

COVID-19

## Mental and Sexual Health of Polish Women of Reproductive Age During the COVID-19 Pandemic – An Online Survey



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### ABSTRACT

**Introduction:** The COVID-19 pandemic can cause emotional distress, which can in turn lead to the development of mental and physical symptoms.

**Aim:** We examined the association of the COVID-19 outbreak and the mental, physical and sexual health of the female Polish population.

**Methods:** Data were collected in an online survey distributed on social media from April 22, 2020 through to May 7, 2020. The data collection began one month after the start of lockdown in Poland.

**Main Outcome Measure:** Women were asked to complete the Beck Depression Inventory (BDI) and the Female Sexual Function Index (FSFI) questionnaires.

**Results:** Overall, 1644 women (median age 23 years) took part in the survey. They reported a lower frequency of sexual activity ( $P < .001$ ) and a lower libido level ( $P < .001$ ) during the pandemic than before it. 57.5% of the study group ( $n = 944$ ) strongly agreed or agreed that fear of the health condition of loved ones was a source of stress and depressed mood. The average BDI-II total score was 11 (range 0-51; IQR 5-18), which corresponds to minimal depression. The average FSFI total score was  $27.01 \pm 7.61$  (range 2-36). The FSFI and BDI scores were significantly correlated ( $P < .001$ ). The FSFI score was significantly correlated with the presence of any comorbid chronic disease, the intensity of the fear of infection and fear of health conditions, perceived loneliness, and the being up to date with media news. The BDI score was significantly correlated with age, the intensity of the fear of infection and fear of health conditions, perceived loneliness, being up to date with media news, and the more frequent use of stimulants.

**Conclusions:** The COVID-19 lockdown setting was associated with a high occurrence of depressive symptoms and increased risk of sexual dysfunction with decreased libido and lower sexual frequency the most commonly reported issues. **Szuster E, Kostrzewska P, Pawlikowska A, et al. Mental and Sexual Health of Polish Women of Reproductive Age During the COVID-19 Pandemic – An Online Survey. Sex Med 2021;9:100367.**

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**Key Words:** COVID-19 Pandemic; Sexual Dysfunction; Mental Health; Polish Population; Female Health

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### INTRODUCTION

A stressful event such as warfare, sexual assault and life-threatening events are a source of strong stress and anxiety that can have long-term effects on health. It has been estimated that 2/3 of the population can witness or participate in a traumatic event, but only 20% of them will develop post-traumatic stress disorder (PTSD).<sup>1</sup> The definition of PTSD is still under debate; however, PTSD is one of the most widely used diagnoses in mental health care. According to the International Classification of Diseases (ICD-11), PTSD “develops following exposure to an extremely threatening or horrific event”. This disorder includes reexperiencing the traumatic event, avoidance behaviour, and

hypervigilance phenomena.<sup>1,2</sup> Clinically, PTSD translates into the occurrence of a wide variety of physical and emotional symptoms that include the impairment of sexual health.<sup>3,4</sup> The Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5), which is often used in clinical trials as well, defines PTSD a bit differently. According to DSM-5, PTSD is a disorder characterized by anhedonic and/or dysphoric and externalizing phenotypes with symptoms including persistent negative evaluation of self or others, elevated self-blame, a negative emotional state, and reckless or self-destructive behavior.<sup>5</sup> It is worth noting that groups of patients diagnosed using the two systems do not overlap completely. On top of this, about 50% of victims experience posttraumatic and depressive symptoms.<sup>6</sup>

Reports from the literature suggest that PTSD can be linked with impaired sexual functioning. Breyer et al. investigated sexual health among warzone-deployed veterans who returned from the Iraq and Afghanistan conflicts. The study included 794 women and 787 men. In the study group, 12.7% of women were diagnosed with sexual dysfunction and/or were on prescription treatment for sexual dysfunction. Moreover, PTSD women were less likely to be sexually active when compared to non-PTSD women (58.7% vs 72.1%,  $P < .001$ ).<sup>7</sup> O'Loughlin and Brotto compared women with and without hypoactive sexual desire disorder (HSDD). They found that women with HSDD were more likely to experience current PTSD (OR = 5.50, 95% CI [1.18, 25.61]) and lifetime PTSD (OR = 2.78, 95% CI [1.56, 4.94]). HSDD women also reported the more frequent occurrence of, and more severe symptoms of, PTSD.<sup>3</sup>

