

ANALYSIS OF UROGYNECOLOGICAL AND SEXUAL CHANGES ASSOCIATED WITH COVID-19

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Abstract: **Introduction:** Although SARS-CoV-2 is responsible for causing the Coronavirus disease, and mainly affects the respiratory tract, it has been associated with other series of extrapulmonary manifestations, including pelvic dysfunctions. **Goal:** To analyze urogynecological and sexual sequelae in women and men affected by the Coronavirus and establish a relationship between the symptoms and the characteristics of the population with the highest prevalence. **Method:** A cross-sectional study was carried out, with a convenience sample, 191 participants, 135 female and 56 male. After free consent, we sent the link to the Google Forms questionnaire for the investigation of post-COVID-19 urogynecological and sexual symptoms. Data were statistically analyzed using non-parametric tests, such as Friedman, Wilcoxon, Equality of Two Proportions, Chi-Square, Spearman correlation and Confidence Interval for the mean, considering a significance level of $p \leq 0.05$. **Result:** In the urinary system, an increase in Stress Urinary Incontinence (SUI) ($p=0.06$), nocturia ($p<0.05$) and the feeling of urinary urgency ($p<0.05$) was observed in women. In men, only increased urinary frequency without statistical significance ($p=0.061$). Considering sexuality, sexual performance and lubrication scores were reported in both as a sign of reduction, but only women showed statistical significance for scores and lubrication respectively ($p<0.001$, $p<0.056$). **Conclusion:** We concluded that the COVID-19 infection increased the incidence of urinary disorders more in women than in men, with SUI, urinary urgency/hyperactivity and nocturia being more prevalent. Considering sexuality, both groups were affected and women were more affected.

Keywords: COVID-19, Pelvic Floor Disorders, Sexuality.

INTRODUCTION

According to the World Health Organization, in 2020 COVID-19 was classified as a pandemic, affecting health, economic and social health globally. This disease has three levels of clinical manifestations during the course of the disease, first asymptomatic or without detection of the virus in the incubation period, in the second stage as symptomatic, not severe and with the detection of the virus and in the third level with complications in the treatment. respiratory disease in a severe symptomatic way and with a high viral load (FRIZZELLI et al., 2020).

COVID-19 has variable severity and presents forms of transmission, which can be through physical contact through surfaces, objects, or through kisses and hugs when the infected droplets reach the mucous membranes of the body. And through the airways, which consists of high transmissibility through droplets from sneezes, coughs and speech of infected people (BELASCO; FONSECA, 2020).

Although SARS-CoV-2 is responsible for causing the Coronavirus disease and mainly affects the respiratory tract of humans, it has already been associated with other series of extrapulmonary clinical manifestations, highlighting the impact on multiple systems (GUPTA et al., 2020). In addition to the clinical signs most seen in the symptomatic phase of the disease, which are similar to the flu, such as cough, myalgia, fever, fatigue, leukopenia and lymphopenia, atypical signs have also been described in studies. According to Do Monte and collaborators (2020), kidney changes, abdominal pain, conjunctivitis, anosmia, among others, were found.

The pelvic muscle group is called the pelvic floor, as it consists of a set of muscles, ligaments and fascia, which are responsible for sexual function, maintaining continence (urinary and fecal) and supporting pelvic structures and organs such as the uterus, bladder, rectum. and prostate (HODGES et al., 2007).

At times of increased intra-abdominal pressure, such as, for example, when coughing or jumping, an anticipatory contraction of the pelvic floor muscles occurs. As far as you are concerned, they are the muscle groups responsible for protecting the pelvic organs, supporting urinary and intestinal support, as well as the sexual function (HODGES et al., 2007). In view of this synergy between the pelvic floor, respiratory diaphragm and abdominal muscles, the influence of COVID-19 related to the severity of symptoms can probably overload and fatigue the pelvic muscles.

