



# Women's Sexual Health During the Pandemic of COVID-19: Declines in Sexual Function and Sexual Pleasure

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## Abstract

**Purpose of the Review** The World Health Association declared COVID-19 a pandemic more than 1 year ago. We conducted a systematic review of the literature on the topic of women's sexual health during the pandemic, with a focus on sexual function and sexual pleasure. Our aim is to describe current findings and to discuss implications for women's sexual health during this period.

**Recent Findings** Thirty-four articles, from 18 countries, were identified. These studies addressed topics ranging from individual aspects, such as cognitive, emotional, and personality factors affecting sexuality during the pandemic, to contextual factors, including relationship, childrearing, and employment status in this period.

**Summary** Research identified a deterioration of women's sexual function across countries, with an emphasis on sexual desire. Most studies found decreases in the frequency of sexual intercourse during the pandemic and increases in solitary sexual behavior. Many women also experienced declines in sexual satisfaction and relationship satisfaction. Findings suggested that gender inequalities contributed to lower indices of sexual function and satisfaction, and might have exacerbated the pleasure gap between men and women.

**Keywords** Sexual health · Sexual function · Sexual pleasure · Women · Gender inequality · COVID-19

The World Health Association considered the outbreak of COVID-19 the greatest health threat of the past century [1]. Because virus transmission occurs via close human contact, social distancing became indispensable to avoid spreading the virus. Many countries endorsed lockdown measures, which included but were not limited to contact bans, curfews, and travel restrictions, leading to a global economic crisis [2] and to mental health deterioration among the general population [3, 4] and in medical care personnel [5].

Recommendations related to sexual activity were issued by the New York City Health Department to decrease COVID-19 transmission rates; masturbation was considered the safest sexual practice, followed by having sex with a cohabitating

partner [6]. Consequently, numerous individuals were forced to repress or to reformulate sexual life [7]. Debate in the scientific community prompted as to whether confinement would lead to increases or decreases in sexual activity [8]. Similar debates were taking place in the media. In an overview of media narratives on this topic, Döring [2] found speculations about coronavirus baby booms, divorces due to declines in sex, the obliteration of casual sex, and increased use of telephonic and online sex. The media also predicted higher frequency of masturbatory behavior, sex toy use, pornography use, and the emergence of coronavirus porn as a new genre of pornography.

Among the many societal consequences of the COVID-19 outbreak, several deleterious effects were expected to have a particular impact on women's sexual rights and sexual health [9]. Sexual health refers to a state of physical, emotional, mental, and social well-being in relation to sexuality, which requires respect for everyone's sexual rights and the possibility of pleasurable sexual activity [10]. Although sexual rights need to be safeguarded during crisis, sexual well-being is often neglected at the face of more significant immediate concerns [11]. Because sexual wellness may be considered

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nonessential, sexual medicine services might be reduced along with maternal and reproduction health services, affecting women disproportionately [12, 13]. In addition, pre-existing inequalities affecting homelife, work [14, 15], and sexual pleasure [16, 17], as well as higher vulnerability to affective disorders [18–20], and to sexual dysfunction [21, 22], could be contributing to decreased sexual health among women during this period. Notably, sexual problems manifest in the context of overlapping systems of oppression that besides gender also intersect with aspects such as race, ethnicity, and socioeconomic status [23]. Therefore, some women may face an additional strain on their sexual rights during the COVID-19 pandemic, including those from developing countries [13, 24], and from marginalized groups [25].

More than 1 year after the World Health Association declared COVID-19 a pandemic, we review up to date research on the topic of women's sexual health during this period. Our aim is to provide an overview of data on this matter and to discuss its intersections with sexual pleasure as a fundamental right. Considering previous data, we are expecting to find mainly literature describing challenges to women's sexual health during this pandemic and limited data on their enhanced sexual pleasure.

