

EPIDEMIOLOGY

Impact of COVID-19 Pandemic on the Sexual Function of Health Professionals From an Epicenter in Brazil



Rubens Pedrenho Neto, MD,¹ Bruno C.G. Nascimento, MD,¹ Gabriel Carvalho dos Anjos Silva, MD,¹ João Arthur Brunhara Alves Barbosa, MD,¹ José de Bessa Júnior, MD,^{1,2} Thiago Afonso Teixeira, MD,^{3,4,5} Miguel Srougi, MD,¹ William Carlos Nahas, MD,¹ Jorge Hallak, MD,^{3,5,6} and José Cury, MD¹

ABSTRACT

Introduction: The pandemic caused by the COVID-19 resulted in worldwide social isolation and leading to significant personal distress, particularly among health professionals on the front lines. Those factors' relevance and their impact on sexual function in this population have not yet been established.

Aim: To evaluate the impact of the pandemic on sexual function in healthcare professionals and medical students at a reference center in the treatment of COVID-19 in Brazil.

Methods: A cross-sectional analysis with online questionnaires about sexual function was sent to health professionals and medical students from the HC-FMUSP medical complex. The questionnaire evaluated Total Sexual and Masturbatory Frequency prior and during the pandemic, libido and sexual satisfaction changes with a detailed inquire about demographics and personal factors. An objective assessment of sexual function was also made using the validated sexual quotient questionnaires.

Main Outcome Measures: Differences in intercourse frequency, libido, and overall sexual satisfaction, in a sample of healthcare professionals particularly vulnerable to the pandemic effects.

Results: A total of 1,314 responses were available with a mean age of 37 years. Worsening of sexual satisfaction was reported by 44.5% of the participants, with the following associated factors: Lower libido, missing Nightlife, Higher Masturbatory Frequency, and isolation from the partner. Remaining sexually active and having higher sexual frequency appear to decrease the chance of worsening sexual function. Worsening of Libido was reported by 37% and had several associated factors, including missing of Nightlife, older age, isolation from the partner among others. Being male and sexually active was associated with a smaller chance of reporting lower libido.

Conclusion: We were able to observe a sharp drop in Libido and General Sexual Satisfaction. Although an increase in pornography consumption and masturbatory frequency did occur, these factors were not associated with greater sexual satisfaction. The impact of COVID-19 on this population's sexual health is not to be underestimated and should be further studied in the follow-up of the pandemic. **Neto RP, Nascimento BCG, Carvalho dos Anjos Silva G, et al. Impact of COVID-19 Pandemic on the Sexual Function of Health Professionals From an Epicenter in Brazil. Sex Med 2021;9:100408**

Copyright © 2021 The Authors. Published by Elsevier Inc. on behalf of the International Society for Sexual Medicine. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Key Words: Sexual Activity; Erectile Function; COVID-19; SARS-Cov-2; Social Isolation

Received December 27, 2020. Accepted June 15, 2021.

¹Sexual Medicine Service, Division of Urology, Hospital das Clinicas - University of Sao Paulo Medical School, Sao Paulo, Brazil;

²Division of Urology, State University of Feira de Santana, Bahia, Brazil;

³Division of Urology, Hospital das Clinicas - University of Sao Paulo Medical School / Men's Health Study Group, Institute for Advanced Studies - University of Sao Paulo, Sao Paulo, Brazil;

⁴Division of Urology, Federal University of Amapa, Amapa, Brazil;

⁵Androscience, Science and Innovation Center in Andrology and High-Complex Clinical and Research Andrology Laboratory, Sao Paulo, Brazil;

⁶Reproductive Toxicology Unit, Department of Pathology, University of São Paulo, Sao Paulo, Brazil

Copyright © 2021 The Authors. Published by Elsevier Inc. on behalf of the International Society for Sexual Medicine. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.esxm.2021.100408>