In females, the weakening of this muscle is more susceptible and the risk may be increased due to multiparity, gynecological surgeries or the decrease in the hormone estrogen, among others. By analyzing respiratory mechanics and the perineum, it is imaginable to establish an impact between COVID-19 and impairment of the triad of functions. Even more so if associated with a long period of hospitalization and psychological influence due to social distancing. (SIRACUSE; GRAY, 2020).

According to Zhu Na et. al (2019), in the male public, the development of sexual disorders due to the COVID-19 virus was noted, especially those who had Acute Respiratory Distress Syndrome (ARDS) and pulmonary fibrosis as a consequence of the virus. The hypothesis raised was due to the decrease in gas exchange, blood circulation and saturation, consequently impairing the mechanics of the pelvic organ

and male erectile function. Furthermore, the proposed treatment for this infection with antihypertensive agents and β -blockers may worsen or advance erectile dysfunction (SANSONE et al., 2020).

SARS-CoV-2 uses Angiotensin-Converting Enzyme 2 (ACE-2) as an entry receptor for cells, which is a transmembrane protein that facilitates the entry of the virus to infect a wide range of cells. of the body, including Leydig cells, Sertoli cells, and sperm. In view of this, a hypothesis was raised in the study by Aitken and his collaborators (2020) about the possible damage to men's sexual health when considering this fact.

Considering the pandemic context and social isolation, the impacts on society reflect both the physical health and the mental health of the population. In the study by Bigalke, Greenlund and Carter (2020) an increased incidence related to anxiety associated with greater frequency and urinary urgency in the female population was discovered (VRIJENS et al., 2017).

Economic, psychological and social issues were negatively potentiated, and in the male population this period of seclusion and emotional stress can generate erectile, ejaculatory and excitation dysfunctions, as a response from the Autonomic Nervous System (DE SOUZA ALVES, 2020). Therefore, a relationship between COVID19 and the increase in dysfunctions of the pelvic organs and muscles, a decrease in sexual performance in men and women, as well as a possible worsening of cases after the pandemic is likely (SIRACUSA; GRAY, 2020).

Therefore, the objective of the study was to analyze urogynecological and sexual symptoms in men and women affected by the Coronavirus during the period with COVID19, and post-COVID-19, comparing the symptoms before the pandemic and establishing a relationship between the

symptoms presented and the characteristics of the population. with higher prevalence, comparing genders.

METHODOLOGY

A cross-sectional study was carried out, using a convenience sample and via online dissemination, with 191 participants, 135 female and 56 male, aged between 18 and 60 years who were proven to be infected with COVID-19.

This study was previously approved by the Ethics Committee for Research with Human Beings of Universidade Presbiteriana Mackenzie via Plataforma Brasil, under protocol CAAE: 44655221.9.0000.0084, in which we respect all the ethical principles that guide the research, as well as its privacy, as advocate international documents and Resolution 466/12 of the National Health Council of the Ministry of Health.

All study participants had access to the Free and Informed Consent Form.

Informed (TCLE) digitally, and agreed with the document before the start of data collection, all clarifications, referrals were explained in detail and elucidated at any time. After that, we sent the link to the Google Forms application form for the investigation of post-COVID-19 urogynecological and sexual symptoms, which was published between August 30 and October 20, 2021 in different groups on social networks, and within the nucleus itself academic at the institution: " Universidade Presbiteriana Mackenzie".

For data collection, the self-authored questionnaire was structured based on the study by Siracusa and Gray (2020), which consisted of 18 parts, namely: TCLE; anamnesis; general questions about symptoms of COVID-19; sexuality; urinary tract; hospitalization and post-COVID-19 sequelae. The screening for collecting information

included questions such as: age, profession, severity of COVID-19 in each case, presence of comorbidities, psychological symptoms that emerged after the start of the pandemic, medications and sedentary lifestyle, with a view to promoting future analysis. Soon after, the participant could indicate, through multiple-choice tests and dichotomous yes or no questions, the presence or absence of the symptom, divided into three moments: before the pandemic; during the time they were infected with the COVID-19 virus; and after the cure of COVID-19, which constituted several questions about the presence of symptoms related to the pelvic floor and sexual symptoms related to COVID-19, such as: urinary incontinence, urinary urgency, nocturia, fecal incontinence, sexual dysfunction and pelvic prolapse.