## Methods

A systematic search was conducted in EBSCO, Scopus, Web of Science, and PubMed databases for papers published until early April 2021 using an exhaustive list of key terms. These were “sexual health” AND “covid”; “sexual function” OR “sexual dysfunction” AND “covid”; “sexual desire” OR “sexual excitation” OR “sexual pain” OR “orgasm” AND “covid”; and “sexual pleasure” OR “sexual satisfaction” AND “covid”. In this review, we only included peer-reviewed empirical articles concerning the topic of interest written in English, Portuguese, or Spanish languages. Studies that recruited only men or adolescents were excluded. References were cross checked to identify additional papers.

## Results

This review includes 34 articles from 18 countries related to the impact of COVID-19 on women's sexual health. Overall, findings revealed that women's sexual function decreased during this period, with most studies emphasizing negative effects on sexual desire. Numerous studies found decreases in the frequency of sexual intercourse during the pandemic, while finding increases in solitary sexual behavior. In addition, many women also experienced declines in sexual satisfaction and relationship satisfaction. The large majority of

these studies used the Female Sexual Function Index (FSFI) [26].

This review suggests that there are vulnerability factors affecting sexuality during the pandemic. These include individual aspects (psychological adjustment, and personality), interpersonal factors (relationship factors, cohabitation status, and childrearing), and societal factors (work type and employment status, living area, and gender inequalities). We found several relationships between variables which have been previously associated in the literature (e.g., sexual satisfaction and sexual function, dyadic adjustment and sexual satisfaction), and might not be specific to the pandemic. In contrast, findings on vulnerability factors, including those related with cohabitation, childrearing, and work, are very heterogeneous. See Table 1 for an overview of results as well as studies' characteristics.

## Changes in Sexual Function and Sexual Behavior

In a qualitative study with health professionals, clinical sexologists perceived that sexual problems and sexual dysfunction were aggravated by the context of COVID-19 [29]. Several studies corroborate those perceptions, as findings identified decreases in women's scores in sexual function [30–34] and sexual satisfaction during the pandemic, compared to pre-pandemic [27, 32, 34–37]. Even so, one study with patients with epilepsy did not find significant changes [38]. Furthermore, declines in sexual function during the pandemic were associated with lower quality of life in women [39].

Sexual desire seems to have been particularly affected, showing significant decreases during this period [36, 40, 41], although some studies have found the opposite [27, 35, 42]. Still, two of the three studies that found increases in sexual desire during the pandemic did not use validated questionnaires to assess sexual function [27, 35], which may explain these contradictory findings.

Most studies found decreases in the frequency of sexual intercourse as well [30–33, 37, 40, 41, 43–47], and one study verified that women were two times more likely than men to use sexual avoidance behaviors [30]. However, there is at least one study that did not find any changes compared to pre-pandemic levels [35], and one study finding significant increases in the average weekly frequency of sexual intercourse during the pandemic compared with the 6–12 months prior (2.4 vs 1.9;  $p=0.001$ ) [42]. Conversely, the large majority of the studies found increases in masturbation behavior and viewing pornography during the pandemic [27, 30, 35, 40, 44, 47]. Specifically, Zattoni, Gül [48], in an analysis of Google Trends® from January 9, 2020 to May 25, 2020, found an increased interest in pornography and coronavirus-themed pornography after the outbreak of COVID-19 in the countries under lockdown (refer to Table 1 for details). Together, findings point at a clear reduction of sexual