INTRODUCTION

The current outbreak of coronavirus-associated (CoVs) acute respiratory disease, named coronavirus disease 19 (COVID-19), caused by the *severe acute respiratory syndrome coronavirus 2* (SARS-CoV-2), is not the first well-known spillover of an animal originated virus to infect humans, but is one of the few to make such a fast jump in a powerful and efficient evolutionary shortcut. The pattern of aggressiveness and the nude reality all over the world is that 15% to 20% of those infected need hospitalization because of adverse clinical scenarios and 5% evolve to critical conditions not limited to respiratory-related issues, but rather to systemic involvement, precipitating profound changes in different healthcare systems and provoking significant morbidity and mortality globally.¹ In early December 2020, deaths caused by COVID-19 have exceeded 1.5 Million worldwide, with more than 66 Million individuals tested positive. In Brazil, one of the top 5 Nations plagued by this new illness, more than 7 million cases have been confirmed, with over 180,000 deaths by SARS-CoV-2 infection.²

Due to the impressive and unprecedented demand for specialized medical care in an uncertain scenario and the absence of an effective treatment or vaccine to prevent SARS-COV-2 infection, healthcare professionals involved in the disease management are subject to an unknown deal of stress and anxiety.^{3,4} Hence, these healthcare professionals referred to feelings of stress/anxiety, mostly fear of getting infected or spreading the disease to their family members in a domestic environment.⁵

Furthermore, the implementation of social isolation measures and new assistance protocols in medical facilities lead to a complete change in health professionals and medical student's daily lives. In Sao Paulo, the largest Brazilian city and the main epicenter of COVID-19 pandemic in South America, all medical school activities were suspended, and the University of Sao Paulo Medical School Hospital - "Hospital das Clinicas" (HC-FMUSP) – the largest medical complex in Latin America with over 2,200 hospital beds – was immediately turned into an exclusive care center for COVID-19 patients: thus, drastically modifying their healthcare workers' routine.⁶

Concurrently, due to social distancing, the reduced interpersonal interactions may increase the rates of psychological conditions, including the exacerbation of pre-existing subclinical mental disorders. Among the behaviors mostly affected by social isolation, sexual activity gains progressive scientific and media attention due to its consequences in general, physical, and mental wellbeing.⁷

Jacob et al⁸ evaluated sexual activity during the UK COVID-19 self-isolation/social distancing and demonstrated that individuals engaging in weekly sexual activity in that period were just below 40%. Notably, women, individuals aged over 35 years, or those without a steady partner were more likely to experience sexual abstinence. Conversely, individuals who were married or in a domestic relationship and more extended periods of isolation were theoretically more

likely to increase their sexual activity, which was presumably helped by the possibility of spending more time with their partners.^{9,10}

The impact of the SARS-CoV-2 pandemic on the sexual function of healthcare workers directly involved in COVID-19 patient management was not investigated so far. Also, few surveys use validated questionnaires to assess the quality of sexual life during prolonged periods of stressful work concomitant with restricted interpersonal interactions. Therefore, our study aims to assess the influence of the COVID-19 pandemic in the sexual life of healthcare professionals and medical interns of a Brazilian COVID-19 reference hospital.

OBJECTIVE

Evaluate the influence of the SARS-Cov-2 pandemic on the sexual function of healthcare professionals and medical interns of a Brazilian COVID-19 reference hospital.

MATERIAL AND METHODS

Study Design and Participants

This cross-sectional quantitative convenience sample study was performed through an online survey in an adult aged 18 years-and-over population, comprising healthcare professionals and medical students (interns) from the HC-FMUSP. Eligible participants received an online questionnaire via corporate email between July 22nd and August 24th, 2020. Individuals confirmed their agreement to participate in the research after reading all the information on the electronic informed consent sheet. The study was performed according to the Declaration of Helsinki ethical guidelines,¹¹ and the Research Ethics Committee of the University of Sao Paulo Medical School (FMUSP), approved its development (trial registration number: CAAE: 3411220.5.0000.0068). Thus, data confidentiality and the only-use for scientific purposes would be guaranteed, preserving the participant's privacy and minimizing the risks of disclosure, discrimination, or stigmatization by accessing the information content.

Questionnaire

The online survey was divided into 2 sections to evaluate sexual life and its domains. The first section comprised a self-constructed, research-specific instrument, including participants' demographics, such as gender, age, sexual orientation, profession, relationship status, SARS-CoV-2 infectivity status and whether the subject was recruited to work within the COVID-19 referral institute. Furthermore, the questionnaire was designed to evaluate the domestic environment and couples' dynamics, including living situation, if the isolation recommendations changed their routine, if they isolated from their partner and if they were sexually active (≥ 1 relation per week).