In addition, other studies that also analyzed the presence of symptoms associated with the COVID-19 pandemic, based our completion of questionnaires, as they were carried out in the midst of this same scenario using the same application, as in the studies by Ozamiz-Etxebarria (2020); and Souza et al. (2021).

In addition, during the collection, the participant could also have indicated if he already had any of the symptoms and if the clinical manifestation worsened in the pandemic period, it being possible to have reported descriptive answers in each section if the participant judged some consideration to be the most relevant. During the production of data collection, we considered selecting the Google Forms application due to the pandemic and social isolation scenario, in addition to offering easy access to the user and an intuitive layout. In addition, in the questionnaire we used popular terms, images and a brief explanation of each symptomatology, in order to facilitate understanding and reduce possible errors by the participants.

The data were organized in tables for descriptive analysis, and the results were later presented to all participants, safeguarding the participants' personal data. For the statistical analysis, non-parametric statistical tests were performed, as the normality of the main outcome quantitative variables was tested using the Kolmogorov-Smirnov test ($N \geq 30$) and we concluded that there is no assured distribution of normality, therefore, we used the tests Friedman, Wilcoxon, Equality of Two Proportions, Chi-Square, Spearman correlation and Confidence Interval for mean, considering the significance level of $p \leq 0.05$.

RESULTS

191 participants answered the Google Forms questionnaire and self-reported that they had been infected with COVID-19, with 135 (70.6%) female participants and 56 (29.3%) male participants. However, only 130 participants met the inclusion criteria with all consistent data, with 88 (67.6%) female participants and 42 (32.3%) male participants (Table 1).

As for the characteristics of contamination by the COVID-19 virus, mostly both genders had higher rates of mild contamination, with females being more affected in all contamination measures (Table 1).

With regard to comorbidities, the male population indicated some comorbidity in greater numbers compared to the female population, among them the most seen were Systemic Arterial Hypertension (SAH), Diabetes Mellitus (DM), obesity, respiratory diseases, autoimmune diseases and heart diseases. In women, the most highlighted comorbidities were DM, SAH and respiratory diseases (Table 1).

Considering the use of some type of medicine, it was analyzed that 52 (40%) of all participants used some type of medicine, among the most common used among women were contraceptives, Exodus, Puran, Metmorphine and in both populations the most used drugs were Omeprazole, Valsartan, Losartan, Hydrochlorothiazide, Glifage and Atenolol (Table 1).

Regarding the urinary system, an increase was observed in women in relation to Stress

Gender	Female	Male
N (%)	88 (67,6%)	42 (32,3%)
Middle Ages: \pm DP	31,9 \pm 10,8 years	33,5 \pm 11,81 years
Contamination characterization		
asymptomatic (%)	4 (4,5%)	8 (19%)
Lights (%)	69 (78%)	24 (57%)
Serious (%)	12 (13%)	8 (19%)
critics (%)	3 (3,4%)	2 (4,7%)
Comorbidity (%)	24 (30%)	26 (61%)
Sedentary lifestyle (%)	38 (43%)	12 (28,5%)
Use of drugs (%)	34 (38,6%)	15 (35,7%)

Table 1: Characterization of the sample.

