

“INSIDE” Project on Sexual Health in Spain: The Impact of the Lockdown Caused by COVID-19

Rafael Ballester-Amal

Universitat Jaume I <https://orcid.org/0000-0003-4421-1144>

Juan E. Nebot-Garcia (✉ junebot@uji.es)

Universitat Jaume I <https://orcid.org/0000-0001-7698-7479>

Estefanía Ruiz-Palomino

Universitat Jaume I <https://orcid.org/0000-0001-8948-9233>

Cristina Giménez-García

Universitat Jaume I <https://orcid.org/0000-0002-6309-1224>

María Dolores Gil-Llario

Universitat de València <https://orcid.org/0000-0003-4985-1327>

Research Article

Keywords: COVID-19, lockdown, impact, sexuality, general population, Spain.

Posted Date: August 20th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-61952/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Version of Record: A version of this preprint was published on November 16th, 2020. See the published version at <https://doi.org/10.1007/s13178-020-00506-1>.

Abstract

Introduction. The COVID-19 pandemic is becoming a major hazard to public health worldwide. This is causing a significant impact on life and physical health, as well as on the psychological well-being of the general population. Since the emotional distress and the social restrictions caused by this epidemic, it must be expected that its impact will also extend to sexual health. The purpose of this study, the first including a large sample of the Spanish general population, was to analyze sexual behavior during the 99 days of confinement in Spain (INSIDE Project).

Method. 1,448 Spanish people, between 18 and 60 years old, were evaluated through an online survey during April 2020. The variables analyzed were the physical and social environment during confinement, sexual desire, type of sexual activity, masturbation, sexual intercourse, online sexual activity, general sexual frequency, sexual fantasies, degree of self-control over sexual drive, sexual abuse, general impact of confinement on sexuality and emotional mood.

Results. Confinement has affected the sexual life of half of the Spanish population (47.7%), especially women. Those who reported a worsening of their sexual life are almost three times more (37.9%) than those who reported an improvement (14.4%).

Conclusions. Different factors have been significant predictors of the positive or negative valuation about the impact of this confinement on sexual life, such as gender, couple life, privacy, stress level and the perception of confinement as unbearable.

Policy Implications. These results have important implications for the public health and more especially sexual health of the Spanish population.

Introduction

Historical events partly determine the identity of a society and affect the development of the life span of people, together with other biological, environmental and personal factors (Baltes, 1985). As occurred with other relevant events, such as the emergence of the Internet in the 80-90s (Griffin-Shelley, 2003), in 2020 an agent of a viral nature is writing a new chapter in the history of humanity and, possibly, lead the path for a new way of living and expressing sexuality.

The disease caused by novel coronavirus SARS-CoV-2 was declared as a Public Health Emergency of International Concern (PHEIC) on January 30, 2020 by the International Health Regulations Emergency Committee (IHR). After that, this was recognized as a global pandemic on March 11, 2020 by the World Health Organization (WHO) (Instituto de Salud Carlos III, 2020a). According to official sources, COVID-19 has been confirmed in more than 13 million people worldwide on July 18, 2020, around 30% are in the European region (WHO, 2020). Nowadays, Spain (260,255) is the country with most confirmed cases in the European Union followed by Italy (243,736), Turkey (216,873), Germany (200,843) and France (173,838). Moreover, Spain is the third country with the highest number of deceased people (28,420). More than 135,000 people in this country have needed hospitalization or admission to Intensive Care Units (Ministerio de Sanidad, 2020). This global health emergency has been the greatest challenge that the Spanish health system has faced (Legido-Quigley et al., 2020). As a consequence, more than 40,000 health professionals had been infected on May 10, 2020. This data represents 15.7% of the total reported cases (Instituto de Salud Carlos III, 2020b).

Given the known particular properties of this virus and the absence of a tested treatment and vaccine, prevention is crucial to reverse the pandemic (Sohrabi et al., 2020). In this context, all countries have been forced to take drastic measures based on reducing movement to diminish its spread (Dowd et al., 2020). In Spain, specifically, the Council of Ministers decreed the "State of Alarm" for the entire national territory on March 13, 2020, with an initial duration of two weeks that lasted until June 21, 2020. Spanish society has lived for months with strict rules on hygiene, social distancing, suspension of all non-essential activities and confinement of a large part of the population (Real Decreto 463/2020). After that, the deescalation process for the transition to the "new normality" began with important prevention and containment measures such as the mandatory use of masks (Real Decreto-Ley 21/2020). At the moment, the new wave of infections still continues to progress in this country and causes great suffering, especially among the most vulnerable groups (Ballester-Arnal & Gil-Llario, 2020).

It seems clear that this unprecedented historical moment will influence on different generations (Mira, 2020) and their system of beliefs and values (Li, Wang, Xue, Zhao, & Zhu, 2020). At the same time, this is also having significant negative psychological effects on the general population as numerous studies have shown, mainly in eastern countries such as China (Huang & Zhao, 2020; Qiu et al., 2020; Wang et al., 2020), Singapore (Ho, Chee, & Ho, 2020) or South Korea (Jung & Jun, 2020). For example, Z. Li et al. (2020) found that the general population reported higher secondary traumatic stress scores compared to the frontline healthcare workers who attended COVID-19 patients. The new social and behavioral discipline due to COVID-19 represents a sudden and important change in the habitual lifestyle of most people and an unpleasant and stressful experience (Brooks et al., 2020). As Lippi et al. (2020) suggest, confinement would cause serious physical and mental health problems because of factors such as physical inactivity, weight increase, behavioral addictions, insufficient exposure to sunlight and social isolation. Furthermore, it can seriously affect sleep patterns, generating alterations that directly influence on emotional regulation (Altena et al., 2020). In particular, in the Spanish population, Sandín, Valiente, García-Escalera and Chorot (2020) found negative emotional symptoms associated with fear of death, fear of contagion and fear of losing their job or income.

But what are the implications of COVID-19 for sexual and reproductive health?, ask Julia Hussein (2020) in a recently published editorial. It is widely demonstrated that physical (Allen & Walter, 2018; Colson, 2016), environmental (Fisher, 2015; Lichtenberg, 2014) and psychological adverse conditions (Badger, 2017; McCann et al., 2019; Rokach, 2019; Weiss, Walsh, DiLillo, Messman-Moore, & Gratz, 2019) affect sexual functioning and sexual satisfaction, becoming worse the quality of individual and dyadic sexual life. In addition, these also influence on the engagement in risky sexual

behaviors. However, there is a lack of studies focused on how a virus, whose transmission routes include body fluids that may be present in everyday gestures such as sweat, tears or saliva, can affect sexual behavior. Tenkorang (2018) evaluated safe sexual behaviors in a group of Ghanaian men and women in the context of the Ebola virus. Nevertheless, the risk of COVID-19 virus goes much further and, unlike the Ebola virus, it is transmitted through the air and spread by casual contact. Probably, this is the first time that this generation is living a scenario when social standards, affection, privacy and sexual rights are at risk. Nevertheless, there are still few studies examining how this pandemic is affecting the sexual life of society and some of them include important methodological deficiencies. Specifically, only two studies with large samples of general population have been only found, one focused on United States, Canada, the United Kingdom and Australia (Lehmiller, Garcia, Gesselman, & Mark, 2020), and another on Great Britain (Jacob et al., 2020). A third one also included an important number of participants from the United States although this was restricted to men who have sex with men (MSM) (Sanchez, Zlotorzynska, Rai, & Baral, 2020). The remaining of the published studies have only evaluated between 58 and 459 participants belonging to the general population from Bangladesh, India and Nepal (Arafat, Mohamed, Kar, Sharma, & Kabir, 2020), Japan (Taniguchi, Hisasue, & Sato, 2020) and a very small group of women from Italy (Schiavi et al., 2020) and Turkey (Yuksel & Ozgor, 2020). The only study found that has explored the impact of COVID-19 on the Spanish population is the review by Ibarra et al. (2020). This presents preliminary data from 279 participants who responded to an English and Spanish version survey. However, the authors do not provide the characterization of the sample or the methodology used.