For a detailed analysis of other possible affected behaviors, questionnaire included a report of pornographic media viewing, dating apps use, and the influence of the absence of social interaction in nightlife (clubs, bar, restaurants). A categorical query evaluated how libido was during the pandemic (decreased, increased, or remained the same), while another question compared overall sexual satisfaction before and after the quarantine. An ordinal multiple-choice question (<1, 1-2, 3-5, >5/week) graded the masturbatory sexual frequency before and after the quarantine, too (results in [Table 1 and 2](#)).

The second section corresponded to 2 gender-specific Brazilian-designed validated global sexual function questionnaires: The female sexual quotient (FSQ)¹² and male sexual quotient (MSQ).¹³ Both instruments were developed in Brazilian Portuguese as self-reported questionnaires to evaluate several sexual domains ([Table 3](#)),^{12,13} and currently they are used for population surveys in different scenarios.^{14,15} Data were analyzed in questions to be answered in a Likert scale fashion (0 = never to 5 = always), usually expressing the satisfaction level or frequency of a specific event, contemplating the sexual response cycle phases. In the end, a score can be disclosed for each sexual domain, or indeed the overall quality of sexual life can be declared as a total score, ranging from 0 to 100 points.^{12,13}

Specifically, the FSQ items analyze the ensuing domains: libido (questions 1, 2, and 8), foreplay (question 3), personal excitement and attunement with a partner (questions 4 and 5), and comfort, orgasm, and satisfaction (questions: 7, 9, and 10).¹² Similarly, the MSQ considers the following sexual domains: desire (item 1), self-confidence (item 2), erection quality (items 5, 6, and 7), ejaculation control (item 8), ability to achieve orgasm (item 9), self-satisfaction (items 3, 4, and 10), and partner's satisfaction (items 3 and 10).¹³ [Table 3](#) demonstrates the standardization of sexual performance classification, according to FSQ and MSQ Scores, and that a total score of below 62 indicates an unfavorable sexual performance.¹²⁻¹⁵ The expected time for the participant to complete the online survey was around 10 minutes.

Statistical Analysis

We considered adverse outcomes: the reporting of worsening sexual satisfaction or libido and FSQ/MSQ <62 points (the cutoff for unfavorable sexual performance; [Table 3](#)).

After a thorough discussion of physical and social factors possibly related to the outcomes above, the following variables were investigated for their significance: age, gender, sexual orientation, sexually active status (at least 1 per week), living together with a partner, isolated from partners, sexual and masturbatory frequency, sexual desire or libido, view of pornographic media and lack of social interaction in nightlife. The evaluation of masturbatory sexual frequency as an associated factor of other outcomes was conducted in a dichotomized fashion, with patients being grouped into more (frequency ≥ 3 /week) and less active (frequency <3/week).

All data collected were processed before further analysis and checked for data quality to verify errors, atypical observations,

missing data, or inconsistent entries. Subsequently, a descriptive analysis of the data was performed to calculate absolute or relative frequencies of each variable (quality of sexual life and different male and female sexual activity issues addressed in the MSQ and FSQ, respectively).

Data were expressed as means \pm SD, medians and interquartile ranges, or absolute values and fractions. The Student t or Mann-Whitney U test was used to compare continuous variables while categorical variables were compared using the chi-square or Fisher's exact test. In a multivariate analysis, after adjusting for age, gender, sexual orientation and Social and comportamental confounders the association, we evaluated the variables with each outcome (worsening sexual satisfaction, worsening libido, and FSQ/MSQ < 62 points). The significance level of the results was set at $P < .05$. All statistical analyses were performed with Graph-Pad Prism, version 9.0.0 San Diego-CA, USA.

RESULTS

A final sample of 1,314 respondents (from a total of 28,000 active individual e-mails) was involved in this study (mean age of 37.6 ± 10.8 years), confirming a response rate of 4.69%. Women corresponded to 70% (n = 928), and nearly one-third of participants (31.5%) reported that they were isolated from their partners. SARS-CoV-2 infected almost a quarter (n = 316) at the moment of the online survey, and roughly 55.6% remained sexually active. Lower libido was reported by 37% of the participants (42.3% male and 24.6% female), while lower sexual satisfaction was reported by 44.5% of the participants (41.7% male and 45.7% female). [Table 1A](#) and [1B](#) displays participants answers to several other relevant topics from our questionnaires.