Urinary Incontinence (SUI), from 13 women (14.8%) to 22 (25%) during COVID-19 infection ($p=0.08$), and for 23 (26.1%) after COVID-19 ($p=0.06$). The percentage of women with nocturia, who described having their sleep interrupted by the urge to urinate, increased from 36 (40.9%) before the pandemic to 50 (56.8%) during the period with COVID-19 ($p<0.05$), reducing to 48 (54.5%) after COVID-19 ($p=0.07$). The feeling of urinary urgency significantly increased during and after COVID-19 when compared to the period before the pandemic. Of 14 (15.9%) women who had the symptom, there was an increase to 29 (33%) women during COVID-19 and 31 (35.9%) after COVID-19 ($p<0.05$) (Table 2).

Regarding changes in the male urinary tract, it was possible to observe similarity between the sexes only in the increase in urinary frequency, with a prevalence of 9.5%

to 21.4% in men, comparing before and after COVID infection, thus presenting a trend to significance when statistically analyzed ($p=0.061$) (Table 2).

Considering the evaluation of sexuality, the female participants showed a statistically significant reduction in the sexual performance score comparing moments before and after COVID-19 from 7.85 to 6.74 ($p<0.001$), providing a decrease in the perception of sexual performance after COVID-19. Analyzing the variables, there was statistical significance in the reduction of intimate lubrication after COVID-19 reported by women ($p<0.056$). Furthermore, despite the statistic inferring a weak correlation, it was seen that the more participants reported psychological symptoms, the lower the reported sexual performance score, however caution must be exercised in interpreting the results.

WOMEN		Before	COVID-19	After	Value of p
		N (%)	N (%)	N (%)	
IUE		14 (15,9)	22 (25)	23 (26)	$p=0,089$ $p=0,062$
Frequency	Waking up at night to urinate	36 (40,9)	50 (56,8) *	48 (54,5)	$p=0,035$ $p=0,070$
	frequency increase	41 (46,6)	36 (40,9)	29 (33)	$p=0,065$
Urgency	sense of urgency	14 (15,9)	29 (33) *	31 (35,2) *	$p=0,009$ $p=0,003$
	Urgency accompanied by urinary incontinence	9 (10,2)	19 (21,6) *	26 (29,5) *	$p=0,039$ $p=0,001$
Urinary Tract	incomplete emptying	14 (15,9)	26 (29,5) *	18 (20,5)	$p=0,031$ $p=0,434$
MEN		N (%)	N (%)	N (%)	
Pee loss		0 (0)	0 (0)	0 (0)	- x -
Increase in frequencies		4 (9,5)	3 (7,1)	9 (21,4)	$p=0,061$
Strong and immediate desire to pee		2 (4,8)	3 (7,1)	4 (9,5)	$p=0,693$
incomplete emptying		2 (4,8)	2 (4,8)	6 (14,3)	$p=0,314$
Difficulty or effort		0 (0)	0 (0)	2 (4,8)	$p=0,152$

*: Meaningful.

Table 2: Comparison of urinary symptoms in women and men at the evaluated times.

WOMEN	Before	COVID-19	After	Value of p
	N (%)	N (%)	N (%)	
Lubrication reduction	14 (13,6)	- x -	22 (25)	0,056*
performance grade	7,85	- x -	6,74	<0,001*
MEN	N (%)	N (%)	N (%)	
Lubrication reduction	2 (4,8)	- x -	1 (2,4)	≥0,05
performance grade	8,52	- x -	8,07	≥0,05

*: Meaningful

Table 3: Comparison of sexual symptoms in women and men at the evaluated times.

In relation to men, the sexual performance score reduced from 8.52 to 8.07 ($p \geq 0.05$) after infection with the virus compared to before, emphasizing that COVID-19 impaired the perception of male sexual health, however without statistical significance, thus differing from the female audience where sexuality was greatly affected (Table 3).

DISCUSSION

Due to the global impact of the Coronavirus pandemic, it was exciting to carry out this unprecedented cross-sectional study to look for the prevalence of urinary and sexual symptoms during the pandemic. In addition, verify and compare which female and male population was most affected by the COVID-19 infection, in order to create strategies for future treatments for problems that may arise.

