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Perceptions of women on sexuality, intimacy, and health-related quality of life during the COVID-19 epidemic

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ABSTRACT

Introduction: The COVID-19 epidemic and its restrictions have affected all aspects of people's lives, including health-related quality of life and, considering sexuality as an integral part of individual needs, also intimacy and sexuality. Therefore, the aim of this article was to investigate women's sexual functioning and health-related quality of life assessment in Slovenian women in the reproductive period.

Methods: An online survey with valid questionnaires (short form 36 [SF-36] and Female sexual function index [FSFI-19]) was conducted in January 2022. All research ethical measures were taken to ensure the integrity of the participants.

Results: The FSFI scale score was 25.37 ± 8.29, 1.18 points above the cutoff point, indicating a higher risk of sexual dysfunction (26.55). The estimated prevalence of sexual dysfunction was 36.8%, with sexual desire being the most problematic area. The mean score on the SF-36 scale in our sample reached 73.52 ± 13.84 on a 100-point scale, with 0 representing the worst and 100 the best quality of life; fatigue ($\bar{x}$= 48.50) was the most problematic category. The results partly reflect the results of foreign studies, but we must be aware of cultural differences in the understanding of sexuality and keep in mind that some countries faced difficult circumstances during the COVID-19 pandemic and that social constraints were different in 2020 than in 2022.

Conclusion: The epidemic affected the sexual function of women of reproductive age and their perception of (health-related) quality of life.

Keywords: COVID-19; intimacy; midwifery; quality of life; sexuality

INTRODUCTION

Exceptional circumstances such as the declaration of an epidemic affect all aspects of people's lives, including partnerships (1,2). The new coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first discovered in Wuhan, China, spread rapidly around the world (3). By the end of 2021, the World Health Organization (4) recorded 274,628,461 confirmed cases of infection and 5,358,978 deaths due to Covid-19. The first case of coronavirus disease in Slovenia was confirmed on March 4, 2020 (5). The government declared the epidemic on March 12 of the same year. During this time, various preventive measures were taken to contain the spread of the infection (6). People faced major changes (7,8) in their daily lives, became ill and lost loved ones. They were under stress due to the fear of infection, the changed economic situation, limited social contacts and altered working conditions. Some worked from home, for example, and in some industries people were exposed to higher work demands and an increased risk of infection (9), while some lost their jobs. The fact that they were confined and had to spend their days with their partner and family affected their quality of life, relationships, intimacy and even sexuality (2,10).

Randall et al. (2) conducted a study in 27 countries and concluded that personal stress levels had increased during the epidemic. Stress caused by the state (restrictions imposed by the virus) did not affect the quality of the relationship as much as personal stress; people who reported high levels of personal stress found their relationships with their partners unsatisfactory in particular. A very important factor that increased the quality of the partnership was mutual support in solving problems. Some researchers reported higher levels of self-rated relationship quality, but lower quality of relationships with friends and significant others (1). Pietromonaco and overall (11) note that factors such as loss of significant others, changes in daily life, isolation and other perceived losses due to the epidemic affected couples differently; personal characteristics and pre-epidemic relationship quality played a role in how their relationship

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evolved during the COVID-19 epidemic. People with low socioeconomic status were particularly at risk.

Murgaš and Petrovič (12) write that the overall quality of life of women during the epidemic was lower than before, but still higher than the average assessment of all citizens before COVID-19. A particular element of quality of life is health-related quality. The largest declines in perceived health-related quality of life during the COVID-19 epidemic were observed among women and the elderly. Many factors played a role in these perceptions. Single people rated their quality of life lower than people living in a relationship. Chronic illness and living in a household with members who had a higher risk of severe respiratory disease also had a negative impact (13).

El Keshky et al. (14) found more post-traumatic stress disorder and mental health problems since the beginning of the epidemic. They point out that the prevention measures also affected quality of life. Some were under greater stress due to media reports on mortality rates, and those who worked in sectors such as tourism and lost their jobs faced great financial instability. In contrast, people employed in healthcare, delivery services, grocery stores, and the like were burnt out (15). Constant cohabitation led to friction in households, and more cases of domestic violence were reported (16).

Those who had an infection and suffered from the long-term effects rated their quality of life up to 31% lower 3 months after infection than before the disease (17); many also suffered from the psychological effects of the disease itself (18).

Quality of life also depends on the perceived quality of the partnership, which in turn is closely linked to the quality of intimacy and sexuality. Satisfaction with sexuality in sexual function correlates closely with perceived quality of life (19,20). Many factors that influence individual (health-related) quality of life also have an impact on sexual function and partnership, for example, infertility (21), pelvic floor dysfunction (22), self-perception or body image (23), and the like. Epidemic and preventive measures had a major impact on the expression of intimacy. Touching, which is considered one of the basic forms of expressing affection and forms the core of intimacy, was restricted, especially in couples who did not live in the same household. The opposite was true for cohabiting couples (24). A close relationship was found between physical distancing, stress, and the perceived quality of the relationship. Higher ratings of relationship quality were associated with frequent affectionate touching between partners (25).

In this context, it is logical that relationship status, monogamy, sexual desire, and satisfaction with sex life were strongly influenced (26). Li et al. (27) write that those individuals who were more afraid of contracting COVID-19 and radically changed their lifestyle during the epidemic reported more negative consequences in the area of sexuality, but rated their partnership as better. This suggests that intimacy was highly valued. Couples living together but with home-schooled children, on the other hand, reported more negative consequences of isolation for their partnership, more frequent conflicts, and higher stress levels among family members (28).

Younger adults reported lower sexual desire, less frequent sexual intercourse, and masturbation during the epidemic: Thirty-one percent estimated that their relationships were affected by the epidemic (27). Schiavi et al. (10) found that women of reproductive age had less frequent sexual intercourse (including those who lived with a partner in the same household). They also reported lower sexual function in women compared to before COVID-19. The latter was confirmed by Bazyar et al. (29) using a literature review for both sexes. Women cited isolation, arguments with their partner, low sexual desire and fear of infection with SARS-CoV-2 as reasons for less frequent sexual intercourse and lower sexual function (30). Starc et al. (31) reported that 31% of Slovenian women suffered from sexual dysfunction before the epidemic.