Traumatic nature of the pandemic and compulsory isolation may cause illness or flare existing symptoms because infectious disease outbreaks evoke strong emotions and a fear of contracting a deadly disease. The severity of anxiety increases if the isolation, due to the threatening disease, is prolonged. It can also be affected by domestic violence and the loss of earning opportunities. On February 11, 2020, the name of the disease known as COVID-19 was announced by the WHO.<sup>8</sup> An outbreak of severe pneumonia caused by the coronavirus SARS-Cov-2 was rapidly spreading around the world. At the time of writing this paper, COVID-19 was diagnosed in patients from 187 countries, it affected over 4 million patients and had caused almost 300 deaths worldwide.<sup>9</sup> To protect citizens, a lot of countries implemented many social distancing methods, closed schools and shops, put some travelling restrictions in place, and advised the extensive use of remote working and home-schooling. The COVID-19 pandemic is not only a cause of a health crisis, but it has also led to adverse mental health consequences. A recent review of the literature on the impact of the COVID-19 pandemic on mental health suggests that symptoms of anxiety and depression (16-28%) and self-reported stress (8%) are commonly reported in affected populations.<sup>10</sup> The study of Liu et al. showed that symptoms of PTSD were present in 7% of the population living in the areas of China hardest-hit by SARS-Cov-2. The researcher noted that women, when compared to men,

much more frequently experienced repeated adverse changes in cognition or mood, as well as hyper-arousal.<sup>11</sup> Also, Omar et al. reported that the COVID-19 pandemic decreased sexual satisfaction and was a source of anxiety and depression particularly in women.<sup>12</sup>

Taking into account that the COVID-19 pandemic can cause emotional distress leading to the development of physical symptoms, we hypothesized that women would report subjective worsening of sexual symptomatology. In this study, we investigated an association between the COVID-19 outbreak and the mental and physical health of the vulnerable female population. This is the first study that addresses the quality of sexual health in the Polish population and correlates it with other variables including mental health.

## MATERIAL AND METHODS

An online survey based on Google Forms was put on social media (namely Facebook). The questionnaire has been sent to numerous groups on Facebook associating Polish users of every age and sex as well as groups only for women. It was also spread to groups for young adults and for middle age and older women. The aim of such distribution was to collect data on people infected with COVID-19, people suspected to be infected, people with a fear of contracting the infection, the use of stimulants, and perceived mental and sexual health. The questionnaires included additional demographic questions and general questions about participants' behavior during the lockdown (those questions are described in [Table 1](#) and [Table 2](#)). All women were asked to complete the Beck Depression Inventory (BDI) and the Female Sexual Function Index (FSFI) questionnaires. The study was conducted from April 22, 2020 through to May 7, 2020. The data collection began one month after the start of lockdown in Poland (March 25, 2020). Participation in the study was voluntary and anonymous. Participants were informed that by completing the questionnaire, they provided consent to participate in the survey. The exclusion criteria was age less than 18 years old. Also, incomplete questionnaires were excluded. The study was approved by the Commission of Bioethics at Wrocław Medical University, Wrocław, Poland.

The BDI is a 21-question multiple-choice self-report inventory, and is one of the most widely used psychometric tests for assessing depression.<sup>13</sup> Each answer is scored on a scale value of 0-3. Higher total scores indicate more severe depressive symptoms. The score ranges for the final results are: (i) 0-11 minimal depression, (ii) 12-19 mild depression, (iii) 20-25 moderate depression, (iv) 26-63 severe depression.