**Table 1** Articles on women's sexual health and sexual function during the pandemic

Author	Country	Study design	Data collection	Sample	Age mean $\pm$ SD; age group	Sex measures	Results
Ballester-Arnal et al [27]	Spain	Quantitative	April 2020	1448 (67.5% women)	31.92 $\pm$ 10.1 [18–60]	Ad hoc questionnaire	37.9% of participants reported worsening of sexual life during confinement. In women, better sex life was predicted by higher sexual desire during lockdown (overall and for and partner), living with partner, and lower stress. Worse sex life was predicted by not living with partner, not having privacy, and higher stress (and not by boredom). Those who included new sexual activities into their repertoire were three times more likely to report improvements in their sexual lives
Carvalho et al [28]	Portugal	Quantitative	May–June 2020	417 women 245 men	34.3 $\pm$ 10.97; 41.8 $\pm$ 13.07; [18–76]	FSFI [26] IIEF [77]	Sexual function was related with psychological adjustment during lockdown (anxiety, depression, and somatization), but not with confinement levels—contrary to men, where confinement, mediated by psychological adjustment, predicted sexual function
Cito et al [50]	Italy	Quantitative	April 2020	1018 women 558 men	[18+]	Ad hoc questionnaire	Frequency of sexual intercourse was related with higher wellbeing scores during quarantine. Lower frequency was related with poor privacy and lack of psychological stimuli. The majority did not show decreases in sexual desire (71.3%). Men presented lower sexual desire than women
Cocci et al [35]	Italy	Quantitative	-	1515 women/men	Mdn = 21; [19–25]	Ad hoc questionnaire	40% of respondents reported an increase in sexual desire and autoerotism during the pandemic, but no increases in sexual intercourse or sexual satisfaction, which significantly decreased
Coombe et al [47]	Australia	Quantitative	April 23–May 11, 2020	965 (70% women)	Mdn = 24; [18–76, 78]	Ad hoc questionnaire	Most participants (53.5%) reported having less sex during lockdown than in 2019, especially those without a regular partner. Solo sex activities increased: 14.6% reported using sex toys more often and 26.0% reported masturbating more often
Culha et al [41]	Turkey	Quantitative	May 2–May 26, 2020	89 women 96 men in healthcare	30.65 $\pm$ 5.99; [18–53]	FSFI [26] IIEF [77]	Sexual desire, sexual intercourse/masturbation frequency, duration of foreplay, and duration of sexual intercourse decreased during the pandemic. Participants privileged non-face to face sexual positions
Daneshfar et al [39]	Iran	Quantitative	-	296 married women	33.68 $\pm$ 6.47; [18–27, 29–46]	FSFI [26]	Sexual dysfunction impacted quality of life and was related with lower marital satisfaction.
Feng et al [46]	China	Quantitative	May 27–June 6, 2020	150 women 134 men	27.04 $\pm$ 4.72; 27.35 $\pm$ 4.23;	Ad hoc questionnaire	43.3% of participants reported a decrease in sexual frequency during the pandemic. Higher sexual

**Table 1** (continued)

Author	Country	Study design	Data collection	Sample	Age mean ± SD; age group	Sex measures	Results
Fuchs et al [31]	Poland	Quantitative	March–April, 2020	764 women	[18–27, 29–45] 25.1 ± 4.3; [18–27, 29–41]	FSFI [26]	satisfaction predicted higher relationship satisfaction (or “intimacy”) Frequency of intercourse, sexual desire, arousal, lubrication, orgasm, satisfaction, and pain decreased during the pandemic. The women who did not work experiencing the highest decreases Coping using sex did not increase during the pandemic; 30% of participants reported increases, 29% reported decreases, and 41% did not report any changes
Gillespie et al [56]	UK	Quantitative	April 19 – April 21, 2020	522 women 257 men 5 non-binary	30.56 ± 9.59 [18–59]	Coping using sex inventory [79]	1/3 of participants reported a decrease in frequency of sexual activity and sexual satisfaction. Decreases in sexual satisfaction affected more women and were related with more negative sexual cognitions and less positive sexual emotions. Increases in digital sex use contributed to minimizing the likelihood of negative sexual emotions
Gouvernet & Bonierbale [37]	France	Quantitative	April 27–May 11, 2020	741 women 338 men	Mdn = 31	Sexual Modes Questionnaire [80]	Sexual dysfunction increased compared to pre-pandemic, but this was non-significant
Gul [38]	Turkey	Quantitative	June–July 2020	65 women 51 men	Mdn = 33; [18–65]	Arizona Sexual Experiences Scale [81]	Women’s sexual dysfunction was predicted by lower sexual and relationship satisfaction, sexual dysfunctional beliefs, and sexual double standards. Markers of sexual conservatism and sexual double standards were inversely related to sexual function and satisfaction, mainly in women
Hidalgo & Dewitte [55]	Ecuador	Quantitative	-	431 women 159 men	26.5 ± 6.84; [18–58]	Brief Sexual Opinion Survey [82]; Sexual Double Standards Scale [83]; Sexual Dysfunctional Beliefs Questionnaire [84]; New Sexual Satisfaction Scale [85]; FSFI [26]; IIEF [77]	Both partnered and single participants reported declines in most sexual activities during the physical distancing measures. For partnered participants, the increase in new practices was associated with sociosexuality and physical attraction to one’s partner but not to affection towards partner or relationship satisfaction
Hille et al [58]	Germany, Switzerland, and Austria	Quantitative	April 9–April 20, 2020	2515 (47.4% women)	Mdn 31–40; [18+]	Ad hoc questionnaire, Revised Sociosexual Orientation Inventory [86], Questionnaire of Sexual Experience in Close Relationships Ad Hoc Questionnaire	Being a woman, younger age, and unmarried were all associated with lower sexual activity.
Jacob et al [87]	UK	Quantitative	March 17, 2020 (launch)	548 women 320 men, epileptics	[18–75+]	FSFI [26]	
	Turkey	Quantitative	May 6–May 20, 2020	97 women			