There is a synergistic relationship between the pelvic floor and the respiratory diaphragm, in which they act cephalad and simultaneously contract during expiration. During inspiration, the pelvic floor maintains intra-abdominal pressure, in addition to playing a role in protecting the pelvic organs from overload. In view of this, the pelvic floor and overactive bladder are directly linked as far as it is concerned, it is a syndrome that

causes the sudden sensation of urinating that may or may not be accompanied by urine loss, nocturia (need to urinate while sleeping) and increased urinary frequency. Therefore, the overactive bladder associated with COVID-19 can further alter respiratory mechanics, restricting the mobility of the diaphragm and chest wall, modifying intra-abdominal pressure (PARK et al., 2015; SIRACUSA; GRAY, 2020) or which corroborates the data found in this research as symptoms found in women as well as in men.

It is noteworthy that the pandemic moment makes the individual susceptible to psychological impairments at all times evaluated, as a result, COVID-19 has great potential to trigger psychological problems due to the pandemic period and social distancing (SIRACUSA; GRAY, 2020). According to studies, although urinary urgency and frequency are multifactorial, as they involve the nervous system and smooth muscles, it is established that autonomic dysregulation is directly related to the psychological domain. Emotional stress and anxiety are possible triggers for the manifestation of symptoms related to overactive bladder (ZILBERLICHT et al., 2017; VRIJENS et al., 2017).

Thus, both sexes obtained statistical differences regarding the urinary tract, but in men there was only a tendency to significance in the increase in urinary frequency compared to the moment during COVID-19 and after the infection, although without statistical significance. The hypothesis that post-COVID-19 urinary symptoms were more pronounced in females may be that in addition to hormonal factors, multiparity and pelvic floor muscle weakness, female anatomy is also a determining factor.

In addition, men have a urinary tract that is anatomically more favorable to urinary continence, only in adverse situations can we encounter male urinary incontinence, such as, for example, removal of the prostate (DOS SANTOS et al., 2020; MATA et al., 2021). Other reasons for the risk of male sexual dysfunctions are patients after hospital discharge who spent a long time in the Intensive Care Unit (ICU) where microcirculation could be impaired (SIRACUSA; GRAY 2020).

However, sexuality involves biopsychosocial aspects, being an intercommunicating part with itself and with the individuals with whom it relates; the human being presents a sexual response cycle in four phases developed by Masters and Johnson in 1970, basically in: desire, excitement, orgasm and resolution. As described by Siracusa and Gray (2020), the sexual disorder presents potential aggravation and incidence due to the psychological influences of the pandemic and social isolation of COVID-19, being a conflicting change in the intimate moment of couples, as well as abstinence for single individuals or who do not reside with a partner (BANERJEE; RAO, 2020).

As a result, certainly in addition to the physical impacts, it is possible to analyze the psychological impacts of this pandemic context, in which it can potentially increase cases of anguish, anxiety and depression,

and consequently, increase episodes of sexual dysfunction. Therefore, it is common for men and women to have a drop in the sexual performance score from a situation of emotional stress and to present a lack of desire, excitatory and lubrication difficulties due to the response of the Autonomic Nervous System (DE SOUZA ALVES, 2020).

In our present study, both groups reported a worsening in the score attributed to sexual performance, our findings corroborate the research conducted by Yukzel and Ozgor (2020) who also pointed out a worsening in the quality of sexual life score comparing the period before and after the pandemic. However, only in the female group was there significance regarding the sexual performance score, with a more reported reduction in intimate lubrication after COVID-19. The hypothesis of this correlation may have been caused by a somatic response by the psychosocial factors involved, which directly interfere in the phase of excitement and sexual desire, impairing lubrication, causing pain during the act, thus justifying the low score of sexual performance (ALVES, 2020; YUKSEL; OZGOR, 2020).