Sexual functioning was investigated using the FSFI questionnaire<sup>14</sup>, which is a brief multidimensional questionnaire measuring sexual functioning in women. In the study, we used the Polish version of the Female Sexual Function Index. This version was developed and validated by Nowosielski et al.<sup>15</sup> It includes 19

**Table 1.** Study group characteristics

| Variable  | N=1644  |
|---|---|
| Age, years  | Mean 25.11 ± 7.09<br>Median 23<br>IQR (21-27) |
| Education, n (%)                                      |   |
| Primary   | 88 (5.4)                                      |
| Vocational  | 74 (4.5)                                      |
| Secondary   | 780 (47.4)                                    |
| Higher  | 702 (42.7)                                    |
| Employment status, n (%)                              |   |
| Employed – working at work place                      | 407 (24.8)                                    |
| Remote work   | 331 (20.1)                                    |
| Employment issues due to COVID-19 pandemic            | 55 (3.3)                                      |
| Sick leave  | 60 (3.6)                                      |
| Unemployed due to other reasons                       | 58 (3.5)                                      |
| Full-time student                                     | 637 (38.8)                                    |
| Student-income lost                                   | 24 (1.5)                                      |
| Maternity leave/stay-at-home-mum                      | 58 (3.5)                                      |
| Childcare due to COVID-19 pandemic                    | 9 (0.5)                                       |
| Pensioner   | 5 (0.3)                                       |
| Marital status, n (%)                                 |   |
| Single  | 278 (16.9)                                    |
| Married   | 302 (18.4)                                    |
| In partnership  | 1064 (64.7)                                   |
| Place of living, n (%)                                |   |
| Rural area  | 311 (18.9)                                    |
| City >50,000 inhabitants                              | 267 (16.2)                                    |
| City from 50,000 to 100,000 inhabitants               | 142 (8.6)                                     |
| City from 100,000 to 250,000 inhabitants              | 186 (11.3)                                    |
| City above 250,000 inhabitants                        | 738 (44.9)                                    |
| Comorbid chronic disease, n (%)                       |   |
| No / Yes  | 1306 (79.4) / 338 (20.6)                      |
| On treatment due to any disease, n (%)                |   |
| No / Yes  | 1072 (65.2) / 572 (34.8)                      |
| In quarantine, n (%)                                  |   |
| No / Yes  | 1590 (96.7) / 54 (3.3)                        |
| Friends/family in quarantine, n (%)                   |   |
| No / Yes  | 1351 (82.2) / 293 (17.8)                      |
| History of contact with infected with COVID-19, n (%) |   |
| No / Yes  | 1615 (98.2) / 29 (1.8)                        |
| Diagnosed with COVID-19, n (%)                        |   |
| No / Yes  | 1638 (99.6) / 6 (0.4)                         |
| Friends/family infected with COVID-19, n (%)          |   |
| No / Yes  | 1544 (93.9) / 100 (6.1)                       |
| Friends/family died of COVID-19, n (%)                |   |
| No / Yes  | 1620 (98.5) / 24 (1.5)                        |

**Table 2.** Psychological characteristics of the study group

| Variable   | N=1644                  |
|--|-------------------------|
| Under psychiatric / psychological care during COVID-19 pandemic, n (%); No / Yes                 | 1537 (93.5) / 107 (6.5) |
| On sedatives during COVID-19 pandemic, n (%); No / Yes   | 1520 (92.5) / 124 (7.5) |
| Fear of infection with coronavirus has negative impact on my mental health, n (%)                |                         |
| Strongly agree   | 125 (7.6)               |
| Agree  | 410 (24.9)              |
| Undecided  | 382 (23.2)              |
| Disagree   | 393 (23.9)              |
| Strongly disagree  | 334 (20.3)              |
| Fear of health condition of the loved ones is a source of stress and depressed mood, n (%)       |                         |
| Strongly agree   | 302 (18.4)              |
| Agree  | 642 (39.1)              |
| Undecided  | 234 (14.2)              |
| Disagree   | 305 (18.6)              |
| Strongly disagree  | 161 (9.8)               |
| Following the media reports is a source of a significant deterioration of my mental state, n (%) |                         |
| Strongly agree   | 344 (20.9)              |
| Agree  | 461 (28.0)              |
| Undecided  | 307 (18.7)              |
| Disagree   | 295 (17.9)              |
| Strongly disagree  | 237 (14.4)              |
| Perceived loneliness caused by isolation from the world / loved ones, n (%)                      |                         |
| Strongly agree   | 528 (32.1)              |
| Agree  | 191 (11.6)              |
| Undecided  | 176 (10.7)              |
| Disagree   | 191 (11.6)              |
| Strongly disagree  | 187 (11.4)              |
| More frequent use of alcohol / cigarettes cause by pandemic, n (%)                               |                         |
| Strongly agree   | 165 (10.0)              |
| Agree  | 235 (14.3)              |
| Undecided  | 154 (9.4)               |
| Disagree   | 257 (15.6)              |
| Strongly disagree  | 833 (50.7)              |