**Table 1** (continued)

Author	Country	Study design	Data collection	Sample	Age mean $\pm$ SD; age group	Sex measures	Results
Karagöz et al [30]				148 men	34.7 $\pm$ 6.67; 36.7 $\pm$ 7.1; [18–65]	IIEF [77]	Sexual function and frequency of sexual intercourse decreased in men and women during the pandemic, but women showed higher sexual avoidance behaviors. Couples spending more time together during the pandemic reported better sexual function scores
Karakas [51]	Turkey	Quantitative	1 month after restrictions	135 pregnant women 45 controls	34 $\pm$ 4.73 [22–40]; 34 $\pm$ 4.76 [23–39]	FSFI [26]	The sexual function of pregnant women decreased during the pandemic. Women who had university degrees, were multiparous, and in the third trimester were more likely to develop sexual dysfunction
Karsiyakali et al [44]	Turkey	Quantitative	June 1–June 20, 2020	685 women 671 men	33.16 $\pm$ 8.31	FSFI [26] IIEF [77]	Being single, not having a child, having a regular sexual partner, living in a metropolitan area, and being unemployed during the pandemic were associated with a decline in both sexual intercourse frequency and sexual desire. Being older and a woman were associated with a decline in sexual desire
Kaya et al [32]	Turkey	Quantitative	May–June 2020	15 women with COVID-19	33.3 $\pm$ 5.6; [19–27, 29–50]	FSFI [26]	The frequency of sexual intercourse and of sexual satisfaction decreased after COVID-19 disease in these women
Lehmiller et al [57]	USA	Quantitative	March 21–April 14, 2020	1559 (71.1% women)	34.1 $\pm$ 10.3; [18–76, 78, 88–91]	FSFI [26]	Nearly half of participants reported a decline in sex life. One in 5 participants incorporated new activities and were more likely to report improvement of sex life. Common additions included sexting, trying new sexual positions, and sharing sexual fantasies. Being younger, living alone, and feeling stressed and lonely were linked to trying new things
Li et al [45]	China	Quantitative	March 13–March 15, 2020	189 women 270 men	[18–27, 29–46]	Ad hoc questionnaire	30% of women reported a decrease in the number of sexual partners, 37% reported a decrease in sexual frequency, and 39% reported decreases in sexual satisfaction. Multiple regression analysis showed that age, partner relationship, and sexual desire were closely related to sexual frequency
Li et al [40]	China	Quantitative	May 1 – May 5, 2020	426 women 541 men	26.6 $\pm$ 4.86; [16–27, 29–36]	Ad hoc questionnaire	22% of participants reported a decrease in sexual desire, 41% experienced a decrease in the sexual intercourse frequency, and 30% reported an increase in the frequency of masturbation. 31% reported a deterioration in partner relationships during the pandemic
Lorentz [53]	Brazil			50 women		FSFI [26]	