However, it is not possible to reliably determine the correlation between manifestations of COVID-19 and sexual dysfunction, since, according to the discussion raised by Banerjee and Rao (2020), sexual abstinence during the pandemic period can influence the worsening of psychiatric symptoms. Furthermore, our study did not consider the difference between women and men who had or did not have a partner during social isolation; due to this, the drop in sexual performance could also be due to the individuals' perception of dissatisfaction due to the absence of a partnership (STEELE et al., 2020).

Furthermore, as it is a fully digital survey, it is justifiable that our survey has pointed

out elements that are not so statistically significant, as it was the free responsibility of the individuals in the collection to answer the questionnaire without the presence of an examiner. As a result of this, it is possible that mistakes were made when filling in and the men were somewhat uncomfortable with the questions.

According to the study by Gomes et al. (2007), males are ashamed when associating themselves with any demonstration of vulnerability such as fear, anxiety and insecurity due to an imposed social masculinity, even more so in terms of their sexuality. Women, on the other hand, are more likely to develop anxiety, even more so during social isolation due to COVID-19, thus being more likely to develop some sexual dysfunction (BIGALKE et al., 2020).

It is possible to infer by evaluating the general context, even though it was not the objective of this investigation, that COVID-19 disrupted the sexual disposition, the pandemic period made all relationships difficult, including family life due to the exacerbated time that the spouses must spend together, thus changing the quality of time and activities performed. In some cases, it could be a greater investment in the couple's sex life and intimacy, while for others, greater aggravated problems (PASCOAL et al., 2020). Therefore, further studies are needed to correlate clinical findings and the drop in individuals' sexual disposition.

However, we could also observe that COVID-19 did not statistically worsen the existing symptoms of the urinary tract and sexuality, thus emphasizing that participants who already had some type of impairment prior to the pandemic remained with the same limitation.

Finally, our study has some limitations, as the samples between the female and male population had divergent numbers, as well

as a statistically small sample for analysis of worsening symptoms, especially in the male population. Furthermore, we do not present a control group and an uninfected group, in order to actually establish the causal relationship with COVID-19. Furthermore, the fact that data collection was performed subjectively by the participants, asynchronous, remote and with no evaluator, makes our findings susceptible to failures. Another limiting factor that may have interfered with the results was the question that men could have felt embarrassed during the questions, since this is a reluctant audience when addressing health and sexuality issues.

Therefore, we cannot conclude whether there were really associations between the increase in any symptomatological manifestation with COVID-19, however, the increase in incidences on the occasions evaluated compared to the pandemic is notable. On the other hand, as it is an acute condition, the reported symptoms may not persist for a long time after COVID-19, not only that, we cannot establish the duration of these clinical manifestations nor as a permanent sequel.

Thus, our study aimed to raise discussions about the post-COVID-19 syndrome with symptoms that seem to cause discomfort in some individuals even after total healing and we aimed to investigate the direct and indirect impacts of a recent disease that mobilized the scientific community worldwide. However, more studies are needed that encompass a greater number of collections, considering that some of the possible sequelae would possibly be seen in the long term, that is, requiring more specific scientific research. Despite the current scenario showing great progress in immunization and an almost complete reduction in cases of COVID-19, we must point out that our work offers subsidy for

studies that may happen according to the prognosis of world health.

FINAL CONSIDERATIONS

COVID-19 has a tendency to increase the incidence of dysfunctions related to pelvic organs and muscles, in women stress urinary incontinence, the feeling of urinary urgency/hyperactivity and nocturia were the most observed symptoms. In men, however, there was an increase in urinary frequency, but without statistical significance.

Considering the sexuality of the two populations, there was a significantly reduced score in the perception of sexual performance, which worsened in the pandemic and post-COVID-19 periods, as well as in intimate lubrication. But only women showed a greater loss.

It was not possible to establish whether COVID-19 worsens existing urological and sexual symptoms, as well as whether severity and hospitalization are linked to urogynecological and sexual changes due to COVID-19 infection.

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