In general, there are diverse results depending on the country of the participants and the variables analyzed. The studies seem to agree that there have been fewer sexual partners. However, in the study by Ibarra et al. (2020), about 6% of participants have had sex with different people during quarantine. Regarding sexual frequency with respect to the period before confinement, a decrease exists as in the study by Lehmiller et al. (2020) but also an increase as in the study by Yuksel & Ozgor (2020), thus the results are inconclusive. Other studies, in line with Lehmiller et al. (2020) or Sanchez et al. (2020), indicate that the sexual repertoire has expanded with new activities such as sexting or viewing pornography, the use of recreational drugs and alcohol consumption. In addition, the use of dating apps would have decreased or the motivation to use them would have changed. Finally, studies by Taniguchi et al. (2020), Yuksel & Ozgor (2020) and Schiavi et al. (2020) have observed a deterioration of sexual function, sexual satisfaction and quality of life.

Since the response to this pandemic also requires attention to sexual health as a fundamental pillar of physical and mental well-being, the aim of this study is to analyze, in a comprehensive manner, the sexual habits of the Spanish general population during the COVID-19 confinement (INSIDE Project).

Methods

Participants

By means of a convenience sampling, 1,632 completed answers were obtained (2,562 were partial answers). Among all of them, we selected 1,448 people who meet the inclusion criteria: being between 18 and 60 years old ($n=1,600$), living in Spain ($n=1,456$) and self-identified as men or women ($n=1,448$).

Finally, the sample consisted of 1,448 Spanish people aged between 18 and 60 years old, including 67.5% women and 32.5% men. The average age was 31.92 years old ($SD=10.03$). In relation to sexual orientation, 78.3% self-identified as heterosexual, 9.9% as bisexual, 8.7% as homosexual, 2.5% as pansexual, 0.2% as asexual and 0.3% self-identified with "other sexual orientations". Regarding the romantic relationship status, 43.8% had regular partner, 31.6% were single people, 20.6% were married or unmarried partner, 3.6% were separated or divorced and 0.4% were widow/widower.

Measures

An adhoc questionnaire with 59 items, created by the Qualtrics platform, was used. This mainly evaluates different sexual behaviors developed during the COVID-19 confinement. However, this research only includes a total of 42 items based on a varied format. The reliability of the instrument evaluated through Cronbach's alpha is .80. The evaluated topics were the following:

Physical and social environment in which the confinement has occurred. It is evaluated whether people had been alone or in company during this confinement, and in this last case, number of people and if they were people with whom they usually cohabit. Other question evaluated if there was a possibility of privacy at home, with safe areas where they could have sexual activity without being disturbed.

Sexual desire. The intensity of sexual drive or desire during confinement was evaluated by a Likert-type item with seven options to response. The answers ranged from "1 - Much less intense than before" to "7- Much more intense than before".

Type of sexual activity. A multiple choice item evaluated the type of sexual behaviors that people carried out during this confinement. There were different options: "I have masturbated", "I have masturbated using sex toys", "I have had sex with my partner", "I have had sex with my boy roommate", "I have had sex with my girl roommate", "I have skipped the quarantine to have sex with someone I was not living with", "I have had online sexual activity (viewing pornography, chats, webcam, sharing photos / videos of my own with sexual content, etc.)" and "Others".

Masturbation. In case they reported having masturbated, using or not sex toys, there were four more Likert items. First, two items explored the frequency of masturbation before and during confinement. The scale of responses ranged from "1 - More than once a day" to "7 - Never". Furthermore, they were asked about the time invested on each masturbation during confinement. The response scale ranged from "1 - Much less time than before" to "7 - Much longer time than before". Finally, they were asked how satisfactory these masturbations were during confinement by a scale of responses ranging from

"1 - Much less satisfactory than before" to "7 - Much more satisfactory than before". In addition, if they reported using sex toys for masturbation, one question explored if they had already carried out this behavior before confinement by a Yes or No response.

Sexual relationships. If they had practiced sex with their partner, their roommate, or if they had skipped confinement to have sex, how often they had sex before and during this confinement was explored. The response scale ranged from "1 - More than once a day" to "7 - Never". Second, they were asked about the time invested on each sexual relationship during confinement. The scale of response ranged from "1 - Much less time than before" to "7 - Much longer than before". Finally, they were asked how satisfactory these sexual relations were during confinement by a response scale ranging from "1 - Much less satisfactory than before" to "7 - Much more satisfactory than before".

Online sexual activity. If they reported online sexual activities during confinement, they were evaluated by three more items. A Likert-type item explored how much time they had invested on each online sexual activity during confinement by a seven-point scale that ranged from "1 - Much less time than before" to "7 - Much more time than before". In addition, two other items evaluated how many minutes they dedicated to each sexual activity before and during confinement.

General sexual frequency. A Likert-type item evaluated the general frequency of sexual behaviors during confinement, compared to their previous situation, by a scale of response ranging from "1 - Much less frequently than before" to "7- Much more frequently than before." Whether they reported less or more frequency, they were asked by two other items what factors may cause this change in sexual activity and its possible consequences.

Sexual fantasies. In particular, three items evaluated the existence of a series of sexual fantasies during confinement. First, when they had a stable partner, were married or unmarried partner, they were asked if they had fantasized about being unfaithful to their partner during confinement. When they self-identified as heterosexual people, they were asked if they had fantasized about having same sex during confinement. Finally, when they self-identified as homosexual, it was evaluated whether they had fantasized about having sex with someone of another sex during confinement.

Degree of control over sexual urges. Two items explored what degree of perceived control they had over their sexual activity before and during confinement. By means of a scale of four alternatives, the response options were: "Nothing", "Something", "Enough" or "A lot".

Sexual abuse during confinement. Two items assessed whether they had been forced by another person to have sex during confinement or whether they had forced another person to have sex with them.

Global evaluation of the confinement impact. One item explored the global impact of confinement on their sexual life by one of these three options: "It has improved my sexual life" "It has not altered my sexual life," or "It has made worse my sexual life". After that, they were asked about what specific aspects had improved or worsened, with non-exclusive alternatives of dichotomous response.

Mood. Five Likert-type items evaluated the mean level, during confinement, of anxiety, depressive mood, boredom, stress and to what extent they had considered that the confinement situation was becoming unbearable. The response options were: "Not at all", "Somewhat", "Mostly" and "A lot".

Procedure

On March 16, 2020, the Spanish Government decreed the State of Alarm due to the health emergency caused by Coronavirus, forcing the confinement of the Spanish population until May 2, when the outings were allowed to do sport or to walk. Finally, on June 21, the state of alarm ended.

Since April 3 and during the confinement, an advertisement was disseminated on the Internet on social networks (Facebook, Twitter, Instagram, Whatsapp and Telegram) requesting participation in a study to assess sexual behavior during the COVID-19 confinement.

When participants clicked on the advertisement, before answering the online questionnaire, they reach a screen where they were informed about the anonymous, voluntary and confidential nature of the research. Moreover, they were asked for their informed consent. The research had the permission of the Deontological Commission of the Universitat Jaume I (Castellón, Spain). Additionally, the ethical principles of the Declaration of Helsinki were followed at all times.

Statistical analyzes

Statistical analyzes were performed by the SPSS statistical package (version 25.0). Percentages were calculated for categorical variables for both the total sample and each gender separately. Differences according to gender were analyzed by the Chi-Square Test and the Cramer's V was used to calculate the effect size. The Wilcoxon test was used to evaluate those percentages that had been compared in related samples (before and after confinement).

Finally, to predict the variables that affect the improvement or the deterioration of the sexual life during the Covid-19 lockdown, a multinomial logistic regression was carried out.