**Table 1** (continued)

Author	Country	Study design	Data collection	Sample	Age mean ± SD; Sex measures age group	Results
Luetke et al [60]	USA	Quantitative, longitudinal	November 2019–March 2020 April 10–April 20, 2020	381 women 365 men	Mdn = 25; [23–26, 29–34] [18–94]	There were no changes in the FSFI scores at the three evaluated times were reported, but depressive symptoms increased across times Among individuals in relationships, 34% reported some degree of conflict with their romantic partners. Those experiencing frequent coronavirus-related conflict were more likely to report decreased frequency of solo and partnered sexual behaviors compared to those not experiencing any such conflict, exhibiting a dose-response trend among partnered sexual behaviors
Micelli et al [59]	Italy	Quantitative	-	944 women 538 men	[18–27, 29–47]	From 18.1% participants who were planning to have a child before the pandemic, 37.3% abandoned the intention, related to worries of future economic difficulties (58%) and consequences on pregnancy (58%). Of 81.9% who did not intend to conceive, 11.5% revealed a desire for parenthood during quarantine than before (mostly women), related to will for change (50%) and need for positivity (40%). 4.3% of these tried to get pregnant
Mirzae et al [52]	Iran	Quantitative	May–June 2020	200 pregnant women, 203 lactating women, 201 non-pregnant/non-lactating women	20.81 ± 5.92	Pregnant and lactating women presented higher sexual dysfunction and lower quality of life scores
Mollaioli et al [43]	Italy	Quantitative	April 7–May 4, 2020	4177 women 2644 men	32.83 ± 11.24; [18+	50.3% of participants reported an interruption of sexual activity during lockdown. Logistic regression models showed that lack of sexual activity during lockdown was associated with higher risk of developing anxiety and depression
Omar et al [34]	Egypt	Quantitative	March 30–June 27, 2020	479 women 217 men	[16–75]	Overall, sexual satisfaction was higher before lockdown. During lockdown, men were more satisfied than women. Most men did not have erectile dysfunction, while most women presented sexual dysfunction.
Panzeri et al [54]	Italy	Qualitative	April 11 – May 5, 2020	124 (73% women) in cohabiting relationships	34.01 ± 8.71; [23–60]	Some women reported decreases and others increases in sexual function and pleasure/satisfaction. Decreases were related to worry, lack of privacy, and stress, whilst increases with having more free time and time with the partner, less stress, and boredom

Table 1 (continued)

Author	Country	Study design	Data collection	Sample	Age mean $\pm$ SD; Sex measures age group	Results
Pascoal et al [29]	Portugal	Qualitative	March 22–June 1, 2020	24 women 15 men clinical sexologists	[27, 28, 34–73] -	These clinical sexologists perceive that the pandemic contributed to worsening sexual problems and dysfunctions, mental health, relationship management, as well as to the rise of conservatism the use of technology
Schiavi et al [33]	Italy	Quantitative	February 2018–February 2020	89 women	Mdn = 39, [27, 30–51] FSFI [26] Female Sexual Distress Scale [99]	Women cohabiting with their partners reduced their sexual activity. Women with higher level of education showed greater decline in terms of sexual activity, and quality of life
Wignall et al [49]	UK	Quantitative	May 14–May 18, 2020	565 (338 women)	25.35 $\pm$ 4.13; [18–26, 29–34] Sexual Desire Inventory [98], Sexual Behaviors Catalog (Ad hoc), Revised Sociosexual Orientation Inventory [86] FSFI [26]	Women reported decreases in sexual desire during lockdown, but men did not. Partnered participants reported increases in sexual activity compared to those who were single or dating casually. Individuals with high sociosexuality perceived higher impact of lockdown on their well-being
Yüksel & Özgür [42]	Turkey	Quantitative	March 11–April 12, 2020	58 women	27.6 $\pm$ 4.4	Frequency of sexual intercourse increased during the pandemic compared with 6–12 months prior (2.4 vs 1.9; $p = 0.001$ ), but sexual function decreased (except for sexual desire)
Zattoni et al [48]	China, Italy, Spain, France, Sweden, and the USA	Quantitative	January 9, 2020 to May 25, 2020	-	-	China, Italy, Spain, and France showed increased searches for “PornHub” and “Porn” with an average weekend percentage change (AWPC) of 4.9 and 3.8, respectively, after the outbreak of COVID-19, but not Sweden or the USA. All the nations had a significant increase in WRSV coronavirus-themed pornography for each keyword ( $p < 0.01$ ) with an AWPC, ranging worldwide between 18.5 and 61.8 ( $p < 0.01$ ), after the beginning of self-quarantine

