4 weeks after the start of social containment measures.

Table 3. Predictive value of specific variables for FSFI score—univariable and multivariable analysis

Variables (mean FSFI)	Univariable analysis			Multivariable analysis		
	OR	95% CI	<i>P</i>	Adjusted OR	95% CI	<i>P</i>
Working in the home	1 (Referent)			1 (Referent)		
Working outside the home	3.6	1.6–7.9	<.0001	4.6	1.8–10	<.0001
Parity = 0	1 (Referent)			1 (Referent)		
Parity ≥ 1	2.4	1.1–4.8	.02	0.6	0.2–1.7	.269
Nonhormonal contraception	1 (Referent)			1 (Referent)		
Hormonal contraception	1.5	0.7–3.2	.32	1.3	0.5–2.8	.45
Nonuniversity educational level	1 (Referent)			1 (Referent)		
University educational level	2.9	1.4–6.7	.004	0.8	0.2–1.6	.59
Working in the home + parity = 0 + nonuniversity level	1 (Referent)			1 (Referent)		
Working outside the home + parity ≥ 1 + university level	5.7	2.2–9.1	<.0001	3.8	1.4–8.9	.03

CI = confidence interval; OR = odds ratio.

DISCUSSION

The study showed a decrease in sexual function and quality of life in reproductive-age women during the social restriction period due to the COVID-19 epidemic. Despite the longer cohabitation time, women who live with their partners have reduced significantly the sexual activity. Specifically, women who practiced ≥4 sexual intercourse a month before government measures decreased from 89 (100%) to 52 (58.4%). Social distancing measures imposed must be respected to try to decrease the infections and deaths. Smart-working is raised, interpersonal relationships have decreased, but people had to adapt and understand that it is extremely useful for the whole population.

Nevertheless, in this atmosphere of generalized alarm, the way of life is inevitably changed. This social restriction and the uncertainty about the future have an impact on people's quality of life and sexual function.²⁰ The main psychological impact to date is caused by high rates of stress and depression, anxiety, and dissatisfaction.^{9,21}

In times of high stress, sexual activity can be reduced more in women who do not have a partner at home, because the distancing measures prohibit going out.¹² However, as demonstrated in our results, women who live with their partners also suffer from negative influences from the external environment and showed a significantly lower FSFI and SF-36 scores during the COVID-19 epidemic. Also, the increase in sexual distress negatively affects women's quality of life. This worsening, probably, is due to the emotional impact, caused by the emergency, on the women psychology.⁹

During the initial phase of the COVID-19 outbreak in China, female gender, student status, and specific physical symptoms were associated with a greater psychological impact and higher levels of stress, anxiety, and depression.²² The psychological trauma is felt by the health workers. Surprisingly, in the non-frontline Chinese nurses and the general public, severity was significantly higher than the frontline nurses who are in close contact with COVID-19 patients. Therefore, people confined to

home, far from a real perception of the epidemiological situation, also experience generalized fear.²¹ Certainly, as already proposed in China during the forced quarantine, the introduction of specific health information and some precautionary measures including psychological support has been linked to a lower level of stress, anxiety, and depression, and a better psychological outcome.¹¹ Unfortunately, in the present study, there are no data on the association between psychometric alteration and sexual activity. In fact, the analyzed women had not completed psychological tests.

The decrease in the average number of sexual intercourses, during an extreme stress period, depends on several variables.^{23,24} People's priorities have certainly changed, and sexual arousal and relationship status are influenced by the surrounding environment. Inevitably, women tend to decrease sexual activity during this period. Sometimes, with a significant impact on marital life, above all if the stressful period is prolonged.^{25,26}

Therefore, the panic of contagion, fear of having contact with the partner working outside the home (30% of our population reported partner working outside the home during the epidemic period), anxiety, and depression compromise daily life. Furthermore, less body care during the quarantine may have affected the reduction of desire. The sexual dysfunction, measured by FSFI, was found in 67% of the sample associated with a sedentary lifestyle.²⁷ In the present study, women working outside the home during the COVID-19 outbreak period showed a greater reduction in sexual function and FSFI and SF-36 scores than in women working in the home. These results could be explained by the greater exposure of these women to the external environment and therefore to the possibility of infecting the sexual partner. Indeed, the desire is significantly reduced in this group of women.¹⁴

A significant difference was also observed between university educational level vs nonuniversity educational level women. Women who had a higher level of education showed a greater decline in terms of sexual activity, and quality of life. Perhaps, the greater propensity for critical reading of pandemic information,

strict compliance with the rules, and a higher percentage of women working outside the home into the group could affect sexual desire and quality of life.^{21,28} Parity ≥ 1 was another factor influencing negatively FSFI, due to the constant and demanding presence of children at home which could reduce sexual desire. We excluded pregnant women because it has already been widely demonstrated that pregnancy significantly diminishes sexual function in women.²⁹ Probably facing a stressful period reduces sexual desire and quality of life. The activation of psychological and sexual assistance programs can be useful in women who will not be able to solve the problem after the end of quarantine. But the end of social restrictions and the return to normal daily life will be essential to restore women's psychological balance.

CONCLUSION

The acute stress caused by the government's social restriction measures to contain COVID-19 infections has worsened sexual function and quality of life in women living with their partners, probably due to the inability to adapt quickly to a significant change in daily life. This deterioration may be due to the emotional impact caused by the emergency. Although sexual activity is not the main concern during the COVID-19 emergency period, it is a key aspect of women's lives.^{23,30} To our knowledge, this is the first study in the literature that analyzes the change in sexual function in women of reproductive age during the COVID-19 pandemic.

Surely, it would be very interesting to evaluate the correlation between restriction measures and the relational aspect with the partner, but the present study is essentially aimed at assessing sexual function and frequency of sexual intercourse. Therefore, the main limitations of the study were the low number of participants analyzed, psychological tests were not included, and data on masturbation, self-heroism, solitary, and nonpenetrative sex were not collected. Also, the emotional relationship and affectivity within the couple were not evaluated. Further prospective studies on a larger number of women are needed to confirm these results and any possible change in the national birth rate due to a reduction in sexual activity.

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