In the studied population, the mean quotients reported were: MSQ = 75.3 ± 17.6 , FSQ = 67.8 ± 17.6 , and total sexual quotient = 70.0 ± 18.0 points, all classified as partially satisfied. The stratification of QS score <62 points (the cutoff for unfavorable sexual performance) was: 23% of the sample, 16.6% of men and 25.7% of women, the ratio FSQ/MSQ <62 was 3.7 (indicating less sexual satisfaction among women in this sample, although women have greater hypoactive desire, already demonstrated in literature.^{25,35} Our aim was to show the impact of the imposed modifications on their routines by SARS-CoV-2 pandemic on the sexual function.

Associated factors with the chance of reporting worsening of sexual function and lower libido follows are reported on [Table 2](#). In a multivariate analysis, after adjusting for age, gender, sexual orientation, and social and comportamental confounders.

Factors Associated With Worsening Sexual Satisfaction ([Table 2A](#))

Worsening sexual satisfaction was reported in 44.5% of the sample, 41.7% of males and 45.7% of females. In a logistic regression model adjusted for several factors including gender,

Table 1. General sample characterization

Table 1A			
Variables	General (n = 1,314)	Male (386–29.4%)	Female (928–70.6%)
Age(y)	37.6 ± 10.8	37.6 ± 12.1	37.7 ± 10.3
Sexual orientation			
<i>Heterosexual</i>	1172 (89.2%)	318 (82.4%)	853(92.0%)
<i>Homosexual</i>	98 (7.5%)	61(15.7%)	37(4.0%)
Infection by COVID-19	316 (24%)	98 (23.5%)	218 (25.3%)
Sexually active during quarantine	731 (55.6%)	236(61%)	495(53.4%)
Reported Lower Libido	487 (37%)	95(42.3%)	392(24.6%)
Reported Lower Sexual Satisfaction	585 (44.5%)	161(41.7%)	424(45.7%)
Table 1B			
General descriptive data	n, (%)	Male	Female
Had a steady partner	1086 (82.6%)	315(81.6%)	771(83.2%)
Were isolated from their partners	414 (31.5%)	106(27.4%)	308(33.1%)
<i>Worked at central institute (exclusive in care of COVID-19)</i>	478 (36,4%)	132(34.2%)	346(37.3%)
Were sexually active (at least 1 event per week)	731 (55.6%)	236(61%)	495(53.4%)
Increased the masturbatory frequency	226 (17.1%)	132(34.2%)	94(10.1%)
Decreased the sexual frequency	309 (23.5%)	91(23.5%)	218(23.51%)
Increase the sexual frequency	192	65(16.8%)	127(13.7%)
Reported use of dating apps	123 (9.3%)	60(15.5%)	63(6.8%)
Reported the lack of nightlife impacted their sexual life	347 (26.4%)	108(28%)	63(6.7%)
Increased the viewing of pornographic media	141 (10.7%)	83 (21.4%)	58(6.3%)

Continuous variables are presented as mean ± standard deviation.

Categorical variables are presented as n (%). Bold values specifies general sample characterization.

variables independently associated with this outcome were: lower libido, lack of social interaction in nightlife, higher masturbatory frequency, having worked at central institute (exclusive in patient care of COVID-19 patients), and isolation from partner. Furthermore, factors significantly associated with a lower chance of reporting worse sexual satisfaction included: Higher sexual frequency and being sexually active.

Factors Associated With Lower Libido (Table 2B)

Lower libido was reported by 36.9% of the sample, 42.3% of males and 24.6% of females. In a logistic regression model adjusted for several factors including gender, variables independently associated with a greater chance of reporting lower libido were lack of social interaction in nightlife, older age, isolation from partners, and marital status. Higher masturbatory frequency, male gender, higher sexual frequency, increased pornographic media viewing, and being sexually active were associated with lesser chance of reporting lower libido.