FSFI Female Sexual Function Index, IIEF International Index of Erectile Function, Mdn median

intercourse, while finding increases in masturbation behavior in women during the pandemic.

Furthermore, research found overall decreases in the number of sexual partners, risky sexual behavior [40, 45], and in contraception use [42] (refer to Table 1 for details). In the study of Li, Li [45], there were also 30% of women reported having less sexual partners, and only 5 individuals of a total of 459 (not specified whether they were men or women) reported increased sexual risk. However, in the same study, 18% of women indicated that they were inclined to increase the number of sexual partners and risky sexual behaviors once the outbreak ended.

### Contribution of Individual Factors

Gender, age, and educational attainment may be associated with sexual function and sexual wellness in the context of the pandemic. Several studies indicated that women experienced more sexual functioning issues [34, 36, 44, 49], higher sexual distress [34], and lower sexual satisfaction [27, 34, 37] during the pandemic compared to men. However, some studies found that men were experiencing lower sexual desire [27, 50] and more sexual dysfunction [41] compared to women. Pregnant women may be more severely affected in terms of sexual function [51, 52] and, possibly, puerperal women too, although it is unclear from this study if the decline in sexual function was pandemic related [53]. In addition, being older [36, 44, 45] and having a higher education [33, 51] were linked to declines in sexual functioning and sexual activity.

Declines in women's sexual function and sexual satisfaction during the pandemic were associated with lower psychological adjustment [28], higher anxiety and depression [30], additional worry and stress [54], more negative sexual cognitions and less positive sexual emotions [37], and with sexual conservatism and sexual double standards [55]. Increases in sexual function and frequency were related with higher boredom, lower stress [27, 54], lower anxiety, and with lower depression [43]. Some individuals seem to have specifically used sex to cope during lockdown [56].

Some studies which found declines in sex life, i.e. sexual activity and sexual function, also found that sex life improved for some individuals [27, 57, 58]. Improvements were related with higher overall sexual desire and sexual desire for the partner, and with incorporating new sexual activities, such as sexting, new sexual positions, and sharing sexual fantasies [27, 57]. New practices, on the other hand, were associated with sociosexuality and physical attraction to one's partner, but not with affection towards partner or relationship satisfaction [58]. At the same time, individuals with high sociosexuality perceived higher impact of lockdown on their wellbeing [49].

### Contributions from Interpersonal and Societal Factors

Living situation, including partner availability and the presence of children at home, was associated with changes in sexual function during the pandemic, although results are somewhat mixed. On one hand, being single and living alone accounted for declines in sexual function and sexual activity during the pandemic [31, 44, 49], but so did having a regular partner [44] and living with one's partner [36]. Studies with young women found that the ones living with their parents were the ones presenting the highest decreases in FSFI scores [31, 33]. In the study of Fuchs, Matonóg [31], the smallest differences between pre-pandemic and pandemic referred to the women living with their partner with no children. On the other hand, declines in sexual life were related with poor privacy and lack of psychological stimuli [27, 50, 54], while improvements were related with having more free time and spending more time with the partner [30, 54]. In line with these findings, other research found that having children contributed to decreased sexual function in women [31, 36], but so did not having children [44]. Some women revealed having more desire for parenthood during quarantine than before due to need for change and positivity, but many dropped intentions to conceive [59]. In conclusion, both feeling lonely at home and having a home that feels too crowded for privacy have impacted sexual function.