The aim of our study was to investigate whether the epidemic and related prevention measures had an impact on sexual function in Slovenian women of reproductive age and how they perceived intimacy and partnership in relation to health-related quality of life. Since the epidemic was declared at different times in different countries, we consider the epidemic as the period from the beginning of 2020.

METHODS

The study is designed as a descriptive and non-experimental method of empirical research and is based on a validated online questionnaire consisting of two parts: The first part of the questionnaire: Female sexual function index (FSFI-19) (32) and the second part of the questionnaire: Health-related quality of life assessment short form 36 (SF-36) (33). The aim of the study was to investigate the sexual function and quality of life of Slovenian women during the reproductive period in accordance with the research results of other countries (in relation to COVID-19). For this purpose, two research questions were asked:

RQ1: What is the sexual function of Slovenian women in the reproductive period during the COVID-19 epidemic?

RQ2: What is the health-related quality of life of Slovenian women in the reproductive period during the COVID-19 epidemic?

The sample consisted of women in the reproductive period (the boundaries of the reproductive period, i.e., from 18 to 45 years of age), defined based on the inclusion criteria of the study by Schiavi et al. (10), with permanent residence in Slovenia, who received the questionnaire via social networks. At the end of the survey, we received 1895 partially completed questionnaires. We excluded 872 individuals because they did not meet the criteria for participation in the survey (pregnant women, menopausal women, women under 18 and over 45 years of age, women with chronic health problems that could affect their sexual function or health-related quality of life, and women who were not sexually active in any way at the time of the survey). A total of 889 questionnaires were completed; 369 (41.5%) women were 26-34 years old, 357 (40.2%) women were 18-25 years old, 82 (9.2%) women were 35-39 years old, and 81 (9.1%) women were 40-45 years old. A total of 388 (43.6%) women stated that neither they nor their partner had confirmed COVID-19 infection; 289 (32.5%) women stated that they had both overcome COVID-19

with their partner; 133 (15%) women responded that only the respondent had overcome COVID-19, and for 79 (8.9%) participants, only their partner had overcome COVID-19.

The survey was distributed through social networks in Slovenia from January 11, 2022 to January 30, 2022.

A valid questionnaire was used to assess women's sexual function, arousal, satisfaction with sexuality, pain, and orgasmic experiences (FSFI) in the past 4 weeks. For health-related experiences, we used the SF-36 to assess women's quality of life, general health perceptions, physical functioning, women's limitations due to emotional problems, energy or fatigue, emotional well-being, social engagement, and pain. The FSFI questionnaire consisted of 19 questions and rating scales on sexual desire, arousal, orgasm, pain, and sexual satisfaction in the past 4 weeks. Participants rated their agreement with each statement using a 6-point descriptive scale. The SF 36 questionnaire consisted of 36 questions with statements on general health, physical functioning, limitations due to physical functioning, limitations due to emotional problems, energy or fatigue, emotional well-being, social engagement, and pain. Responses to the various statements were given in the form of three-, five- or six-point rating scales, and two sets of statements were of the closed-ended type with the option of answering "yes" or "no." Cronbach's alpha coefficients were calculated for the Slovenian versions of the questionnaires, which proved to be very reliable. The values were 0.823 for the SF-36 questionnaire and 0.863 for the FSFI questionnaire.

Before responding to the survey, participants indicated that they agreed to participate in the research. The research was conducted in accordance with the principles of research ethics and the principles of the Helsinki-Tokyo Declaration. The research design and ethical measures of the study were approved by the faculty departmental committee.

Data were analyzed in IBM SPSS Statistics 28.0.0.0 by calculating averages, frequencies, percentages, and standard deviations. In addition to the frequency analysis of the data, the analysis of differences between the selected independent variables was checked using analysis of variance (ANOVA) and *post hoc* Tukey's tests.

RESULTS

The results are presented based on the research questions mentioned above.

Sexual function was measured using the FSFI questionnaire scale. The mean total score of the entire FSFI questionnaire, which is composed of six-point rating scales for sexual desire, arousal, lubrication, orgasm, satisfaction, and pain, ranged from 25.37 ± 8.29 (Table 1).

As can be seen from Table 1, the highest average scores (i.e., the least problematic areas) are in the "pain" dimension ($\bar{x}$= 4.8). A high score means that the participants have felt low pain during or after sexual intercourse in the past 4 weeks, and "arousal" ($\bar{x}$= 4.7). The lowest average score among the participants in the past weeks was found in the dimension "sexual desire" ($\bar{x}$= 3.3).

Further analysis of sexual function from Table 1 with ANOVA on the FSFI scale showed statistically significant differences in the scores of participants who had overcome the infection and in recovery from COVID-19 (F = 5.308, sig.= 0.001) (Table 2). Therefore, we also performed a Tukey test (I-J) to determine which specific groups differed in their mean scores. Pairwise comparisons were performed between all possible pairs of means to determine where the significant differences lay. The results showed statistically significant differences between the participants in which only the woman or only her partner had overcome the infection (I-J = - 4.5045, sig.<0.001), the groups in which only the woman or both partners had overcome the infection (I-J = -2.7744, sig.=0.006) and the groups in which only the partner had COVID-19 or neither partner had an infection (I-J = 2.9549, sig.=0.016) (Table 3). The statistically significant differences in sexual function observed in couples in which at least one partner recovered from COVID-19 can be attributed to various factors related to the disease and its recovery process. COVID-19 can have a significant psychological impact that can affect sexual function. The experience of illness and recovery can affect the dynamics of a relationship, including communication, emotional intimacy, and physical closeness. Changes in these areas can affect the couple's sexual satisfaction and desire. The importance of these differences lies in their potential to shed light on the broader impact of COVID-19 on individuals and relationships. Understanding how the disease impacts sexual function can inform health-care providers and educators about the holistic needs of patients during and after recovery. It can also help in the development of interventions and support services that address the sexual needs of individuals and couples affected by COVID-19. In addition, studying these differences can contribute to our understanding of the intersections between infectious diseases, mental health, and sexual health. This interdisciplinary approach can inform future research, education systems, and public health efforts aimed at promoting overall well-being in the context of global health crises.