Factors Associated With Worst Sexual Quotient (MSQ and FSQ) (Table 2C)

Factors that appear to negatively influence the sexual quotient were worst sexual satisfaction, living with partner and older age. On the other hand, higher libido, male gender, being sexually

active, and having higher sexual frequency were associated with better sexual quotient scores.

DISCUSSION

This research scrutinizes the broad impact of the COVID 19 pandemic on the sexual life of healthcare workers and interns from a referral university based medical complex for hospitalization of moderate-to-severe SARS-CoV-2 infected patients in Brazil. In our data, while more than one-third of people reported lower libido and 44% lower sexual satisfaction after the outbreak, almost 55% of individuals remained sexually active during the quarantine. Older women were at higher risk to present impaired sexual life issues, while sexually active individuals with higher libido were less likely to present such outcomes. To our knowledge, this is the first survey concerning the sexual health of healthcare providers during the current pandemic.

The COVID-19 pandemic brought the single highest demand for immediate healthcare services in the last one-hundred years, probably exceeding the needs from the 2 great wars in a global scenario, therefore exposing millions of healthcare workers to a considerable contamination risk and consequently to an unprecedented deal of stress, fear, and anxiety, because not only the individual was at risk, but rather their families as

Table 2. Factors associated with sexual satisfaction, libido, and sexual quotient

2A – factors associated with worsening sexual satisfaction:			
Parameter	OR	95% CI	P value
Lack of nightlife (clubs, bar, restaurants)	3.14	2.30–4.28	<.001
Lower libido	7.32	5.44–9.84	<.001
High masturbatory frequency	2.16	1.51–3.13	<.001
Isolation from partner	1.50	1.13–1.98	.0048
Worked at central Institute (exclusive care in COVID-19)	1.43	1.08–1.91	.0115
Higher sexual frequency	0.32	0.19–0.54	<.001
Sexually active	0.33	0.25–0.44	<.001
2B – Factors associated with lower libido:			
Parameter	OR	95% CI	P value
Lack of nightlife (clubs, bar, restaurants)	1.58	1.18–2.12	.0022
Older age	1.01	1.00–1.03	.0120
Isolation from partner	1.77	1.36–2.29	<.001
Live with partner	2.36	1.75–3.19	<.001
Higher masturbatory frequency	0.37	0.24–0.58	<.001
Higher sexual frequency	0.29	0.19–0.47	<.001
Increased viewing of pornographic media	0.54	0.33–0.90	.017
Male	0.57	0.42–0.77	.0003
Sexually active	0.46	0.35–0.62	<.001
2C – Factors associated with worst sexual quotient (QS-M and QS-F):			
Parameter	OR	95% CI	P value
Older age	1.02	1.00–1.03	<.001
Live with partner	1.89	1.36–2.62	<.001
Worst sexual satisfaction	2.38	1.76–3.20	<.001
Higher libido	0.44	0.29–0.68	<.001
Higher sexual frequency	0.45	0.26–0.77	<.001
Male	0.63	0.45–0.87	<.001
Sexually active	0.57	0.42–0.79	<.001

Bold values specifies general sample characterization.

well.^{16,17} Apart from general health, financial and mental deterioration caused by the pandemic, sexual health may be seriously impaired, as demonstrated in a few previous investigations.¹⁸ It is possible and even expected that as front-line workers dealing directly with SARS-CoV-2 infected patients, healthcare professionals might have their sexual health even further impacted.

In our study, around one-quarter of participants reported a decreased (<62 points) MSQ and FSQ scores, suggesting unfavorable sexual performance in validated questionnaire. Despite not having prepandemic data, this information coupled with the 44% rate of reporting worsening sexual satisfaction indicates that healthcare professionals have suffered significant deleterious effects on their overall sexual health, despite the predominantly

young population (mean age of 37-year-old). Likewise, Cocci et al⁵ reported in a young Italian population (n = 1,515, mean age of 21 years) that 55% of participants referred impact on their sex life. In a British general population survey, Jacob et al⁸ reported that only 40% of people remaining sexually active during the pandemic, while in our study, levels of sexual activity reached 55%, even with a population submitted to a more stressful environment. Although our study population was subject to fear of contamination, a stressful work environment and a disease burden, the cultural differences between countries and a less strict quarantine adopted in Brazil may explain these differences. Furthermore, our sample comprised predominantly young subjects with a substantial stable relationship prevalence (81%), favoring higher coital frequency.¹⁹