Results

Physical and social environment in which confinement has occurred

As Table 1 shows, most of the people evaluated were in company the months of confinement (88.5%) compared to 11.5% who were alone. The last percentage is significantly higher among men (15.1%) than among women (9.7%) ($c^2=8.964$, $p<.003$). The people with whom they lived were mainly the couple (50.2%), followed by the father / mother (40.9%), the siblings (23.3%) and the children (22.5%). Men have been more accompanied by parents and siblings than women, who have been more accompanied by their partners. There are statistically significant differences in these variables. In many cases (86.4%), those people with whom they were confined were the same with whom they used to live. There are also significant differences in which men (89.3%) exceed women (85.1%) ($c^2=3.949$, $p<.047$). For all these results, the effect size has been small (see Table 1). Finally, 79.4% of the total sample, without differences between men and women, reported that, in the location where they were confined, there were places where they could have a certain privacy.

Sexual desire

Regarding sexual desire, the total sample is divided into three quite similar subgroups. Approximately one third, 35.9% stated that they had a higher sexual desire during confinement, 34.9% had a lower desire and 29.1% nearly the same (see Table 2). However, there are significant differences according to gender ($c^2=15.844$, $p<.015$, $V=.105$). In particular, women revealed a higher percentage of those who had more desire than usual (37.8%) than men done (29.1%), but the opposite occurred with those who felt less sexual desire (39.5% in men and 34.3% in women). That is, in general terms, men decreased desire while women increased it.

Types of sexual activity

In general, in the total sample, the most performed sexual practices were in order, traditional masturbation (without using sex toys) (61%), followed by relationships with the partner (40%), online sexual activities (28.4%) and masturbation using sex toys (20.2%), highlighting that 4.1% skipped confinement to have relationships with another person (see Table 2). Except for the last behavior, there are statistically significant differences according to gender. Men report higher percentages for traditional masturbation ($c^2=105.895$, $p<.000$, $V=.270$), and online sexual activity ($c^2=83.198$, $p<.000$, $V=.240$), and women for masturbation using sex toys ($c^2=36.562$, $p<.000$, $V=.159$), and intercourses with partners ($c^2=25.774$, $p<.000$, $V=.133$) (see table 2).

For each of these practices, we explored if there had been any changes from the pre-confinement situation. Regarding masturbation, the most usual frequency before confinement for men was 4-7 times per week (44.4%), followed by 2-3 times per week (29%) and more than once a day (12.5%) (see Table 3). However, during confinement the percentage of those who did it more than once a day rose to 25.8%. The changes were significant when applying the Wilcoxon test ($p <.001$). The changes were also significant for women ($p <.001$). Thus before confinement, the most prevalent frequencies were 2-3 times per week (33.8%), followed by 1 time per week (19.4%), 2-3 times per month (18%) and 4-7 times per week (17.8%). Only 2.5% did it more than once a day. However, during confinement this last percentage increased to 8.1% and the previous one to 20.5%. Regarding the invested time on masturbation (see Table 2), half of those evaluated, 49.6%, invested the same time as before, while for the other half, confinement had an impact on the amount of time dedicated to masturbation. However, similar as sexual desire results, this was in two different directions: 27.2% invested more time and 23.1% less time. Regarding the satisfaction obtained by masturbating, something similar occurs. Slightly more than half (57.3%) perceived it as satisfactory as before, while almost the other half is divided between those who stated that it was less satisfactory (26.4%) and those who indicated that it was more satisfactory (16.3%). For neither of these two variables, there were statistically significant differences according to gender (see table 2).

The use of sex toys in masturbation slightly varied due to the situation of confinement. Most of people who used them (98.3%) had already done before confinement, with no differences between men and women. This also occurred for most of those who had relationships with their partner or roommate (see table 2).

Regarding sexual relations, the most common frequency for men before confinement was 2-3 times per week (45.6%) followed by once a week (19%), 4-7 times per week (15.2%) and 2-3 times per month (13.9%) (see Table 3). During confinement, the percentages were respectively 38%, 14.6%, 20.3% and 17.7%, not revealing significant differences by the Wilcoxon test ($p <.788$). Nor was it for women ($p <.702$) for whom the most common frequency before confinement was 2-3 times per week (41.5%) followed by once a week (26%), 2-3 times per month (14.9%) and 4-7 times per week (11.6%). After that, these percentages were respectively 31.4%, 22.1%, 17.9% and 16.6%. About the invested time on relationships (see Table 2), half of those evaluated (52.3%) maintained it and in the other half, 20.5% invested less time and 27.1% invested more time. Just over half (59.1%) these were equally satisfactory, while for 20.1% they were less satisfactory and an almost identical 20.8% stated that these were more satisfactory. These two variables did not obtain statistically significant differences according to gender (see Table 2).

Finally, regarding online sexual activities, the percentage of those who maintained the invested time on them was lower (34.1%). Among those who were affected by confinement (65.9%), only 19.3% stated spending less time on these activities compared to 46.7% who admitted spending more to them. Once again, there were not statistically significant gender differences. Additionally, those who did it, reported investing significantly more time on each online sexual activity. Among men, the mean before confinement was 23.8 minutes ($SD=27.9$) and during it was 35.2 minutes ($SD=36.4$) ($t = 5.04$, $p <.000$). Among women, the mean increased from 18.8 minutes ($SD=23.4$) to 30.8 minutes ($SD = 43.05$) during it ($t=3.50$, $p <.001$) (see Table 2).

Global frequency of general sexual activity, reasons and consequences of changing

The frequency of general sexual activity has maintained in 26.6% of participants and has been affected in most of them, almost equally in the two opposite directions. In particular, it has been lower for 38% and higher for 35.5%. This variable has obtained significant differences according to gender

($c^2=26.025$, $p<.000$, $V=.134$). In men, 30.1% have maintained the same frequency, while the percentage of women has been lower (24.9%). Contrarily, more women (41.3%) than men (31%) have had less frequency. Moreover, more men (39.8%) than women (33.8%) have had a higher frequency (see table 4).

The main reasons for the lower sexual frequency have been in order: worries (41.5%), stress (37.5%), lack of desire (35.3%), lack of privacy (27.3%), not being able to be with the partner (26.4%) or being locked up at home (24.8%). In any case, 7.8% reported overloading by being with the partner a long time or having conflicts with them (7.7%) and these are also interesting. None of these reasons revealed significant differences according to gender, except for the stress ($c^2=4.628$, $p<.031$, $V=.092$) and lack of sexual desire ($c^2=4.581$, $p<.032$, $V=.091$) in which the percentages of women are higher. Only for the lack of privacy and being locked up at home, the percentages of men have exceeded those of women, although not significantly.

Moreover, the main consequences of the lower sexual frequency have been in order: none (42.1%), irritability (24.6%), psychological discomfort (22.4%), having more sexual fantasies (17.3%) and couple conflicts (11.5%). Additionally, other consequences have highlighted such as having fantasies that they had never had (5.5%), engaging in sexual behavior that they had not performed before (1.5%) or even having thoughts of having relationships with a family member (0.7%). Irritability is the only one that reveals statistically significant differences by gender ($c^2=8.376$, $p<.004$, $V=.124$), being more present in women. Men only exceed women in a non-significant term for having new sexual fantasies and thoughts of having relationships with a family member (see table 4).

Regarding the reasons for the higher frequency, the main ones are the following: increase of desire (48.6%), seeking to relax (45.7%), distracting oneself from boredom (39.9%), investing more time on partner (29.2%), or reduce anxiety (29%). In the distance, are reported more available people to cybersex (6.6%), being alone and perceiving that nobody controls them (6%) and curiosity about feeling trapped (1.9%). There were only significant gender differences, in favor of men, in searching for distraction ($c^2=17.151$, $p<.000$, $V=.183$) and more available people to cybersex ($c^2=4.774$, $p<.029$, $V=.096$). Moreover, women exceed men in increasing sexual drive ($c^2=4.898$, $p<.027$, $V=.098$) and investing more time on partner ($c^2=22.492$, $p<.000$, $V=.209$).