Almost half of the participants (48%) (Figure 1) reported having sexual intercourse 2-6 times per week before the epidemic, and 36% of participants had sexual intercourse once per week. After the start of the epidemic, almost half (42.7%) still reported having sexual intercourse 2-6 times per week and a slightly larger proportion (43.3%) once per week. The changes in the frequency of sexual intercourse during the epidemic were most pronounced in these two categories of responses. There was a decrease of 5.2% in the first category and an increase of 7.3% in the second category. The first category refers to the frequency of sexual intercourse before the COVID-19 epidemic and the second category refers to the frequency of sexual intercourse after

TABLE 1. Results of the FSFI scale

Values	FSFI	Sexual desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain
Average ($\bar{x}$)	25.37	3.33	4.75	3.83	4.32	4.33	4.8
Standard deviations (SD)	8.286	0.947	1.495	1.419	1.89	1.865	1.989

FSFI: Female sexual function index

TABLE 2. ANOVA test values for the FSFI scales (statistically significant values)

Variables	F	Sig.
Age and variables of the FSI scale in Table 1 (sexual desire, arousal, lubrication, orgasm, and satisfaction pain)	1.008	0.388
Education and variables of the FSI scale in Table 1 (sexual desire, arousal, lubrication, orgasm, satisfaction, pain)	0.074	0.974
Recovery from COVID-19 and variables of the FSI scale in Table 1 (sexual desire, arousal, lubrication, orgasm, and satisfaction pain)	5.308	0.001
Age and education and variables of the FSI scale in Table 1 (sexual desire, arousal, lubrication, orgasm, satisfaction, and pain)	2.321	0.031
Age and recovery from Covid-19 and variables of the FSI scale in Table 1 (sexual desire, arousal, lubrication, orgasm, satisfaction, and pain)	1.284	0.242
Education and recovery from COVID-19 and variables of the FSI scale in Table 1 (sexual desire, arousal, lubrication, orgasm, satisfaction, and pain)	1.874	0.071
Age, education and recovery from COVID-19 and variables of the FSI scale in Table 1 (sexual desire, arousal, lubrication, orgasm, satisfaction, and pain).	0.866	0.574

Legend: F - F value, sig. - statistically significant value. ANOVA: Analysis of variance, FSFI: Female sexual function index

TABLE 3. Tukey's test (I-J) for the FSFI scales

Have you or your sexual partner recovered from COVID-19?	I-J	Sig.
Yes, me		
Yes, partner	−4.504	<0.001
Yes, both	−2.774	0.006
No	−1.549	0.225
Yes, partner		
Yes, me	4.504	<0.001
Yes, both	1.730	0.331
No	2.954	0.016
Yes, both		
Yes, me	2.774	0.006
Yes, partner	−1.730	0.331
No	1.224	0.208
No		
Yes, me	1.549	0.225
Yes, partner	−2.954	0.016
Yes, both	−1.224	0.208

Legend: sig.- statistically significant value. FSFI: Female sexual function index

the start of the epidemic. In this context, "increase" and "decrease" refer to changes in the frequency of sexual intercourse compared to pre-epidemic levels. In the first category (2-6 times per week), the change is a decrease from 48% to 42.7%, which means a decrease of 5.3% in the proportion of participants who had sexual intercourse 2-6 times per week. In the second category (once a week), the proportion of participants who reported having sexual intercourse once a week increased from 36% to 43.3%, reflecting a 7.3% increase. These changes suggest that the overall frequency of sexual intercourse has decreased slightly among participants who had sex 2-6 times per week before the epidemic. In contrast, the frequency of sexual intercourse increased slightly among participants who originally had sex once a week before the epidemic. The reference point for "increase" and "decrease" is the frequency of sexual intercourse before the COVID-19 epidemic. The percentages represent the change in the proportion of participants reporting each frequency category before and after the start of the epidemic.

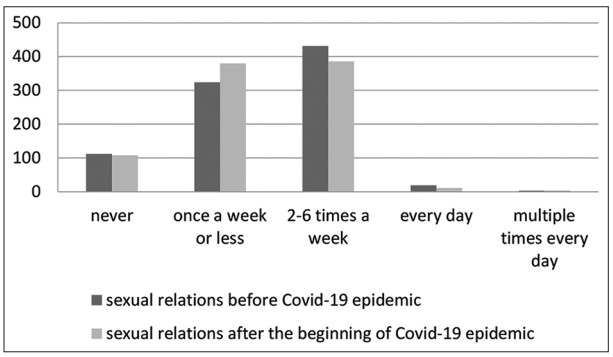

FIGURE 1. Frequency of sexual intercourse with a partner before and after the COVID-19 epidemic.

As part of the online questionnaire, we gave respondents the opportunity to provide additional explanations that they considered relevant in relation to the topic in Figure 1. They had the opportunity to clarify their answers regarding the frequency of sexual intercourse before and after the COVID-19 epidemic. The information provided by the participants, such as the impact of family dynamics on their sex life, the consequences after the COVID-19 infection and the societal changes affecting sexuality are related to Figure 1 to understand the factors influencing the changes in sexual behavior during the pandemic. Two percent of participants emphasized the impact of family on their sex lives, especially for new mothers (due to frequent nighttime sleep interruptions, resulting fatigue, and other postpartum issues). About 0.3% of participants cited the consequences of COVID-19 infection as the reason for lower sexual function, and 0.2% also blamed COVID-19 for changes in their orgasms. About 0.8% felt that problems in their sexuality were more related to societal changes (such as self-isolation, increased anxiety, and sense of responsibility to protect significant others, and conflict in the relationship due to all the uncertain and changing circumstances). Additional information provided by participants provides valuable context and insight into the various factors influencing changes in sexual behavior before and after the COVID-19 epidemic, as shown in Figure 1.