In our study, females and older adults were more likely to present some sexual health impairment during the COVID-19 pandemic. Interestingly, several authors report similar results,^{8,20} even in other stressful mass casualties, such as natural disasters and warfare situations.^{21–23} Also, in a multivariate analysis, Cocci et al²⁰ described age as an independent predictor of sexual dysfunction during the Italian quarantine (OR 0.96, 95%, *P* <

Table 3. Male/female sexual quotient scoring^{12,13}

82–100 points	Highly satisfied
62–80 points	Partially satisfied
42–60 points	Average
22–40 points	Dissatisfied
0–20 points	Highly dissatisfied

.001), analogous to our findings in Brazil (OR 0.98, 95%, $P < .001$). Moreover, we also confirmed the association of older age with decreased sexual satisfaction and libido, consistent with current evidence.¹⁹

Similarly in a cross-sectional study with 868 participants, Jacob et al⁸ found that women age >35 years and without a steady partner were at higher risk of decreasing sexual frequency due to the distance measures adopted in the UK. Contrarily, in Turkey, women seemed to increase sexual desire and higher intercourse frequency, although not followed by an improvement in their sexual life quality during the current pandemic.²⁴ This disparate result may be due to the small sample analyzed ($n = 58$) in the Turkish research.

As expected, physical isolation from a partner in an urban quarantine environment resulted in less frequent sexual encounters. However, in our data, individuals living with their partners were more severely affected in the sexual domain of libido. It is possible that this disclosure is a result of stressful situations resulting from prolonged interactions, daily chores, and problem resolutions, such as looking after children; but this would need to be further investigated. In opposition, intercourse frequency increased with time of social distance in the UK, reaching a prevalence of 47% of couples maintaining ≥ 1 sexual intercourse/week after 10 days of isolation.⁸

In addition to that, in our sample, there was an increase of 10% in pornographic media consumption after social isolation. This finding is markedly lower than the increase by 40% of autoerotism, mostly pornography consumption, in an Italian survey.²⁰ In that study, only 20% of participants complained about decreased desire, while more than 40% reported an increase in libido. On the other hand, nearly 40% of Brazilian healthcare workers had diminished desire, which might influence the slight increment in porn consumption. Also, our studied population was predominantly females (70%), which are known to access less pornographic media than adult men.²⁵ Remarkably, increased porn consumption was prevalent among people with preserved libido; however, it did not correlate with higher sexual satisfaction patterns.²⁶ Evidence supports that masturbation concomitant with pornography use is not correlated with better sexual satisfaction.^{26,27}

Comparing healthcare workers exclusively for the COVID-19 management with others from the non-COVID-19 units, we obtained the unique evidence of the worst sexual satisfaction for those directly involved in the SARS-CoV-2 infection treatment (Table 2A). This finding endorses the onset of psychological distress in sharp levels that challenge even experienced professionals of huge medical facilities during the front-line handling of a mass fatality event, such as pandemics.^{28,29}

COVID-19 could, directly and indirectly, impact couples' sex lives by increasing anxiety and depression rates that configure into higher levels of psychogenic sexual dysfunction. Protective measures to try safe sex might also lead to difficulties, especially

for those at risk for preexisting sexual dysfunction. The medical community must be aware of such phenomena and provide proper counseling, especially during these challenging times and potential future similar situations.³²⁻³⁴ The effect of those factors in couple's sexual frequency is not obvious, and in accordance with our findings, García-Cruz and Peraza's preliminary results demonstrated that sexual intercourse was affected differently (less frequent in 23–31%, same frequency in 39–41% and more frequent in 7–14%). We also observed that in a psychological stress scenario such as the COVID-19 pandemic, the sexual and masturbatory frequency increase only occurs with preserved libido; however, masturbation does not generate greater sexual satisfaction in our sample.^{7,25,26,30,31}

Our study pioneers in the evaluation of sexual aspects of health professionals directly involved in treating moderate-to-severe SARS-CoV-2 infected patients. We obtained a suitable convenience sample size from a specific population, particularly vulnerable to the pandemic effects. Nonetheless, some limitations must be recorded. As for all cross-sectional studies, the causal direction of several issues remains unclear. Although quite detailed, our questionnaire could not evaluate patients' comorbidities, mental illness, or financial impact. Furthermore, no pre-pandemic evaluation was available. There was also the participation bias risk due to a relatively young age population, which adds the chance of under-reporting some sexual dysfunctions.^{35,36} Nevertheless, the online surveys' private environment and mainly the workers' motivation at a university or medical teaching hospital possibly minimize this potential bias.