Finally, the consequences of this higher frequency have been in order feeling more relaxed (44.7%) and having a better mood (41.2%), although for 30.2% there have been none. Others showed a lower percentage such as: less sexual satisfaction (6%), remorse or guilt (2.9%), being unfaithful (1.2%) and conflicts with the partner (1%). In most of these consequences there are significant differences according to gender. Men exceed women in the appreciation of no consequence ($c^2=14.263$, $p<.000$, $V=.167$), lower sexual satisfaction ($c^2=5.324$, $p<.021$, $V=.102$) and remorse or guilt ($c^2=4.068$, $p<.044$, $V=.089$). However, women exceed men in more relaxation ($c^2=4.068$, $p<.044$, $V=.089$) and better mood ($c^2=26.440$, $p<.000$, $V=.227$) (see table 4).

Sexual fantasies

As was mentioned, one of the perceived consequences of decreased sexual frequency during confinement has been to have new sexual fantasies. In fact, 27.4% of the general sample stated that they had the fantasy of being unfaithful to their stable partner, being significantly higher in men (35.2%) than in women (24.5%) ($c^2=10.538$, $p<.001$, $V=.107$). If there had been fantasies opposed to self-assigned sexual orientation was also evaluated. Once again, there were also significant differences according to gender. Among those who self-identified as heterosexual people, 13.8% had homoerotic fantasies, although the percentage in men (7%) is half of the women's percentage (16.5%) ($c^2=17.084$, $p<.000$, $V=.124$). Moreover, 12.8% of those who self-identified as homosexual people stated that they had heteroerotic fantasies; the percentage among men is three times lower (9.1%) than for women (26.9%) ($c^2=5.867$, $p<.015$, $V=.217$).

Degree of control over sexual activity

The perceived degree of control over sexual activity decreased significantly during confinement in both men and women (Wilcoxon's $p=.000$). Thus, those men who reported to have "nothing, some, enough, or much control" before confinement were respectively 3.6%, 19.7%, 58.8%, and 17.8%, compared to 8.9%, 29.1%, 43.1% and 18.9% during confinement. Among women, the percentages were respectively 3.3%, 16%, 51.3%, and 29.5% before confinement compared to 7.9%, 23.1%, 42%, and 27% during this.

Sexual abuse during confinement

Among participants, 2.8% reported having felt sexually forced by another person during confinement. The percentage was higher among men (3.3%) than among women (2.6%), but the differences were far from significance ($c^2=0.459$, $p<.498$, $V=.019$). On the contrary, 1.1% acknowledged having forced another person, and despite the fact that the percentage was higher in men (1.7%) than in women (0.8%), once again the differences were not significant ($c^2=2.430$, $p<.119$, $V=.043$).

Global evaluation about the confinement impact

In line with the heterogeneity of aspects mentioned, the global evaluation about the confinement impact on sexual life was explored (see Table 5). For approximately half of participants (47.7%) their sexual lives have not changed, being higher the percentage for men (53.3%) than for women (45%). However, for the other half of participants it has changed. For 14.4% of people it has improved, being more women (16.3%) than men (10.4%). In a larger percentage (37.9%) they reported a deterioration, with similar percentages in men (36.3%) and women (38.7%). The differences are statistically significant ($c^2=12.640$, $p<.002$, $V=.093$).

In case there was an improvement, the aspects more pointed were having a higher sexual frequency (76.4%), having spent more time fantasizing (33.7%), having diversified the type of sexual practices with their partner (30.8%) and having explored more through masturbation (24.5%). In addition, 8.7% highlights as positive not having felt pressured to have sex because of not being with the partner or not having privacy. Moreover, 2.9% mentioned having sexual relations with a person with whom they had not had it and 1.4% exploring other sexual orientations. For these variables, there are not statistically significant differences according to gender. However, it should be emphasized some aspects such as more men have found positive not feeling pressured to have sex or more women have explored more through masturbation. (see table 5).

Contrarily, among those who reported a deterioration of sexual life, the main aspects identified are: the decrease in sexual frequency (82%), not having the privacy to masturbate calmly (26%) or to have sexual relations (21.3%) and in far distance, having sexual fantasies that caused discomfort (6.7%), feeling attracted to a new person (5.3%), having increased their sexual frequency (3.5%), being forced to have sex (2.6%), being unfaithful to their regular partner (0.5%) or having had same-sex while self-identifying as heterosexual people (0.2%). The only significant differences according to gender were found for the decrease in the frequency of sexual activity that was considered more negative by women (86.5%) than by men (71.9%) ($\chi^2=16.928$, $p<.000$, $V=.176$). However, the increase in frequency was considered more negative by men (7.6%) than by women (1.6%) ($\chi^2=12.750$, $p<.000$, $V=.152$) (see table 5).

Predictive variables of a better or worse sex life as a consequence of COVID-19

To predict what variables affect the improvement or the deterioration of sexual life during the Covid-19 lockdown, a multinomial logistic regression was carried out. Our dependent variable had 3 levels, where sample had to response if their sexual life had improved, had deteriorated or had not change at all. The option "lockdown has not altered my sex life" was used as the reference category. Eleven variables were included in this analysis: gender, age, sexual orientation, being in a relationship, privacy at home, living alone during the lockdown, how hard the lockdown has been and levels of stress, anxiety, depression and boredom during that time. However, in order to summarize and comment just one model, we only present the five variables that are significative and meaningfully contribute to the full effect.

First of all, the goodness-of-fit of the model has to be checked. As the Pearson chi-square statistic has a value of 212.37 (204 df; $p = .329$) and it is not significant, we can assure that our model fits well the data. Furthermore, in Table 6 we can see how our final model is statistically better than the reference model, with lower AIC and BIC values, having our model a good adjustment.

Once the fit has been checked, Table 7 shows what variables are statistically significant. Firstly, when the lockdown has increased the sexual life, women experimented an improvement in this, with an Odds Ratio (OR) value of 1.52 (1/.657). Furthermore, living with your partner has a positive effect on having a better sexual life. In fact, those who were living with their partner have a OR 2.15 times bigger than those who were not living with their partner in having a better sexual life. However, to have got some privacy at home do not have a significant effect on a better sexual life. Similarly, different levels of stress do not have a significative effect on having a good sexual life. Nevertheless, how people lived the lockdown has a significative effect on the improvement of their sexual experiences. Those who lived the lockdown as a fairly hard moment or as a hard moment affirmed that their sexual life did not improve, given that coefficients has a negative value. For example, those who lived the lockdown as a hard moment have an OR 2.45 (1/.408) times bigger than those who not lived that moments as a hard time in not improving their sexual life.

Secondly, Table 8 corresponds to the case that lockdown deteriorated sexual life. In this context, gender is not a significative variable, thus there are no differences between women and men. However, those who were living with their partner affirmed that their sexual life did not decay during the lockdown, with an OR of 1.61 (1/.621), compared with people who were not living with their partners. Now, privacy at home gave to our sample the feeling that their sexual life did not decay, given that the *Privacy* coefficient has a negative value. In this case, the OR are 1.40 (1/.713) times higher for people who had a private place at home and did not have a bad sexual life, compared to those who did not have that private place. Related to the stress variable, those who were very or quite stressed have an OR higher than 2 of having experienced a decrease in their sexual life during the lockdown, compared to those who did not experienced that levels of stress. Finally, all people who lived the lockdown as an unbearable situation agree that their sexual life suffered a deterioration, being really difficult for those who lived that situation as a very hard or a hard lockdown.

Conclusion

The purpose of this study was to analyze the impact of COVID-19 confinement on the sexual behavior of the Spanish general population. Regarding the confinement conditions and the social environment, the results have shown that the majority of the participants stayed in company, half with their partner and the other half with their parents and siblings or with their children. In any case, most of the times, they were the people with whom they already cohabitated, and in most cases their environment allowed a certain privacy to have sexual activity. This information should be considered since it is very likely that the higher or lower and more positive or negative impact of confinement on sexual life may depend on these type of determinants. In fact, ignoring them could be a serious limitation in any research. Other studies such as those by Ibarra et al. (2020), Jacob et al. (2020), Lehmillier et al. (2020) or Schiavi et al. (2020) also take them into account, although there are clear differences among the variables evaluated by one or the other studies.