Table 4 shows the responses collected using the SF-36 questionnaire with a 5-point rating scale to measure health-related quality of life. The overall mean score of the entire SF-36 questionnaire, which consisted of scales on physical functioning, role limitations due to physical health, role limitations due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain, and general health, ranged from 73.52 ± 13.84 (Table 4).

The best average score was achieved in the area of "physical functioning" ($\bar{x}$ = 93.07), followed by the physical (in) ability to cope with everyday tasks ($\bar{x}$ = 81.52) and "social functioning" ($\bar{x}$= 72.53). The main problems mentioned by the participants were: "low energy/fatigue" ($\bar{x}$= 48.50), limitations due to emotional problems ($\bar{x}$= 59.54), and "emotional well-being" ($\bar{x}$= 62.93).

TABLE 4. Results of the SF-36 questionnaire

Variable	SF36	Physical functioning	Role limitations due to physical health	Role limitations due to emotional problems	Energy/ fatigue	Emotional well-being	Social functioning	Pain	General health
Average ($\bar{x}$)	73.515	93.07	81.524	59.542	48.498	62.929	72.525	79.794	70.225
Standard deviation (SD)	13.843	10.697	31.984	42.849	18.631	18.252	22.818	22.179	16.498

SF-36: Short form 36

A further analysis between the variables with ANOVA showed statistically significant differences in the results of the SF-36 depending on the educational level of the participants (F = 3.572, sig.=0.014) (Table 5). Therefore, a Tukey test (I-J) (Table 6) was performed to determine which specific groups differed in terms of their mean scores. It showed statistically significant differences in the estimates related to educational level between the group of participants with 2-year, 3-year, and 4-year secondary education and higher education (pre-Bologna reform programs) or first or second levels of Bologna programs (I-J = 5.5492, sig.<0.001). Problematic fields were found to be "low energy/fatigue" ($\bar{x}$ = 48.50), "limitations due to emotional problems" ($\bar{x}$ = 59.54), and "well-being" ($\bar{x}$ = 62.93). The statistically significant differences observed in the SF-36 results depending on the level of education of the participants indicate that education plays a role in the health-related quality of life measured with this questionnaire. The significant differences indicate that individuals with different levels of education report different levels of health-related quality of life as measured by the SF-36. In particular, the results of the Tukey test indicate that there are significant differences between participants with different types of secondary education and those with university degrees or advanced levels of education within the Bologna programs. A higher level of education is often associated with better access to resources, including knowledge about healthcare, financial stability and social support networks. This could contribute to better health and educational outcomes and a higher quality of life for people with higher levels of education. Understanding the relationship between education and health-related quality of life can serve as a basis for public health interventions aimed at eliminating health inequalities and promoting health equity. Researchers and policy makers can use this information to develop targeted strategies to improve health outcomes and quality of life in populations with lower levels of education. These findings contribute to the understanding of the social determinants of health and emphasize the importance of considering education as a factor influencing health outcomes. Understanding the relationship between education and health-related quality of life can serve as a basis for public health interventions aimed at eliminating health inequalities and promoting health equity. Overall, the results of significant differences (Tables 2 and Table 5) emphasize the importance of considering factors such as Covid-19 infection status and education level when assessing sexual function and health-related quality of life. These findings can serve as a basis for targeted interventions and support services that address the specific needs of COVID-19-affected individuals and couples from different educational backgrounds.

More than half of the respondents (50.6%) rated their health as very good, 25% as good and 14.8% as excellent at the time of completing the questionnaire (Table 7).

TABLE 5. ANOVA test for the SF-36 questionnaire (statistically significant values)

Variables	F	Sig.
Age and variables of the SF-36 in Table 4	0.558	0.643
Education and variables of the SF-36 in Table 4	3.572	0.014
Recovery from COVID-19 and variables of the SF-36 in Table 4	1.435	0.231
Age and education and variables of the SF-36 in Table 4	1.304	0.253
Age and recovery from COVID-19 and variables of the SF-36 in Table 4	1.424	0.173
Education and recovery from COVID-19 and variables of the SF-36 in Table 4	1.060	0.388
Age, education, recovery from COVID-19 and variables of the SF-36 in Table 4	0.972	0.470

Legend: F - F value, sig. - statistically significant value. ANOVA: Analysis of variance, SF-36: Short form 36

TABLE 6. Tukey's test (I-J) for the SF-36 scales

What is your highest level of education?	I-J	Sig.
Unfinished primary school or completed primary school		
2-year, 3-year, or 4-year high school education	1.910	0.992
University level of education before the Bologna system or first or second level of education according to the Bologna system	−3.639	0.95
Master of science or doctor of science	−3.528	0.961
2-year, 3-year, or 4-year high school education		
Unfinished primary school or completed primary school	−1.91	0.992
University level of education before the Bologna system or first or second level of education according to the Bologna system	−5.549	<0.001
Master of science or doctor of science	−5.438	0.141
University level of education before the Bologna system or first or second level of education according to the Bologna system		
Unfinished primary school or completed primary school	3.639	0.950
2-year, 3-year, or 4-year high school education	5.549	<0.001
Master of science or doctor of science	0.11	1.0
Master of science or doctor of science		
Unfinished primary school or completed primary school	3.528	0.961
2-year, 3-year, or 4-year high school education	5.438	0.141
University level of education before the Bologna system or first or second level of education according to the Bologna system	−0.11	1.0

Legend: sig. - statistically significant value. SF-36: Short form 36

Table 8 uses a five-point rating scale to show the participants' self-rated health compared to before the epidemic: 61.8% of participants rated their health as the same, 22.9% of respondents rated it as slightly worse, 3.2% felt that their current health was much worse than before the epidemic, while 3.9% rated their health as much better compared to before the COVID-19 epidemic began.