CONCLUSION

In this survey, we observed a sharp drop in intercourse frequency, libido, and overall sexual satisfaction, in a sample of Brazilian healthcare professionals that directly deal with COVID-19 infected patients. Female and elder workers were the most affected sexually, along with those isolated from their partners. Providers who directly treat patients within the COVID-19 unit were also more affected than those working at other activities within the facility. Although an increase in pornography consumption and masturbatory frequency did occur, especially among subjects with preserved libido, these factors were not associated with greater sexual satisfaction. The impact of the current pandemic on these workers' sexual health should not be underestimated.

AUTHORS' ORCID NUMBERS

Rubens Pedrenho Neto

Bruno Chiesa Gouveia Nascimento: <http://orcid.org/0000-0003-4319-4434>

Gabriel Carvalho dos Anjos Silva

João Arthur Brunhara Alves Barbosa

José de Bessa Júnior

Thiago Afonso Teixeira: <https://orcid.org/0000-0002-6598-2442>

Miguel Srougi: <https://orcid.org/0000-0002-4545-0596>

William Carlos Nahas: <https://orcid.org/0000-0002-7395-8370>

Jorge Hallak: <https://orcid.org/0000-0002-6452-0502>

José Cury

Corresponding Author: Rubens Pedrenho Neto, MD, R.Dr. Ovídio Pires de Campos, 225-Cerqueira César – 05403-010, São Paulo, Brazil; E-mail: rubens.pedrenho@gmail.com

Conflict of Interest: The authors report no conflicts of interest.

Funding: None.