Our results indicate that confinement in Spain has had an impact on sexual desire. It only remained the same for 29% of participants. Among those that changed, two opposite directions was revealed with almost identical percentages: for 36% of participants increased and for 35% decreased. There are also certain gender differences, increasing more in women and decreasing more in men. This differential effect in the same situation may seem contradictory, but it is not so much. Ibarra et al., (2020) emphasize that sexual desire towards a partner may decrease in this situation due to negative

mood (depression or anxiety). However, in those who live apart from their partner, this confinement has exacerbated the desire towards the other, although it could not be satisfied due to the physical distance. In Li's online study, Li et al. (2020) found in a sample of 270 men and 189 women from China, between 18-45 years, that 61% did not vary their sexual desire. Among the others, 25% had less sexual desire and only 14% (18% of men and 8% of women), an increase. Thus, these results are very different from those in Spain, where only a third did not modify their desire and the rest were distributed in the opposite way to what happened in China. Moreover in Spain, desire increased more in women than in men, unlike what was observed in that country. Regarding the statement made by Ibarra et al. (2020) about the association between emotional distress and low sexual desire, it is noted that, as Bancroft et al. (2003) remarked, the opposite may also be true. Increased sexual interest may also be a response to depressed mood (as a means of seeking intimacy, self-validation, and sexual pleasure) and anxiety (as a consequence of a certain transfer from a state of activation and seeking the calming effect of satisfying sexual drive).

Regarding the types of sexual activity, our study reveals that in Spain, for almost half of those evaluated, confinement caused changes on the invested time and satisfaction related to masturbation. Despite the fact that more people dedicated more time to masturbation, and the significant increase in its frequency in men and women with respect to pre-confinement, there were more who reported lower satisfaction than before. However, in the study by Lehmillier et al. (2020) carried out in the United States, Canada, Great Britain and Australia, the frequency of masturbation, like the other sexual behaviors, decreased. Certainly, in the study cited, a small number of participants also increased their sexual behavior. For example, while 20.8% of participants masturbated once a day or more during the previous year, the percentage rose to 23.2% when the pandemic started. However, the change was higher in the opposite direction. For example, only 2.4% reported not masturbating in the previous year, while 20.2% had not done since the pandemic began.

Focusing on our study, regarding sexual relationships, no significant differences were found in the frequency before-during confinement in either men or women, differing from masturbation. However, approximately 40% reported an impact on confinement on their relationships. More of them stated investing more time on sexual relationships, although the percentages of those who reported more or less satisfaction were quite similar. Moreover, the differences between men and women were not significant. In the study by Arafat et al. (2020) based on 120 married couples during confinement in Bangladesh, India, and Nepal, 77% had sex with their partner 1 to 5 times per week before confinement. Since the beginning of confinement, the percentage went to 72.5%, so there were no important changes. Certainly, the percentage of those who did it more than 5 times per week increased (10% compared to 6.7% before it), but in general there was no significant impact on the frequency of relationships. A different result was found by Lehmillier et al. (2020) who observed a decrease in this. Li, Li, Xin, Wang, and Yang (2020), with a convenience sample of 270 men and 189 women from China between 18-45 years old, found that 44% reported a decrease in the number of sexual partners (53% men and 30% women), 6% an increase and 50% unchanged. Thirty-seven percent decreased the sexual frequency (36% of married men and 28% of married women), 20% increased and 43% did not experience changes. Differing from our study that reveals similar percentages for an increase or decrease in sexual satisfaction in relationships, in the study by W. Li et al. (2020), 35% (32% of men and 39% of women with significant differences) had a reduction in their sexual satisfaction, in 15% it increased and in 51% there were no changes. Moreover, Schiavi et al. (2020) evaluated in Italy 89 women between 28-50 years who lived with their partner and who had attended a gynecological clinic. The average number of sexual relations per month also decreased from 6.3 to 2.3. Sánchez et al. (2020), based on 1,051 men who have sex with men from the USA, with an average of 35 years old, found that half (51.3%) had a decrease in the number of their sexual partners and in general fewer opportunities to have sex (68%) (only 4.3% increased 4.3% and 26.8% remained the same). For 47.6% there were no changes and only 0.9% increased the number. Finally, Ibarra et al. (2020) in their review of studies from Iran, Italy and Spain predict that the epidemic will negatively affect on sexual relations due to multiple restrictions for contacting with people. They point out that fear of contagion has reduced contact in couples, from kissing to sexual intercourse. In that sense, the restriction of private places and forced cohabitation 24 hours a day may exacerbate differences of opinion and weaken the emotional bond. In addition, negative emotions often affect relationships. According to these authors, among those who live together, sexual relations have been worsened by the continued presence of children at home due to the closing of schools and the limitation of privacy. For people without a partner, it is more difficult to have sporadic relationships. Additionally, infidelities can be more complicated by the impossibility of visiting to others' houses, but also because those others live closely with their relatives. In summary, these authors consider that there are many psychological and physical restrictions that may explain the reduction in the number of partners and in the frequency of sexual relations.

In addition to masturbation, our study also found a significant increase of frequency in online sexual activity for almost 50% of participants, not being differences between men and women. Moreover, during confinement, there is a significant increase in invested time on each online sexual activity for both men and women. Lehmillier et al. (2020) also show an increase in sexting, especially in people who live without their partner during confinement. Similarly, Sánchez et al. (2020) observe that most of MSM, especially the younger ones, had increased the use of dating apps to contact other men, although not physically. Finally Mestre-Bach, Blycker and Potenza (2020) point out that during the confinement there has been an increase in the consumption of pornography. This is not only because of the existence of free pornography offers. In fact, in countries where there have not been any, they have observed increases of 4-24%.

Considering the global frequency of all types of sexual activities, our study shows that it has been affected in almost 75% of the Spanish population and is almost equally distributed among those who have increased and decreased them. There are significant differences based on gender, following a trend that increases more in men and decreases in women. Negative emotional mood, lack of desire, privacy, not being able to be with the partner or impossibility to leave home are the main reasons for a reduction in frequency. Precisely, in other cases, the main reasons for increasing frequency have been the increase in desire, coping with negative emotions such as anxiety, stress or boredom and spending more time with the partner. Arafat et al., (2020), who find a decrease in the general sexual frequency, also point out that some aspects would increase the sexual frequency such as a longer time with the partner, fewer leisure opportunities, less workload, and less social or family obligations. However, others could also worsen it as a higher

possibility of interpersonal conflicts, stress, lack of privacy or health problems. In China, where a decrease in sexual frequency is also observed (W. Li et al., 2020), age, the existence of a couple relationship and the level of sexual desire seem to be related to this.

Our study went further evaluating the perceived consequences of the decrease in sexual frequency, finding that psychological discomfort, increased sexual fantasies and couple discussions were the most relevant. In any case, it should be noted that almost half of participants reported none. Regarding the consequences of an increase in frequency, the main ones have been an improvement in mood and greater relaxation. In this regard, it is interesting to cite the study by Lehmillier et al. (2020), in which a decrease in the frequency of all types of sexual practices was observed and approximately half reported a decrease in their sexual frequency. However, one in five reported an increase in their repertoire incorporating new activities such as trying new sexual positions (15.5% of those who introduced changes), practicing sexting (14.9%), sharing sexual fantasies (13%), having cybersex with someone (9.2%), bringing to life sexual fantasies with the partner (8.5%), using a sex toy with the partner (7.3%), watching porn with the partner (5.4%), performing BDSM acts (5.4%), or doing a threesome or orgy (2.5%). Being younger, living alone and feeling stressed and alone were associated with trying new activities within the sexual repertoire. There were no differences in changes related to gender, but those who were non-heterosexuals, racial minorities, younger, with less socioeconomic status and who did not live with their partner did more. Those who lived with a partner, reported to perform more sexual positions, sexual fantasies come true, etc., while those living alone did more sexting. These results show the ability to adapt sexual lives in creative ways to cope with the stress caused by the epidemic.