Table 9 compares the results of the present study with those of foreign studies from Italy (Schiavi et al., 2020), Poland (30), and Turkey (34) that were available at the time of our investigation. All these studies were conducted during the epidemic.

The overall FSFI average is similar in the Slovenian and Polish samples, while the Italian and Turkish averages are lower. Higher mean scores in the categories of sexual desire, lubrication, and satisfaction were reported in the Polish study, while the highest mean scores in the categories of arousal, orgasm, and also pain were reported by the Slovenian participants.

DISCUSSION

The mean FSFI scale score was 25.37 ± 8.29, 1.18 points below and close to the cutoff point indicating a higher risk of sexual dysfunction (26.55) (35). A higher FSFI score indicates better sexual function, while lower scores are associated with higher sexual dysfunction. Lower scores indicate a higher risk of sexual dysfunction. Higher FSFI scores indicate better sexual function. Starc et al. (31) found a 31% prevalence of sexual dysfunction in their sample of Slovenian women. The estimated prevalence of sexual dysfunction in our sample was 36.8%, although differences in the samples and other methodological approaches in both studies should be noted. Starc et al. (31) did not report the overall FSFI score, but scores by category are available. Compared to their results, participants in our sample only reported higher scores in the "arousal" category, while scores in all other categories were lower. During the COVID-19 pandemic, many people experienced changes in their daily lives due to lockdowns, social distancing measures, increased stress, and anxiety related to the pandemic.

TABLE 7. Respondents' self-assessment of health at the time of the survey

Self-rated health	Frequency	Per cent
Very bad	6	0.7
Bad	79	8.9
Good	222	25
Very good	450	50.6
Excellent	132	14.8

TABLE 8. Self-assessment of the current health of female respondents compared to self-assessment of health before the COVID-19 epidemic

Self-assessment of current health	Frequency	Per cent
Much worse	28	3.2
A little worse	204	22.9
About the same	549	61.8
Slightly better	73	8.2
Much better	35	3.9

These changes may have affected people's sexual behavior and sexual function, including Slovenian women in their reproductive phase. However, it is important to know that sexual behavior and sexual function are very individual and can vary greatly from person to person. Factors such as stress, anxiety, changing routines, health concerns, and relationship dynamics can affect sexual function during this time.

The situation regarding our FSFI scores was comparable to the results of a foreign study in Poland (30), while researchers in Italy (10) and Turkey (34) reported lower FSFI scores. Differences in FSFI levels between countries already existed before the epidemic. In Turkey, the general FSFI value was 21.8 (34), in Poland 30.1 (30) and in Italy 29.2 (10). However, in all countries, the general FSFI score decreased during the epidemic, least in Turkey (by 0.8) (34), in Poland by 4.3 (30) and in Italy by an average of 10 points (10). The differences could be due to different cultures or a different course of the epidemic. The studies were conducted over a 2-year period and the circumstances were different (more was known about the virus in 2022 than in 2020, so there was also less fear and uncertainty and participants' social lives were less restricted).

Ilgen et al. (34) did not specifically investigate the causes of lower FSFI levels during the epidemic in Turkey, while researchers in Poland (30) and Italy (10) did. They found that participants rated their sexual function as lower due to social isolation, higher stress, conflict with their partner, and lower quality of their relationship. In Italy, women who worked from home and had higher education experienced a particularly sharp decline in FSFI scores (10). In contrast to the Italian study, we found no statistically significant differences in FSFI scores associated with education level, although we must account for differences in demographics; our participants were generally more highly educated than those of Schiavi et al. (10). Panzeri et al. (36) also reported reasons for improvements in sex life during COVID-19. Participants who rated their sexual desire and arousal as improved during the COVID-19 epidemic cited the following reasons: More time with a partner, less stress, and boredom. Those who rated their sexuality as worse saw the reasons as a lack of intimacy, higher workload, fear of infection, and more stress.

Participants in our study generally reported a lower frequency of sexual intercourse, reflecting the findings of other studies (10,29,37). As a result, some authors reported more frequent use of pornography and masturbation (37-39), but these behaviors were largely dependent on housing conditions; individuals in households with children did not report these behaviors as frequently due to lack of privacy and reported lower desire (37). In some cases, sexuality was also negatively affected by lower marital satisfaction,

TABLE 9. Comparison of FSFI scale scores between available studies

Values	Country of research	FSFI ($\bar{x}$)	Sexual desire ($\bar{x}$)	Arousal ($\bar{x}$)	Wetness of the vagina ($\bar{x}$)	Orgasm ($\bar{x}$)	Satisfaction ($\bar{x}$)	Pain ($\bar{x}$)
Our research	Slovenia	25.37±8.29	3.3±0.9	4.7±1.5	3.8±1.4	4.3±1.9	4.3±1.8	4.8±1.9
Research Schiavi et. al. (2020)	Italy	19.2±3.3	3.2±1.1	3.6±1.1	4.4±1.7	4.2±1.1	4.2±1.4	4,5±1.2
Research Fuchs et al. (2020)	Poland	25.8±9.7	4.2±1.3	4.1±2.0	4.5±2.1	3.9±2.1	4.7±1.4	4.3±2.1
Research Ilgen et. al. (2021)	Turkey	21.0	3.3	3.3	3.5	3.4	4.0	3.3

Legend: ($\bar{x}$)- Average score. FSFI: Female sexual function index

in some cases as a result of a poor relationship prior to the epidemic (26,28,40).