(continued)

**Table 2.** Continued

| Variable   | N=1644                              |            |
|--|-------------------------------------|------------|
| Frequency of sexual activity before / during pandemic, n (%) | $P < .001$ (test statistic 1776.87) |            |
| Several times a day  | 27 (1.6)                            | 36 (2.2)   |
| Every day  | 93 (5.7)                            | 84 (5.1)   |
| Several times a week   | 749 (45.6)                          | 579 (35.2) |
| Once a week  | 221 (13.4)                          | 228 (13.9) |
| Several times a month  | 325 (19.8)                          | 320 (19.5) |
| Once a month   | 55 (3.3)                            | 84 (5.1)   |
| Fewer than once a month                                      | 174 (10.6)                          | 313 (19.0) |
| Libido level before / during pandemic, n (%)                 | $P < .001$ (test statistic 647.27)  |            |
| High   | 521 (31.7)                          | 504 (30.7) |
| Moderate   | 909 (55.3)                          | 747 (45.4) |
| Decreased libido   | 214 (13.0)                          | 393 (23.9) |

questions covering 6 domain-structured areas (desire, arousal, lubrication, orgasm, satisfaction and pain and/or discomfort) evaluated during the last 4 weeks. The maximum score for each domain is 6.0. The total FSFI score is a sum of the domain scores and ranges from 2.0 to 36.0. A lower FSFI score is associated with a higher degree of sexual dysfunction. This questionnaire was created and validated for the assessment of female sexual function, quality of life in clinical trials, or epidemiological studies.<sup>16</sup>

The collected data were statistically analysed with the R Project for Statistical Computing v. 3.4.1 (R Foundation for Statistical Computing, Vienna, Austria). Data were presented as a medians and interquartile ranges and numbers and percentages. The Shapiro-Wilk test was used to test for normal distribution. Categorical variables were compared using the  $\chi^2$  test. Spearman's rank correlation coefficient was used to measure the strength of the association between the FSFI and BDI scores and answers on questions about COVID-19. Differences were considered statistically significant at  $P < .05$ .

## RESULTS

Overall, 1724 questionnaires were collected; 80 questionnaires did not meet the inclusion criteria and therefore were not taken into account. Questionnaires from 1644 women with a median age of 23 years (mean  $25.11 \pm 7.09$  years) who took part in the survey were analyzed. Incomplete questionnaires were not included. The characteristics of the study group are presented in Table 1. The results of the psychological characteristics of the study group are presented in Table 2. There was a statistically significant difference between the frequency of sexual activity before and during the pandemic ( $P < .001$ ), as well as a difference in libido level before and during the pandemic ( $P < .001$ ). Libido levels and the frequency of sexual activity were higher

before the pandemic. Over half of the study group ( $n = 944$ ; 57.5%) strongly agreed or agreed that a fear of the health condition of loved ones was a source of stress and depressed mood.

The average BDI-II total score for all participants was 11 (IQR 5-18), which corresponds to the classification of minimal depression. In question 8 (Self-criticalness) and question 14 (Worthlessness), more than 10% of participants obtained 3 points, which could indicate their low self-esteem due to a sense of guilt and a lack of sense of attractiveness. The observed mean values for depression outcomes are presented in Table 3. The average FSFI total score for all the participants was  $27.01 \pm 7.61$  (range 2-36). The detailed results of the FSFI questionnaire are presented in Table 4, while the correlations between the analyzed scales and different variables are presented in Table 5. The table shows a statistically significant correlation between the FSFI and BDI scales ( $r = -0.3261$ ;  $P < .001$ ). Moreover, the FSFI score was significantly correlated with the presence of any comorbid chronic disease ( $r = -0.08747$ ;  $P < .001$ ), the intensity of the fear of infection and fear of health conditions ( $r = -0.08848$ ;  $P < .001$ ), perceived loneliness ( $r = -0.1527$ ;  $P < .001$ ), and being up to date with media news ( $r = -0.1046$ ;  $P < .001$ ). The BDI score was significantly correlated with age ( $r = -0.3261$ ;  $P < .001$ ), the intensity of the fear of infection and fear of health conditions ( $r = 0.3047$ ;  $P < .001$ ), perceived loneliness ( $r = 0.3923$ ;  $P < .001$ ), being up to date with media news ( $r = 0.2738$ ;  $P < .001$ ), and a more frequent use of stimulants ( $r = 0.2308$ ;  $P < .001$ ). However, based on the Guilford's classification, correlation coefficients below 0.3 has limited clinical relevance.