Studies also show that relationship satisfaction was correlated with sexual satisfaction [46, 55] and inversely correlated with sexual dysfunction in women during this period [39, 43]. As for relationship conflict, this was related with having less sexual activity [40], and corona-related conflict in particular accounted for lower frequency of both solo and partnered sexual behaviors [60].

In addition, shifts in work—from employment to unemployment, from working in an office to working from home—seem to be associated with changes in sexual function and sexual activity. Being unemployed seems to be responsible for declines in sexual function and sexual activity [31, 44], yet challenges stemming from shifts at work also seemed to have an impact. Some studies have identified bigger declines in sexual function on those who work from home [31], while others state the opposite, i.e., that essential workers were affected with bigger declines in sexual function [33]. In line with this, a study with healthcare workers in Italy showed that a statistically significant higher proportion of healthcare workers had low sexual desire compared to their acquaintances who did not work at the hospital [36].

Finally, living in a metropolitan area during the pandemic outbreak was associated with declines in sexual desire and reduced sexual activity, possibly because these areas were under severer restrictions [44].

## Discussion

This review suggested that women's sexual health and well-being might have been disproportionately affected during the COVID-19 pandemic throughout 2020, as predicted. According to our findings, women experienced more sexual problems than men, including low sexual desire and low sexual satisfaction [e.g., 32, 35, 48]. Most studies found decreases in the frequency of sexual intercourse during the pandemic, but also found increases in solitary sexual behavior [e.g., 28, 39, 43], which may imply that the declines in sexual desire were affecting mostly partner relationships. While the fact that there was an increase in masturbation and pornography use fits the media narratives described by Döring [2], the speculated "coronavirus babyboom" seems unlikely considering the drops in sexual intercourse, and in intention to conceive during 2020 [59]. This does not mean, however, that this trend is carried on in 2021. As for the prevision of the rise of the new genre of coronavirus themed pornography, this proved to be correct [48].

Research found negative relationships between some individual aspects and sexual function, such as age, level of stress, anxiety, and depression, and negative sexual cognitions and emotions [28, 30, 37, 43, 55]. These do not appear to be pandemic specific, considering that previous research has established that anxiety and depression and their treatments contribute to higher rates of sexual dysfunction [61, 62]. As well, dysfunctional sexual beliefs and emotions were also proven to negatively affect women's sexual health [63, 64]. Nevertheless, the fact is that during this period, many people experienced higher levels of stress, and this seems to have put them at greater risk for sexual dysfunction.

This review also found that higher boredom was related with increased sexual activity and sexual function [27, 54] and that some individuals used sex to cope during lockdown [56]. Some researchers suggest that sex can be a coping mechanism for managing boredom, which has been linked to masturbation and hypersexuality [65, 66]. Boredom was identified as an important stressor for those in isolation during the pandemic [67]. Possibly, for some individuals feeling bored due to isolation, sex was welcomed as a positive distraction. As for individuals who score highly on measures of sociosexuality, who were unable to pursue sex on their terms, including casual sex, they perceived higher impact of lockdown on their well-being [49]. On the other hand, sociosexuality and physical attraction to the partner were associated with introducing new sexual practices during this period [58]. In fact, improvements in sex life during the pandemic were related with higher sexual desire overall and for partner, and with incorporating new sexual activities [27, 57]. Pre-pandemic studies found that sexual novelty was inversely correlated with sexual boredom [68] and that the inability or unwillingness

to engage in novel sexual behavior was positively correlated with sexual boredom [69]. In a recent qualitative study with a large community sample, participants described sexual boredom as the sexual monotony and/or lack of sexual interest that is often linked to the interpersonal aspects of long-term sexual relationships [70]. During COVID-19, many couples changed their lifestyles to comply with restrictions and were forced to face monotony. It seems as if this did not necessarily send them to sexual boredom, as some seemed to have reacted to feelings of boredom by introducing new sexual activities and enhancing sexual desire. Nevertheless, some individuals might not have had the tools to fight pandemic induced boredom and sexual boredom, and this could have affected their sexual function. Yet, that assumption was not investigated.