The mean score of the SF-36 scale in our sample reached 73.52 ± 13.84 on a 100-point scale, where 100 represents the worst and 100 the best quality of life. Schiavi et al. (10) reported S-36 scores in an Italian sample that were 64.2 ± 11.8, which is 9.32 lower than in our sample. The differences could be due to the fact that Italy faced a very severe epidemic caused by COVID-19 in 2020, while the Slovenian study was conducted in 2022.

Our results show that difficulties were most frequently reported in the dimensions of low energy/fatigue and limitations due to emotional challenges. To some extent, the results seem predictable, as studies have claimed that the COVID-19 epidemic, including preventive measures and restrictions, places a great emotional and mental burden on those affected (41). Low energy could be caused by sleep deprivation, which has been shown to be a common problem during the epidemic (42). Regular physical activity during the epidemic was strongly associated with better sleep quality, well-being, mental health, lower stress levels, and less frequent emotional problems. However, different studies report different results in terms of people's behavior during the COVID-19 epidemic. Some researchers found that people were more physically active, ate more healthily diets, and generally took better care of themselves (43), while others found that people were less active, ate unhealthier diets and gained weight (41,42). We hypothesize that different circumstances influenced people's different behaviors. The reasons could include lifestyle, preferences and habits from before the epidemic, but also the situation during the epidemic - what occupation they had (some professions were more stressed during the Covid-19 epidemic and some lost their income as there was no work in their field), where they lived (capacity and opportunities to go outside), whether they had children in the household and had to homeschool them, etc.

Almost three quarters of our participants rated their health status at the time of the study as similar or better than before COVID-19; half of them stated that their health status was very good, a quarter described it as good and 14.8% described it as excellent. The National Institute of Public Health (44) reports that the overall percentage of the Slovenian population who describe their health as good has increased. In 2016, 65.80% of Slovenians rated their health as good, while in 2021, this percentage increased to 67.50%.

From the results of our study, we can conclude that factors that may play a role for women in the reproductive phase during the pandemic include.

- Mental health and well-being: Our study collected data on sexual function and health-related quality of life, both of which are influenced by mental health factors such as stress, anxiety and depression. Using validated questionnaires (i.e., the FSFI and the SF-36), we indirectly assessed aspects of mental well-being. Results showed that lower scores for sexual functioning and reported difficulties in domains such as emotional well-being and energy/fatigue suggest potential mental health impacts during the pandemic.
- Social support and relationships: Our study collected data on sexual functioning and health-related quality of life, both of which are influenced by mental health factors such as stress, anxiety and depression. Using validated questionnaires such as the FSFI and the SF-36, we indirectly assessed aspects of mental well-being. The results showed that lower scores for sexual function and reported difficulties in dimensions such as emotional well-being and energy/fatigue indicate a possible impairment of mental health during the pandemic.
- Work-life balance: Our study did not explicitly examine work-life balance as a factor influencing women's experiences during the pandemic. However, changes in daily routines, work situations and caregiving responsibilities were indirectly addressed through reported changes in sexual behavior and sexual function. Participants' descriptions of increased stress, conflicts with their partners and changes in intimacy dynamics could, for example, reflect disruptions in work-life balance caused by the pandemic-related changes in employment and caregiving responsibilities.

The study shows that Slovenian women of reproductive age experienced changes in sexual desire, arousal, satisfaction, and frequency of sexual intercourse during the pandemic. Factors such as COVID-19 infection status, societal changes, and family dynamics were identified as possible contributors to these changes in sexual behavior and function. The study shows that women in the reproductive age group reported challenges related to emotional well-being, energy levels, and limitations due to emotional problems during the pandemic. Differences in health-related quality of life were found as a function of factors such as education level, indicating the importance of socioeconomic factors in shaping women's experiences during crises such as the COVID-19 pandemic. The study highlights the multifaceted nature of factors influencing women's experiences during the pandemic, including mental health and well-being, social support and relationships, work-life balance, and access to health services. These findings emphasize the importance of considering the broader socio-ecological context to understand the impact of crises on women's sexual functioning and quality of life.

The authors are also aware of the limitations of the study due to the lack of representativeness of the online survey (it could not be conducted in person during the epidemic). The use of online surveys in research has many advantages (e.g., speed of data collection, computerized data entry, which makes it possible to reduce errors when entering data into the database, control of responses, etc.). Despite the many methodological advantages of online surveys, one must also be aware of the disadvantages (e.g., the possibility of data entry and sampling errors, non-response, and measurement errors). However, most of these errors can occur in all forms of surveys, not just online surveys. One of the limitations of our study was that the sampling method was not representative. We therefore ensured that the data from the new participants in the online survey was as widely spread as possible. With a large enough sample, the study allowed us to identify some important trends among non-pregnant women aged 18-45 in Slovenia that were not previously known or studied to this extent in the field of sexuality. The highest levels of pain and arousal were found

in the past 4 weeks. Most problems were reported in the area of energy (fatigue), emotional problems, and emotional well-being. This adds credibility to the study as it is internationally comparable in terms of the research tools used.

CONCLUSION

The review of literature and research, as well as our research findings, has shown that people can experience increased stress, anxiety, and fear, leading to changes in libido, sexual desire and intimacy. Access to routine check-ups, reproductive health services, and psychosocial support can be limited during such times, which affects women's well-being. Open communication about fears, concerns, and changes in sexual health can have a positive impact on women's experiences and well-being. Some human adaptation processes during the epidemic, such as seeking alternative forms of intimacy, focusing on emotional connections in interpersonal relationships and sexuality, or seeking online resources for support and information, could be helpful for people and communities. Understanding these nuances is critical to developing effective interventions and support systems for women during epidemics.

DECLARATION OF INTERESTS

Authors declare no conflicts of interests.