## DISCUSSION

The results of this study demonstrated that the pandemic was associated with a high occurrence of depressive symptoms and sexual functioning disorders in women. Fear of the infection, a worsening of health conditions, following the media news, and loneliness were the most stressful factors that affected psychological and sexual health.

Several limitations of this survey should be considered. First, social media is used mostly by young people, which is confirmed by the mean age of  $25.11 \pm 7.09$  years of our study group. This was additionally narrowed by distribution only via Facebook. Using the computer and internet is still not very common among older people, so it is important to take into consideration that our findings are not representative of the whole population of women. Moreover, some other factors may have an impact on sexual functioning in women such as change in the amount of time partners spend together; change in the amount of time parents spend with their kids; relationship status; relationship quality and perceived stress resulting from these changes. Regarding marital status, there were only 16.9% of responders in our study who declared to be single. This percentage is not high to significantly change the result and they did not deny engaging in sexual activity so we decided not to exclude singles from the study.

**Table 3.** Beck Depression Inventory results

| Question           | Score 0     | Score 1    | Score 2    | Score 3    |
|--------------------|-------------|------------|------------|------------|
| Question 1, n (%)  | 606 (36.9)  | 780 (47.4) | 213 (13.0) | 45 (2.7)   |
| Question 2, n (%)  | 551 (33.5)  | 828 (50.4) | 166 (10.1) | 99 (6.0)   |
| Question 3, n (%)  | 775 (47.1)  | 373 (22.7) | 364 (22.1) | 132 (8.0)  |
| Question 4, n (%)  | 714 (43.4)  | 651 (39.6) | 151 (9.2)  | 128 (7.8)  |
| Question 5, n (%)  | 952 (57.9)  | 371 (22.6) | 251 (15.3) | 70 (4.3)   |
| Question 6, n (%)  | 1391 (84.6) | 136 (8.3)  | 70 (4.3)   | 47 (2.9)   |
| Question 7, n (%)  | 841 (51.2)  | 595 (36.2) | 146 (8.9)  | 62 (3.8)   |
| Question 8, n (%)  | 842 (51.2)  | 557 (33.9) | 58 (3.5)   | 187 (11.4) |
| Question 9, n (%)  | 1238 (75.3) | 369 (22.4) | 25 (1.5)   | 12 (0.7)   |
| Question 10, n (%) | 1042 (63.4) | 451 (27.4) | 92 (5.6)   | 59 (3.6)   |
| Question 11, n (%) | 544 (33.1)  | 784 (47.7) | 266 (16.2) | 50 (3.0)   |
| Question 12, n (%) | 939 (57.1)  | 538 (32.7) | 133 (8.1)  | 34 (2.1)   |
| Question 13, n (%) | 857 (52.1)  | 624 (38.0) | 126 (7.7)  | 37 (2.3)   |
| Question 14, n (%) | 812 (49.4)  | 271 (16.5) | 365 (22.2) | 196 (11.9) |
| Question 15, n (%) | 852 (51.8)  | 569 (34.6) | 177 (10.8) | 46 (2.8)   |
| Question 16, n (%) | 768 (46.7)  | 627 (38.1) | 158 (9.6)  | 91 (5.5)   |
| Question 17, n (%) | 808 (49.1)  | 608 (37.0) | 193 (11.7) | 35 (2.1)   |
| Question 18, n (%) | 1251 (76.1) | 214 (13.0) | 144 (8.8)  | 34 (2.1)   |
| Question 19, n (%) | 1332 (81.0) | 235 (14.3) | 62 (3.8)   | 15 (0.9)   |
| Question 20, n (%) | 1139 (69.3) | 432 (26.3) | 57 (3.5)   | 16 (1.0)   |
| Question 21, n (%) | 1186 (72.1) | 276 (16.8) | 121 (7.4)  | 61 (3.7)   |