REFERENCES

- Sohrabi C, Alsafi Z, O'Neill N, et al. World Health Organization declares global emergency: a review of the 2019 novel coronavirus (COVID-19). *Int J Surg* 2020;76:71–76.
- Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect Dis* 2020;20:533–534.
- Blake H, Bermingham F, Johnson G, Tabner A. Mitigating the psychological impact of COVID-19 on healthcare workers: a digital learning package. *Int J Environ Res Public Health* 2020;17:2997.
- Tsamakis K, Rizos E, Manolis AJ, et al. COVID-19 pandemic and its impact on mental health of healthcare professionals. *Exp Therap Med* 2020;19:3451–3453.
- Cocci A, Presicce F, Russo GI, et al. How sexual medicine is facing the outbreak of COVID-19: experience of Italian urological community and future perspectives. *Int J Impot Res* 2020;32:480–482.
- Iscaife A, Marchini GS, Srougi V, et al. The urologist's role in the fight of COVID-19 pandemic: mandatory mindset shift on the frontline. *Int Braz J Urol* 2020;46:879–882.
- Paul GM, Nascimento BC, Afif-Abdo J, et al. The psychiatric impact of COVID-19 pandemic on sexual health. *Braz J Psychiatry* 2021;43:109.
- Jacob L, Smith L, Butler L, et al. Challenges in the practice of sexual medicine in the time of COVID-19 in the United Kingdom. *J Sex Med* 2020;17:1229–1236.
- Smith L, Yang L, Veronese N, et al. Sexual activity is associated with greater enjoyment of life in older adults. *Sex Med* 2019;7:11–18.
- Grabovac I, Koyanagi A, Yang L, et al. Prospective associations between alcohol use, binge drinking and sexual activity in older adults: the English Longitudinal Study Of Ageing. *Psychol Sexual* 2019. doi: 10.1080/19419899.2019.1687581. E-pub ahead of print.
- World Med A. World Medical Association Declaration of Helsinki ethical principles for medical research involving human subjects. *JAMA* 2013;310:2191–2194.
- Helena C, Abdo N. Quociente sexual feminino: um questionário brasileiro para avaliar a atividade sexual da mulher. 2009.
- Abdo CHN. The male sexual quotient: a brief, self-administered questionnaire to assess male sexual satisfaction. *J Sex Med* 2007;4:382–389.
- Pitta AC, Viola Ferreira GR, Tomioka RB, et al. Sexual function in female juvenile idiopathic arthritis patients. *Adv Rheumatol* 2019;59:13.
- Teixeira T, Nazima M, Hallak J. Male sexual quality of life is maintained satisfactorily throughout life in The Amazon rainforest. *Sex Med* 2018;6:90–96.
- Tavares Lima CK, de Medeiros Carvalho PM, Araruna Silva Lima IdA, et al. The emotional impact of Coronavirus 2019-nCoV (new Coronavirus disease). *Psychiatry Res* 2020;287:112915.
- Jackson SE, Yang L, Koyanagi A, et al. Declines in sexual activity and function predict incident health problems in older adults: prospective findings from the English Longitudinal Study of Ageing. *Arch Sex Behav* 2020;49:929–940.
- Grabovac I, Smith L, Yang L, et al. The relationship between chronic diseases and number of sexual partners: an exploratory analysis. *BMJ Sex Reprod Health* 2020;46:100–107.
- del Mar Sanchez-Fuentes M, Santos-Iglesias P, Carlos Sierra J. A systematic review of sexual satisfaction. *Int J Clin Health Psychol* 2014;14:67–75.
- Cocci A, Giunti D, Tonioni C, et al. Love at the time of the Covid-19 pandemic: preliminary results of an online survey conducted during the quarantine in Italy. *Int J Impot Res* 2020;32:556–557.
- Liu SJ, Han JT, Xiao D, et al. A report on the reproductive health of women after the massive 2008 Wenchuan earthquake. *Int J Gynecol Obstet* 2010;108:161–164.
- Kissinger P, Schmidt N, Sanders C, et al. The effect of the hurricane Katrina disaster on sexual behavior and access to reproductive care for young women in New Orleans. *Sex Transm Dis* 2007;34:883–886.
- Hannoun AB, Nassar AH, Usta IM, et al. Effect of war on the menstrual cycle. *Obstet Gynecol* 2007;109:929–932.
- Yuksel B, Ozgor F. Effect of the COVID-19 pandemic on female sexual behavior. *Int J Gynecol Obstet* 2020;150:98–102.
- Hald GM. Gender differences in pornography consumption among young heterosexual Danish adults. *Arch Sex Behav* 2006;35:577–585.
- Carvalho A, Træen B, Stulhofer A. Masturbation and pornography use among coupled heterosexual men with decreased sexual desire: how many roles of masturbation? *J Sex Marital Ther* 2015;41:626–635.

27. Dwulit AD, Rzymiski P. The potential associations of pornography use with sexual dysfunctions: an integrative literature review of observational studies. *J Clin Med* 2019;8:914.
28. Shultz JM, Cooper JL, Baingana F, et al. The role of fear-related behaviors in the 2013-2016 West Africa Ebola virus disease outbreak. *Curr Psychiatry Rep* 2016;18.
29. Kumar A, Nayar KR. COVID-19 and mass fatality management: a public health challenge. *Disaster Med Public Health Prep* 2020;14:e38–e39.
30. Talevi D, Socci V, Carai M, et al. Mental health outcomes of the CoVID-19 pandemic. *Rivista Di Psichiatria* 2020;55:137–144.
31. Döring N. How is the COVID-19 pandemic affecting our sexualities? an overview of the current media narratives and research hypotheses. *Arch Sex Behav* 2020;49:2765–2778.
32. Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 2020;395:912–920.
33. Ibarra FP, Mehrad M, Mauro MD, et al. Impact of the COVID-19 pandemic on the sexual behavior of the population. The vision of the east and the west. *Int Braz J Urol* 2020;46:104–112.
34. Lara L, Marino F, Abdo CH, et al. Safe sexual practices in the COVID-19 pandemic period. *Sex Med* 2020;8:788–790.
35. Arrington R, Cofrancesco J, Wu AW. Questionnaires to measure sexual quality of life. *Qual Life Res* 2004;13:1643–1658.
36. Mollaioli D, Sansone A, Ciocca G, et al. Benefits of sexual activity on psychological, relational, and sexual health during the COVID-19 breakout. *J Sex Med* 2021;18:35–49.