We have not found studies to compare some of our findings. One of them is related to sexual fantasies. In our research, the percentage of participants who had fantasies of being unfaithful or about relationships that differ with self-assigned sexual orientation is high (27% for the first one and around 13.5% for the second one). However, we cannot affirm that this was caused by the confinement since we did not ask about their percentages before it. Moreover, other studies revealed that these types of fantasies are common among the general population. It is pointed that the degree of perceived control over sexual activity decreased during confinement in both men and women. This perception may be related to the type of sexual fantasies or practices carried out, with special mention of sex on the Internet or the frequency of pornography consumption and the type of materials viewed. In addition, confinement situations may facilitate sexual abuse. In fact, almost 3% of people felt sexually forced and 1.1% acknowledged having forced another person during this period. We cannot affirm the degree of forcing they refer to, whether it was an insistence or a consummate abuse, but in any case these are alarming data.

In general, our study reveals that confinement has influenced on the sexual life of half of the Spanish population (47.7%), especially women. This percentage is extremely similar to the 45% obtained in Bangladesh, India and Nepal (Arafat et al., 2020) and 42.8% found in the United States, Great Britain, Canada and Australia (Lehmillier et al, 2020). In our study, those who reported a deterioration of their sexual life are almost three times more (37.9%) than those who reported an improvement (14.4%). These results are also very similar to the 43% and 13.6% obtained by Lehmillier et al. (2020). This confinement has given some Spanish people an opportunity to improve their sexual lives by increasing frequency, spending more time on sexual fantasies, exploring themselves through masturbation, or engaging in new sexual practices with their partner. However, for others it has been a problem especially due to the decrease in sexual frequency or the lack of privacy to masturbate or have relationships. Curiously, differing from some preconceptions, the decrease in sexual frequency has been considered as something positive and the increase as something negative for more men than women. This result may deserve some attention.

Finally, our study explores the predictive variables of the perception of a worsening or improvement of sexual life during confinement. Our results indicate that age, sexual orientation, and levels of anxiety, depression, and boredom during confinement are not significant factors. Among the variables that did enter the regression model, women and those who have lived with their partners during confinement said that their sex lives had improved, and those who experienced confinement as being too hard said that it had not improved. Having privacy at home and the degree of stress during confinement were not significant variables. Regarding the worsening of sexual life, it was higher among those who experienced significant levels of stress and reported that confinement became unbearable. Conversely, those who lived with their partners during confinement, and had privacy, stated that their sex life did not worsen. Gender was not a relevant variable in predicting worsening. We can only compare these results with those of the study by Lehmillier et al. (2020) who do not observe that age, socioeconomic status, or gender were relevant variables. In contrast, those who reported that their sexual life improved were those who felt more desire for sex in general and towards their partner, felt less loneliness and less stress during confinement. Particularly, those who included new sexual activities into their repertoire were three times more likely to report improvements in their sexual lives. The results in the first study carried out in Great Britain (Jacob et al., 2020) are hardly comparable due to the dependent variable was sexual frequency, a much more specific and limited variable than the comprehensive concept of "sexual life". Except for this, the variables associated with a higher sexual frequency were being male, younger, being married or cohabiting with partner, consuming alcohol and a high number of days of self-isolation / social distancing. The comparison with the data from Italy is also complex (Schiavi et al., 2020) because of the dependent variable was the "female sexual function" of women who attended a gynecological clinic, which decreased among those who worked outside the home, had a university level and more children.

Limitations

Obviously this study has some limitations. The sample reaches almost 1,500 participants and, at the time, has only been surpassed in one hundred participants by the study by Lehmillier et al. (2020). However, it was obtained through a convenience sampling, so it might not be representative and we must be cautious when generalizing the results. Second, it is a study based on the subjective and sometimes retrospective report of the participants. This may derive possible biases of social desirability and memory. Only a longitudinal study in which participants were evaluated before and during the pandemic would avoid this possible memory bias. In any case, even in that situation, based on subjective judgments, it is possible that the negative or positive judgment about sexual life could have been influenced by the general situation of living and not exactly reflect reality. Third, it would have been

interesting to include new variables on factors that could be influencing the sexual life of the participants. In any case, at this moment, this study includes the highest number of variables among the published papers and possibly this could have tired the participants reducing their involvement in the study. Despite all these limitations, we expect to have contributed to the very limited scientific literature on this subject.

Policy Implications

The presented study is the first carried out with a large sample of the Spanish general population and has important implications. Firstly, it provides information about how the confinement and social distancing may impact on human sexual behavior. Secondly, it offers a little studied area in which the COVID-19 pandemic has also had a severe impact worldwide and particularly in Spanish society, in which the disease wreaks havoc (Ballester-Arnal & Gil-Llario, 2020). Thirdly, it shows how half of the Spanish population has experienced important changes in their sexual life during confinement, but these changes have gone in different directions according to a series of factors, such as gender, couple life, privacy, the degree of stress and the experience of the confinement as unbearable. Once again sexuality is shown as a complex phenomenon, that also presents a great diversity in the way it is affected by a situation as complex and threatening as the confinement caused by a pandemic. It would be interesting to know other variables related to personality, the specific relationship of the couple, attitudes towards sex, etc. that may also be modulating the impact of confinement on sexual life. Fourth, the results reveal how sexual activity was moved to masturbation and online sex. It will be interesting to explore if when the epidemic and the need for social distancing subside, the prevalence of these behaviors will return to their initial levels or there will be maintained in the sexual habits of the general population. Fifth, this study incorporates variables not yet studied in any research, such as sexual fantasies, the degree of perceived control over sexual drive, or sexual abuse. And finally, based on the results obtained in this and other studies, it will be interesting to learn how we can prevent the deterioration of sexual life in future confinements caused by this or other epidemics; training people in coping resources to minimize its impact as much as possible, increasing the well-being of the people and their couple life.

Declarations

Compliance with Ethical Standards

Conflict of Interest. The authors declare that they have no conflict of interest.

Ethics Approval. The study was approved by the Ethics Committee of Universitat Jaume I (Castellón, Spain) and was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments.

Informed Consent. Participants were informed about the objectives of the survey, completion times, benefits, and risks, as well as about the anonymity of the responses and the right to stop the survey in any point and for any reasons. Furthermore, participants were informed that the data collected would have been published in scientific journals in aggregate form. After reading all information, participants had to give their consent to participate in the online survey by clicking on the bottom "I accept to take part in the survey."

References

- Allen, M. S., & Walter, E. E. (2018). Health-related lifestyle factors and sexual dysfunction: A meta-analysis of population-based research. *The Journal of Sexual Medicine*, 15(4), 458-475.
- Altena, E., Baglioni, C., Espie, C. A., Ellis, J., Gavriloff, D., Holzinger, B., Schlarb, A., Frase, L., Jernelöv, S., & Riemann, D. (2020). Dealing with sleep problems during home confinement due to the COVID-19 outbreak: practical recommendations from a task force of the European CBT-I Academy. *Journal of Sleep Research*. <https://doi.org/10.1111/jsr.13052>
- Arafat, S. Y., Mohamed, A. A., Kar, S. K., Sharma, P., & Kabir, R. (2020). Does COVID-19 pandemic affect sexual behaviour? A cross-sectional, cross-national online survey. *Psychiatry Research*, 289, 113050.
- Badger, R. L. (2017). Sexuality and stress. In S. Wadhwa (Ed.), *Stress in the modern world: Understanding science and society, Vol. 1*. (pp. 221–236). Greenwood Press/ABC-CLIO.
- Ballester-Arnal, R., & Gil-Llario, M. D. (2020). The virus that changed Spain: Impact of COVID-19 on people with HIV. *AIDS and Behavior*, 1-5. <https://doi.org/10.1007/s10461-020-02877-3>
- Baltes, P.B. (1985). Psicología evolutiva del ciclo vital. Algunas observaciones convergentes sobre historia y teoría. In A. Marchesi et al. (Eds.), *Psicología Evolutiva, tomo 1* (pp. 247-267). Madrid: Alianza Editorial.
- Bancroft, J., Janssen, E., Strong, D., Carnes, L., Vukadinovic, Z. & Long, S. (2003). The relation between mood and sexuality in heterosexual men. *Archives of Sexual Behavior*, 32, 217-230.
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*, 395, 912-920.