Moreover, this survey study is at risk of recall bias resulting from the lack of pre-covid data to compare to post-covid data. Despite these facts, our study provides important information about serious COVID-19 pandemic effects such as sexual and psychological disorders. Public attention should be focused on the prevention of PTSD, depression, sexual functioning disorders and other mental disorders. Second, a part of the survey asked respondents to compare certain behavior before and during the pandemic, which can be subject to recall bias. And finally, the reliability of answers may be lower than in other forms of research due to subjective answers given by respondents.

FSFI is the gold standard for screening sexual disorders. It has been validated in more than 30 countries and used worldwide. In Poland, Nowosielski et al. in 2012 developed a Polish version of the FSFI (PL-FSFI) with Cronbach’s  $\alpha$  value of  $> .70$  for the entire sample.<sup>15</sup> The optimal PL-FSFI cutoff score was 27.50, with 83.1% specificity and 87.1% sensitivity. Consequently, the

**Table 4.** Female Sexual Function Index results

| Domain        | Score, mean $\pm$ SD | Range |
|---------------|----------------------|-------|
| Desire        | 4.16 $\pm$ 1.17      | 1.2-6 |
| Arousal       | 4.60 $\pm$ 1.52      | 0-6   |
| Lubrication   | 4.90 $\pm$ 1.60      | 0-6   |
| Orgasm        | 4.32 $\pm$ 1.69      | 0-6   |
| Satisfaction  | 4.53 $\pm$ 1.55      | 0-6   |
| Pain          | 4.49 $\pm$ 1.75      | 0-6   |
| Overall score | 27.01 $\pm$ 7.61     | 2-36  |

PL-FSFI questionnaire is reliable with good psychometric and discriminative validity. In our study, the mean overall score was lower than the cutoff value suggested by Nowosielski. Desire was the

**Table 5.** Correlations between Beck Depression Inventory and Female Sexual Function Index scores and studied factors

| Variable | Variable                                  | Correlation coef. | P value |
|----------|---|-------------------|---------|
| BDI      | FSFI                                      | -0.3261           | < .001  |
| FSFI     | Age                                       | 0.04983           | .0434   |
|          | In quarantine                             | 0.02175           | .3782   |
|          | Diagnosed with COVID-19                   | -0.01121          | .6496   |
|          | Comorbid chronic disease                  | -0.08747          | <.001   |
|          | Fear of infection                         | -0.08848          | <.001   |
|          | Fear of health condition                  | -0.1016           | <.001   |
|          | Following the media                       | -0.1046           | <.001   |
|          | Perceived loneliness                      | -0.1527           | <.001   |
|          | More frequent use of alcohol / cigarettes | -0.03532          | .152    |
| BDI      | Age                                       | -0.3261           | <.001   |
|          | In quarantine                             | -0.02053          | .406    |
|          | Diagnosed with COVID-19                   | 0.01882           | .446    |
|          | Comorbid chronic disease                  | 0.05604           | .023    |
|          | Fear of infection                         | 0.2936            | <0.001  |
|          | Fear of health condition                  | 0.3047            | <0.001  |
|          | Following the media                       | 0.2738            | <0.001  |
|          | Perceived loneliness                      | 0.3923            | <0.001  |
|          | More frequent use of alcohol / cigarettes | 0.2308            | <0.001  |

BDI = Beck Depression Inventory; FSFI = Female Sexual Function Index.



domain with the lowest score of analyzed FSFI components. Having analyzed the comparison of libido levels before and during the pandemic, respondents declared a decreased libido level during the pandemic, which could lead to a lower FSFI score. Moreover, in Italy Schiavi et al. took into account the reproductive-age of women and examined the impact of social distancing on the quality of life and the intimate sphere. As it turned out, the quality of life and sexual functioning significantly worsened when compared to the period before the pandemic (FSFI score before:  $29.2 \pm 4.2$  vs after:  $19.2 \pm 3.3$ ).<sup>17</sup> Li et al. showed that the pandemic resulted in a reduced frequency of engaging in sexual activity, and also that alcohol consumption increased. It is connected, among other things, with the fact of staying at home with other family members, which results in limited intimacy and freedom. Additionally, with the fear of SARS-CoV-2 infection, people were more likely to masturbate to achieve sexual satisfaction.<sup>18</sup>