Relationship factors are known to affect sexual health [71–73]. However, the extent to which the pandemic impacted relationship quality is unclear. This is especially relevant for women in sexual violent relationships, who became more vulnerable and isolated during this pandemic [2, 9]. Yet, this review did not focus on sexual violence. Additionally, this review found that women living with their partners and having more free time and better opportunities for partnered quality time [30, 54], or women having higher relationship satisfaction, felt more sexually satisfied [46, 55] and had less sexual dysfunction [39, 43]. On the other hand, those experiencing conflict in their relationship had sex less often [40, 60]. Also, negative changes in relationship satisfaction during COVID-19 were related with having dyadic conflict, poor coping [74], and with having children at home for school, irrespectively of work status [75]. Although the current review did not include studies examining same-sex couples, other research has identified that in the pandemic context, being a person of color and having higher internalized homophobia exacerbated the pandemic's negative effects on relationship satisfaction [76]. Thus, it seems highly relevant that these populations are investigated.

Working was one of the life areas where individuals faced more changes. Many people had to adjust their routines to work from home, while essential workers had to manage additional risk at their workplaces. These shifts impacted on individuals' sexual health [31, 33], particularly in subjects who were, or who became, unemployed [31, 44], or in healthcare workers [36, 41], possibly due to increased stress levels. Conversely, those working from home also saw declines in sexual health [31], specifically those who struggled with anxiety, depression, and somatization, although for women, this was not related with their level of confinement [28].

Some authors [41, 44, 51] speculated that the declines in sexual function and sexual activity were a result of the level of education or information on the virus of COVID-19. That is, well-informed or educated individuals were more afraid and/

or compliant with social distancing, experiencing higher dysfunction and less sexual activity. Even though we might consider that access to information may have privileged solitary sexual behavior at some level, we are not sure whether it was a major factor determining sexual function. In reality, research shows that interventions aiming at sexual education favor women's sexual function and pleasure [78, 88]. In addition to possible spillover effects, the declines in the sexual function of women with more access to education or information seem to us a more likely result of lack of parity between men and women. There were several authors who alerted that the advent of teleworking would exacerbate gender inequalities [9, 89, 90]. This review suggests that these inequalities, including childrearing, contributed to lower indexes of sexual function and satisfaction, which in turn provide evidence of pleasure inequality. Because some women may struggle with negotiating sexual pleasure and tend to favor men's sexual pleasure [91, 92], it is possible that during this pandemic, these women engaged in sex in the absence of sexual desire or in the presence of sexual pain. This is likely to have resulted in pleasureless sex and, consequently, to even have lowered levels of sexual function. Although not many studies used measures of sexual pleasure, and rather of sexual satisfaction, the findings of this review leave one to guess that the pandemic may have had stretched the pleasure gap between men and women.

## Implications

Because pleasure is an important dimension of sexual health [93], equality in sexual pleasure is not just relevant, it is essential. The fact that women's sexual pleasure might have been particularly affected due to COVID-19 related downturns, it is a symptom of gender inequality in sexuality. Although it seems impossible to determine at this stage if there will be long-term negative effects of the pandemic in women's sexual health, this matter should be further investigated as the effects of pandemic are still felt globally. An important note on this topic is that studies were mainly focused on women from western cultures, masking the specific challenges of women from developing countries, who have probably faced additional difficulties. In addition, there is a big gap in research regarding sexual minorities, as we did not find any studies focused on LGBTQIA+ or non-monogamous populations. Research on COVID-19-related sexual problems also raises questions on whether sexual dysfunctions should be diagnosed when they are likely caused by identifiable external factors. The main opportunity stemming from the ongoing pandemic might be that the current lack of resources for meeting with the community may lead to the improvement and dissemination of e-Health tools as applied to the context of sexual health and pleasure, and finally reach a wider population.

**Author contribution** In this work, the background idea was provided by JC, i.e., intersecting the topic of women's sexual health during COVID-19 with the realm of sexual rights. LO performed the search (revised by JC) and drafted the manuscript. JC critically revised it, building a bridge between findings and a societal interpretation of data.

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