- Colson, M.H. (2016). Sexual dysfunction and chronic illness. Part 1: Epidemiology, impact and significance. *Sexologies: European Journal of Sexology and Sexual Health*, 25(1), e5–e11. <https://doi.org/10.1016/j.sexol.2016.01.007>
- Dowd, J. B., Adriano, L., Brazel, D. M., Rotondi, V., Block, P., Ding, X., Liu, Y., & Mills, M. C. (2020). *Demographic science aids in understanding the spread and fatality rates of covid-19*. PNAS. <https://doi.org/10.1073/pnas.2004911117>
- Fisher, W. (2015). Loneliness and sexuality. In A. Shaked & A. Rokach (Eds.), *Addressing loneliness: Coping, prevention and clinical interventions*. (pp. 34–50). Routledge/Taylor & Francis Group.
- Griffin-Shelley, E. (2003). The Internet and sexuality: A literature review 1983-2002. *Sexual and Relationship Therapy*, 18(3), 355–370. <https://doi.org/10.1080/1468199031000153955>
- Ho, C. S., Chee, C. Y., & Ho, R. C. (2020). Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. *Annals of the Academy of Medicine, Singapore*, 49(3), 155-160.
- Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry Research*, 112954. <https://doi.org/10.1016/j.psychres.2020.112954>
- Hussein, J. (2020) COVID-19: What implications for sexual and reproductive health and rights globally? *Sexual and Reproductive Health Matters*, 28, 1746065. <https://doi.org/10.1080/26410397.2020.1746065>
- Ibarra, F. P., Mehrad, M., Di Mauro, M., Godoy, M. F. P., Cruz, E. G., Nilforoushzadeh, M. A., & Russo, G. I. (2020). Impact of the COVID-19 pandemic on the sexual behavior of the population. The vision of the east and the west. *International Brazilian Journal of Urology*, 46(Suppl 1), 104-112.
- Instituto de Salud Carlos III (2020a). *Informe sobre la situación de COVID-19 en España. Informe COVID-19 nº 23. 16 de abril de 2020*. <https://www.isciii.es/QueHacemos/Servicios/VigilanciaSaludPublicaRENAVE/EnfermedadesTransmisibles/Documents/INFORMES/Informes%20COVID-19/Informe%20n%C2%BA%2023.%20Situaci%C3%B3n%20de%20COVID-19%20en%20Espa%C3%B1a%20a%2016%20de%20abril%20de%202020.pdf>
- Instituto de Salud Carlos III (2020b). *Análisis de los casos de COVID-19 en personal sanitario notificados a la RENAVE hasta el 10 de mayo en España. Informe a 29 de mayo de 2020. 19 de julio de 2020*. <https://www.isciii.es/QueHacemos/Servicios/VigilanciaSaludPublicaRENAVE/EnfermedadesTransmisibles/Documents/INFORMES/Informes%20COVID-19/COVID-19%20en%20personal%20sanitario%2029%20de%20mayo%20de%202020.pdf>
- Jacob, L., Smith, L., Butler, L., Barnett, Y., Grabovac, I., McDermott, D., Armstrong, N., Yakkundi, A., & Tully, M. (2020). Challenges in the practice of sexual medicine in the time of COVID-19 in the United Kingdom. *The Journal of Sexual Medicine*, 17(7), 1229-1236.
- Jung, S. J., & Jun, J. Y. (2020). Mental health and psychological intervention amid COVID-19 outbreak: Perspectives from South Korea. *Yonsei Medical Journal*, 61(4), 271-272.
- Legido-Quigley, H., Mateos-García, J. T., Campos, V. R., Gea-Sánchez, M., Muntaner, C., & McKee, M. (2020). The resilience of the Spanish health system against the COVID-19 pandemic. *The Lancet Public Health*. [https://doi.org/10.1016/S2468-2667\(20\)30060-8](https://doi.org/10.1016/S2468-2667(20)30060-8)
- Lehmiller, J. J., Garcia, J. R., Gesselman, A. N., & Mark, K. P. (2020). Less sex, but more sexual diversity: Changes in sexual behavior during the COVID-19 coronavirus pandemic. *Leisure Sciences*. <https://doi.org/10.1080/01490400.2020.1774016>
- Li, S., Wang, Y., Xue, J., Zhao, N., & Zhu, T. (2020). The impact of COVID-19 epidemic declaration on psychological consequences: a study on active weibo users. *International Journal of Environmental Research and Public Health*, 17(6), 2032. <https://doi.org/10.3390/ijerph17062032>
- Li, W., Li, G., Xin, C., Wang, Y. & Yang, S. (2020). Challenges in the practice of sexual medicine in the time of COVID-19 in China. *The Journal of Sexual Medicine*, 17, 1225-1228.
- Li, Z., Ge, J., Yang, M., Feng, J., Qiao, M., Jiang, R., Bi, J., Zhan, G., Xu, X., Wang, L., Zhou, Q., Zhou, C., Pan, Y., Liu, S., Zhang, H., Yang, J., Zhu, B., Hu, Y., Hashimoto, K., ... & Zhou, Q. (2020). Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. *Brain, Behavior, and Immunity*. <https://doi.org/10.1016/j.bbi.2020.03.007>
- Lichtenberg, P. A. (2014). Sexuality and physical intimacy in long-term care. *Occupational Therapy In Health Care*, 28(1), 42–50. <https://doi.org/10.3109/07380577.2013.865858>
- Lippi, G., Henry, B. M., Bovo, C., & Sanchis-Gomar, F. (2020). Health risks and potential remedies during prolonged lockdowns for coronavirus disease 2019 (COVID-19). *Diagnosis*. <https://doi.org/10.1515/dx-2020-0041>
- McCann, E., Donohue, G., de Jager, J., Nugter, A., Stewart, J., & Eustace-Cook, J. (2019). Sexuality and intimacy among people with serious mental illness: A qualitative systematic review. *JBI Database of Systematic Reviews and Implementation Reports*, 17(1), 74–125. <https://doi.org/10.11124/JBISRR-2017-003824>