REFERENCES

1. Goodwin R, Hou WK, Sun S, Ben-Ezra M. Quarantine, distress and interpersonal relationships during COVID-19. Gen Psychiatr 2020;33(6):e100385.
   https://doi.org/10.1136/GPSYCH-2020-100385
2. Randall AK, Leon G, Basili E, Martos T, Boiger M, Baldi M, et al. Coping with global uncertainty: Perceptions of COVID-19 psychological distress, relationship quality, and dyadic coping for romantic partners across 27 countries. J Soc Pers Relat 2021;39(1):3-33.
   https://doi.org/10.1177/02654075211034236
3. ECDC. Questions and Answers on COVID-19: Basic Facts. Available from: https://www.ecdc.europa.eu/en/covid-19/questions-answers/questions-answers-basic-facts [Last accessed on 2022 Apr 25].
4. WHO. WHO Coronavirus (COVID-19) Dashboard with Vaccination Data; (n.d.a). Available from: https://data.who.int/dashboards/covid19/vaccines [Last accessed on 2022 Apr 25]
5. Vlada Republike Slovenije. Slovenija Razglasila Epidemijo Novega Koronavirusa. Available from: https://www.gov.si/novice/2020-03-12-slovenija-razglasila-epidemijo-novega-koronavirusa [Last accessed on 2020 Mar 12].
6. WHO. Considerations for Implementing and Adjusting Public Health and Social Measures in the Context of COVID-19. Available from: https://www.who.int/publications/i/item/considerations-in-adjusting-public-health-and-social-measures-in-the-context-of-covid-19-interim-guidance [Last accessed on 2021a Jun 14].
7. Toller Erausquin J, Tan RK, Uhlich M, Francis JM, Kumar N, Campbell L, et al. The international sexual health and reproductive health during COVID-19 (I-SHARE) study: A multicountry analysis of adults from 30 countries prior to and during the initial coronavirus disease 2019 wave. Clin Infect Dis 2022;75(1):e991-9.
   https://doi.org/10.1093/cid/ciac102
8. Eleuteri S, Alessi F, Petruccelli F, Saladino V. The global impact of the COVID-19 pandemic on individuals' and couples' sexuality. Front Psychol 2022;12:798260.
   https://doi.org/10.3389/fpsyg.2021.798260
9. Papaefstathiou E, Apostolopoulou A, Papaefstathiou E, Moysidis K, Hatzimouratidis K, Sarafis P. The impact of burnout and occupational stress on sexual function in both male and female individuals: A cross-sectional study. Int J Impot Res 2019;32(5):510-9.
   https://doi.org/10.1038/s41443-019-0170-7
10. Schiavi MC, Spina V, Zullo MA, Colagiovanni V, Luffarelli P, Rago R, et al. 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. J Sex Med 2020;17(8):1407-23.
    https://doi.org/10.1016/J.JSXM.2020.06.006
11. Pietromonaco PR., Overall NC. Implications of social isolation, separation, and loss during the COVID-19 pandemic for couples' relationships. Curr Opin Psychol 2022;43:189-94.
    https://doi.org/10.1016/J.COPSYC.2021.07.014
12. Murgaš F, Petrovič F. Quality of life and quality of environment in Czechia in the period of Covid-19 pandemic. Geogr J 2020;72(3):261-74.
    https://doi.org/10.31577/geogrcas.2020.72.3.13
13. Ferreira LN, Pereira LN, Da Fé Brás M, Ilchuk K. Quality of life under the COVID-19 quarantine. Qual Life Res 2021;30(5):1389-405.
    https://doi.org/10.1007/s11136-020-02724-x
14. El Keshky ME, Basyouni SS, Al Sabban AM. Getting through COVID-19: The pandemic's impact on the psychology of sustainability, quality of life, and the global economy-a systematic review. Front Psychol 2021;12:700815.
    https://doi.org/10.3389/fpsyg.2021.700815
15. Trumello C, Bramanti SM, Ballarotto G, Candelori C, Cerniglia L, Cimino S, et al. Psychological adjustment of healthcare workers in Italy during the COVID-19 pandemic: Differences in stress, anxiety, depression, burnout, secondary trauma, and compassion satisfaction between frontline and non-frontline professionals. Int J Environ Res Public Health 2020;17(22):8358.
    https://doi.org/10.3390/IJERPH17228358
16. Ravens-Sieberer U, Kaman A, Erhart M, Devine J, Schlack R, Otto C. Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. Eur Child Adolesc Psychiatry 2021;1:879-89.
    https://doi.org/10.1007/S00787-021-01726-5
17. Rass V, Beer R, Schiefecker AJ, Kofler M, Lindner A, Mahlknecht P, et al. Neurological outcome and quality of life 3 months after COVID-19: A prospective observational cohort study. Eur J Neurol 2021;28(10):3348-59.
    https://doi.org/10.1111/ENE.14803
18. Chen KY, Li T, Gong FH, Zhang JS, Li XK. Predictors of health-related quality of life and influencing factors for COVID-19 patients, a follow-up at one month. Front Psychiatry 2020;11:668.
    https://doi.org/10.3389/fpsyt.2020.00668
19. Starc A, Poljšak B, Dahmane R, Levec T, Perat M. Female sexual function as a predictor of well-being. J Appl Health Sci 2019;5(2):217-23.
    https://doi.org/10.24141/1/5/2/7
20. Velten J, Margraf J. Satisfaction guaranteed? How individual, partner, and relationship factors impact sexual satisfaction within partnerships. PLoS One 2017;12(2):e0172855.
    https://doi.org/10.1371/JOURNAL.PONE.0172855
21. Palomba S, Daolio J, Romeo S, Battaglia FA, Marci R, La Sala GB. Lifestyle and fertility: The influence of stress and quality of life on female fertility. Reprod Biol Endocrinol 2018;16(1):113.
    https://doi.org/10.1186/S12958-018-0434-Y
22. Zhu Q, Shu H, Dai Z. Effect of pelvic floor dysfunction on sexual function and quality of life in Chinese women of different ages: An observational study. Geriatr Gerontol Int 2019;19(4):299-304.
    https://doi.org/10.1111/GGI.13618
23. Chang SR, Yang CF, Chen KH. Relationships between body image, sexual dysfunction, and health-related quality of life among middle-aged women: A cross-sectional study. Maturitas 2019;126:45-50.
    https://doi.org/10.1016/J.MATURITAS.2019.04.218
24. Williamson H. Early effects of the COVID-19 pandemic on relationship satisfaction and attributions. Psychol Sci 2020;31(12):1479-87.
    https://doi.org/10.1177/0956797620972688
25. Burleson MH, Roberts NA, Munson AA, Duncan CJ, Randall AK, Ha T, et al. Feeling the absence of touch: Distancing, distress, regulation, and relationships in the context of COVID-19. J Soc Pers Relat 2021;39(1):56-79.
    https://doi.org/10.1177/02654075211052696
26. Rodrigues DL, Lehmiller JJ. COVID-19 and sexual desire: Perceived fear is associated with enhanced relationship functioning. J Sex Res 2021;59(4):403-12.
    https://doi.org/10.1080/00224499.2021.1966359
27. Li G, Tang D, Song B, Wang C, Qunshan S, Xu C, et al. Impact of the COVID-19 pandemic on partner relationships and sexual and reproductive health: Cross-sectional, online survey study. J Med Internet Res 2020;22(8):e20961.
    https://doi.org/10.2196/20961
28. Thorell LB, Skoglund C, de la Peña AG, Baeyens D, Fuermaier AB, Groom MJ, et al. Parental experiences of homeschooling during the COVID-19 pandemic: Differences between seven European countries and between children with and without mental health conditions. Eur Child Adolesc Psychiatry 2021;31:649-61.
    https://doi.org/10.1007/S00787-020-01706-1
29. Bazyar J, Chehreh R, Sadeghifar J, Karamelahi Z, Ahmadimazhin S, Vafery Y, et al. Effects of the COVID-19 pandemic on the intimate partner violence and sexual function: A systematic review. Prehosp Disaster Med 2021;36(5):593-8.
    https://doi.org/10.1017/S1049023X21000789
30. Fuchs A, Matonóg A, Pilarska J, Sieradzka P, Szul M, Czuba B, et al. The impact of COVID-19 on female sexual health. Int J Environ Res Public Health 2020;17(19):7152.
    https://doi.org/10.3390/IJERPH17197152