Our findings confirm those of Wang et al., who concluded that stress and depression were a very frequent reaction for the COVID-19 pandemic.<sup>19</sup> Moreover, in other studies, the higher ranks of depression, PTSD and anxiety were associated with the female gender.<sup>10,11</sup> Xiao et al. tentatively showed that symptoms of anxiety and depression (16-28%) and the feeling of stress (8%) are common responses to the COVID-19 pandemic, and their association with sleep disorders is also suggested.<sup>20</sup>

In our study, more than half of the participants reported sleep disorders, which confirms the finding of Xiao et al.<sup>20</sup> Numerous research papers emphasize the need to educate society about the common psychological effects of a pandemic; motivate society to disease prevention and health promotion strategies; teach problem-solving strategies to deal with the current epidemiological situation; provide psychiatric care for health professionals; train medical personnel in basic aspects of mental health care; use online questionnaires to assess the scope of mental health problems; develop online materials for mental health education; provide online counseling, self-help services and telepsychiatric consultations; and also develop synchronous telemedicine services for diagnostic and counseling purposes<sup>21-25</sup>. This would reduce the fear of infection and the fear of worsening health conditions associated with coronavirus<sup>19</sup> and also help people to ignore false information that increases stress.

A frequently observed phenomenon is the accompanying sexual dysfunction of depression. Many researchers have tried to find out what mechanisms are responsible for this. Sexual expression and the ability to experience sexual pleasure tend to be consistent with mood, motivation, and overall activity. Therefore, the typical state of depression (low mood, motivation and activity) is associated with an overall reduction in sexual responsiveness. There may be fear of physical intimacy, decreased reactions to excitement, a lack of pleasure during sexual intercourse, and a difficulty in reaching orgasm.<sup>26</sup>

Among the many studies, an increased correlation between more severe sexual dysfunction and the use of antidepressants in

patients with depression can be found.<sup>26,27</sup> Antidepressants and mood stabilizers, especially selective serotonin reuptake inhibitors - particularly affecting 5HT<sub>2</sub> and 5HT<sub>3</sub> receptors - may cause increased serotonin levels; decreased dopamine; lockage of cholinergic and alpha-1 adrenergic receptors; inhibition of nitric oxide synthase; and an elevation of prolactin levels. The side effects of these drugs can be decreased desire and excitement, and the inhibition of orgasm. In the present study, we did not investigate this correlation due to small percentage of people using sedatives. It is worth noting, however, that the percentage of patients under psychiatric and/or psychologic supervision is smaller (6.5%) than this of people taking sedatives (7.5%). We assume that some people use self-medication and may not be aware of side effects of various drugs.

These side effects are based on various biochemical mechanisms, in particular the influence of drugs on the concentrations of individual neurotransmitters and their receptors in the central nervous system.<sup>28,29</sup> Cohen et al. reported that people with mental disorders had a high prevalence of sexual dysfunction, which was highest in people with depressive disorders. According to other studies, even in untreated patients, depression is associated with adverse effects on sexual function.<sup>30</sup>

In our study, 24.3% of participants agree or strongly agree that the more frequent use of alcohol and/or cigarettes was caused by the pandemic, with 66.3% disagreeing or strongly disagreeing with this statement. In comparison, the EMCDDA study shows a decrease in stimulant drug use and an increase in the use of cannabis, alcohol and prescription medicines to combat anxiety and depression. The study suggests a few reasons for increased alcohol use: using alcohol as a replacement for drugs, loneliness, and feeling depressed. The study also suggests that the rise in use of alcohol is associated with a greater use of prescription drugs.<sup>31</sup>

## CONCLUSIONS

The COVID-19 lockdown setting was associated with a high occurrence of depressive symptoms, as well as increased risk of sexual dysfunction in women translating in a decreased libido level and a lower frequency of sexual activity. Our findings may be used for improving psychological, psychiatric and sexological care during stressful events.

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