31. Starc A, Jukić T, Poljšak B, Dahmane R. Female sexual function and dysfunction: A cross-national prevalence study in Slovenia. Acta Clin Croat 2018;57(1):52-60.
https://doi.org/10.20471/ACC.2018.57.01.06
32. Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, et al. The female sexual function index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther 2011;26(2):191-205.
https://doi.org/10.1080/009262300278597
33. RAND. 36-Item Short Form Survey (SF-36). Available from: https://www.rand.org/health-care/surveys_tools/mos/36-item-short-form.html [Last accessed on 2022 Apr 25]
34. Ilgen O, Kurt S, Aydin C, Bilen E, Kula H. COVID-19 pandemic effect on female sexual function. Ginekol Pol 2021;92(12):856-9.
https://doi.org/10.5603/GP.A2021.0084
35. Wiegel M, Meston C, Rosen R. The female sexual function index (FSFI): Cross-validation and development of clinical cutoff scores. J Sex Marital Ther 2005;31:1-20.
https://doi.org/10.1080/00926230590475206
36. Panzeri M, Ferrucci R, Cozza A, Fontanesi L. Changes in sexuality and quality of couple relationship during the COVID-19 lockdown. Front Psychol 2020;11:565823.
https://doi.org/10.3389/FPSYG.2020.565823
37. Stavridou A, Samiakou C, Kourti A, Tsiorou S, Panagouli E, Thirios A, et al. Sexual activity in adolescents and young adults through COVID-19 pandemic. Children (Basel) 2021;8:577.
https://doi.org/10.3390/CHILDREN8070577
38. Masoudi M, Maasoumi R, Bragazzi NL. Effects of the COVID-19 pandemic on sexual functioning and activity: A systematic review and meta-analysis. BMC Public Health 2022;22:189.
https://doi.org/10.1186/S12889-021-12390-4
39. Gleason N, Banik S, Braverman J, Coleman E. The impact of the COVID-19 pandemic on sexual behaviors: Findings from a national survey in the United States. J Sex Med 2021;18(11):1851-62.
https://doi.org/10.1016/J.JSXM.2021.08.008
40. McCool-Myers M, Theurich M, Zuelke A, Knuettel H, Apfelbacher C. Predictors of female sexual dysfunction: A systematic review and qualitative analysis through gender inequality paradigms. BMC Womens Health 2018;18(1):108.
https://doi.org/10.1186/S12905-018-0602-4
41. Violant-Holz V, Gallego-Jiménez MG, González-González CS, Muñoz-Violant S, Rodríguez MJ, Sansano-Nadal O, et al. Psychological health and physical activity levels during the COVID-19 pandemic: A Systematic review. Int J Environ Res Public Health 2020;17(24):9419.
https://doi.org/10.3390/IJERPH17249419
42. Martínez-de-Quel Ó, Suárez-Iglesias D, López-Flores M, Pérez CA. Physical activity, dietary habits and sleep quality before and during COVID-19 lockdown: A longitudinal study. Appetite 2021;158:105019.
https://doi.org/10.1016/J.APPET.2020.105019
43. Romero-Blanco C, Rodríguez-Almagro J, Onieva-Zafra MD, Parra-Fernández ML, Prado-Laguna MD, Hernández-Martínez A. Physical activity and sedentary lifestyle in university students: Changes during confinement due to the COVID-19 pandemic. Int J Environ Res Public Health 2020;17(18):6567.
https://doi.org/10.3390/IJERPH17186567
44. NIJZ. Delež Oseb, ki Svoje Zdravje Ocenjuje kot Dobro; (n.d.). Available from: https://obcine.nijz.si/kazalniki/K4.1 [Last accessed on 2022 Apr 25]