- Mestre-Bach, G., Blycker, G.R. & Potenza, M.N. (2020). Pornography use in the setting of the COVID-19 pandemic. *Journal of Behavioral Addictions*, 9(2), 181-183. <https://doi.org/10.1556/2006.2020.00015>
- Ministerio de Sanidad (2020). *Actualización nº 165. Enfermedad por el coronavirus (COVID-19). 19 de julio de 2020.* https://www.mscbs.gob.es/profesionales/saludPublica/ccayes/alertasActual/nCov-China/documentos/Actualizacion_165_COVID-19.pdf
- Mira, J. J. (2020). PANDEMIA COVID-19: Y ahora ¿qué?. *Journal of Healthcare Quality Research*. <https://doi.org/10.1016/j.jhqr.2020.04.001>
- Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *General Psychiatry*, 33, e100213. <http://dx.doi.org/10.1136/gpsych-2020-100213>
- Real Decreto 463/2020 [Gobierno de España]. Por el que se declara el estado de alarma para la gestión de la situación de crisis sanitaria ocasionada por el COVID-19. 14 de marzo de 2020. https://www.boe.es/diario_boe/txt.php?id=BOE-A-2020-3692
- Real Decreto-Ley 21/2020 [Gobierno de España]. De medidas urgentes de prevención, contención y coordinación para hacer frente a la crisis sanitaria ocasionada por el COVID-19. 9 de junio de 2020. https://www.boe.es/diario_boe/txt.php?id=BOE-A-2020-5895
- Rokach, A. (2019). The effect of psychological conditions on sexuality: A review. *Psychopharmacology*, 29, 259-266.
- Sanchez, T. H., Zlotorzynska, M., Rai, M., & Baral, S. D. (2020). Characterizing the impact of COVID-19 on men who have sex with men across the United States in April, 2020. *AIDS and Behavior*, 24, 2024-2032. <https://dx.doi.org/10.1007%2Fs10461-020-02894-2>
- Sandín, B., Valiente, R. M., García-Escalera, J., & Chorot, P. (2020). Impacto psicológico de la pandemia de COVID-19: Efectos negativos y positivos en población española asociados al periodo de confinamiento nacional. *Revista de Psicopatología y Psicología Clínica*, 25(1), 1-22. <https://doi.org/10.5944/rppc.27569>
- Schiavi, M. C., Spina, V., Zullo, M. A., Colagiovanni, V., Luffarelli, P., Rago, R., & Palazzetti, P. (2020). Love in the time of COVID-19: Sexual function and quality of life analysis during the social distancing measures in a group of Italian reproductive-age women. *The Journal of Sexual Medicine*. <https://dx.doi.org/10.1016%2Fj.jsxm.2020.06.006>
- Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A., Losifidis, C., & Agha, R. (2020). World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*, 76, 71-76.
- Taniguchi, H., Hisasue, S. I., & Sato, Y. (2020). Challenges in the practice of sexual medicine in the time of COVID-19 in Japan. *The Journal of Sexual Medicine*, 17(7), 1237–1238.
- Tenkorang, E. Y. (2018). Sexual behaviours in the context of the Ebola virus disease (EVD) in Ghana. *Culture, Health & Sexuality*, 20(7), 746-760.
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 17(5), e1729. <https://doi.org/10.3390/ijerph17051729>
- Weiss, N. H., Walsh, K., DiLillo, D. D., Messman-Moore, T. L., & Gratz, K. L. (2019). A longitudinal examination of posttraumatic stress disorder symptoms and risky sexual behavior: Evaluating emotion dysregulation dimensions as mediators. *Archives of Sexual Behavior*, 48, 975-986. <https://doi.org/10.1007/s10508-019-1392>
- World Health Organization (2020). *Coronavirus disease 2019 (COVID-19): situation report, 180.* 19 de julio de 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200718-covid-19-sitrep-180.pdf?sfvrsn=39b31718_2
- Yuksel, B., & Ozgor, F. (2020). Effect of the COVID-19 pandemic on female sexual behavior. *International Journal of Gynecology & Obstetrics*. <https://doi.org/10.1002/ijgo.13193>

Tables

Table 1. Variables associated with the confinement context

		<u>Total</u> (n=1,448)	<u>Men</u> (n=471) %	<u>Women</u> (n=977) %	<i>Chi</i> ²	<i>p</i>	<i>V</i>
cial context in which the confinement has curred	Alone	11.5	15.1	9.7	8.964	.003	.079
	In company	88.5	84.9	90.3			
n company, with whom?	Father/mother	40.9	46.3	38.4	6.954	.008	.074
	Brother/sister	23.3	28.2	21.1	7.892	.005	.078
	Grandfather/ Grandmother	3.4	3.0	3.6	.328	.567	.016
	Uncle/aunt	1.2	0.8	1.5	1.170	.279	.030
	Partner	50.2	40.8	54.5	20.919	.000	.128
	Son/daughter	22.5	21.3	23.1	0.557	.456	.021
	Father/mother in law	2.2	2.0	2.3	.092	.761	.008
	Girl/boy friend	2.5	3.0	2.3	.607	.436	.022
	Girl/boy roommate	5.7	8.3	4.5	7.072	.008	.074
	Another person	4.7	4.0	5.0	.603	.437	.022
nfinement with people who usually habitate	Yes	86.4	89.3	85.1	3.949	.047	.055
ivate places at home	Yes	79.4	79.8	79.3	.042	.838	.006

Table 2. Sexual desire, sexual practices and related invested time and satisfaction

		<u>Total</u> (<u>n=1,448</u>)	<u>Men</u> (<u>n=471</u>) %	<u>Women</u> (<u>n=977</u>) %	<i>Chi</i> ²	<i>p</i>	<i>V</i>
Intensity of sexual drive during confinement	Much less	9.6	6.4	11.2	15.844	.015	.105
	Considerable less	9.8	7.6	10.8			
	Slightly less	15.5	15.1	15.8			
	About the same	29.1	31.4	27.9			
	Slightly more	20.2	21	19.9			
	Considerable more	11	13	10.1			
	Much more	4.7	5.5	4.3			
Behaviors developed during the confinement	Traditional masturbation	61	80	51.9	105.895	.000	.270
	Masturbation using sex toys	20.2	11	24.7	36.562	.000	.159
	Sex with partner	40	30.6	44.5	25.774	.000	.133
	Sex with boy roommate	0.3	0.2	0.3	0.104	.748	.008
	Sex with girl roommate	0.2	0.2	0.2	0.001	.976	.001
	Sex with another person skipping the confinement	4.1	3.8	4.2	.114	.735	.009
	Online sexual activity	28.4	43.9	20.9	83.198	.000	.240
	Other	1.1	0.8	1.2	0.418	.518	.017
	None	7.5	2.3	9.9	26.544	.000	.135
Spent time on masturbation	Much less	7.3	7.3	7.2	10.177	.117	.102
	Considerable less	5.9	4.2	7.1			
	Slightly less	9.9	12.3	8.4			
	About the same	49.6	48.6	50.3			
	Slightly more	20.1	18.8	20.9			
	Considerable more	5.6	6.8	4.9			
	Much more	1.5	2.1	1.2			
Satisfaction of masturbation	Much less	4.8	6	4	7.546	.273	.088
	Considerable less	8.1	8.6	7.7			
	Slightly less	13.5	15.4	12.3			
	About the same	57.3	53.3	59.9			
	Slightly more	11.9	12	11.8			
	Considerable more	3.5	4.2	3			
	Much more	0.9	0.5	1.2			
When using sex toys, had they used before confinement?	Yes	98.3	98.1	98.3	0.018	.894	.008
When having sex with a boy roommate, had they had before?	Yes	75	0	100	4.000	.046	1.00
When having sex with a girl	Yes	66.7	100	50	.750	.386	.500

mate, had they had before?

Time spent on each sexual relationship	Much less	4.9	3.2	5.5	8.175	0.226	.114
	Considerable less	3.9	3.2	4.2			
	Slightly less	11.7	11.4	11.8			
	About the same	52.3	53.2	52			
	Slightly more	19.9	18.4	20.4			
	Considerable more	5.5	9.5	4.2			
	Much more	1.7	1.3	1.9			
Satisfaction of sexual relationships	Much less	3.8	3.8	3.8	9.845	.131	.125
	Considerable less	4.6	3.8	4.8			
	Slightly less	11.7	15.2	10.5			
	About the same	59.1	54.4	60.6			
	Slightly more	11.8	9.5	12.6			
	Considerable more	5.2	8.9	4			
	Much more	3.8	4.4	3.6			
Time invested on each online sexual activity	Much less	4.4	2.9	5.9	8.334	.215	.142
	Considerable less	4.9	6.3	3.4			
	Slightly less	10	12.1	7.8			
	About the same	34.1	36.2	31.9			
	Slightly more	26.3	22.7	29.9			
	Considerable more	12.9	12.6	13.2			
	Much more	7.5	7.2	7.8			

Table 3. Frequency of masturbation and sexual relationships

		Men			Women		
		Before	During	<i>p</i> (Wilcoxon)	Before	During	<i>p</i> (Wilcoxon)
		(%)	(%)		(%)	(%)	
frequency of masturbation	>once a day	12.5	25.8	.001	2.5	8.1	.000
	4-7 times per week	44.4	37.1		17.8	20.5	
	2-3 times per week	29	20.6		33.8	28.1	
	Once a week	8.4	10.7		19.4	22.1	
	2-3 times per month	3.9	5		18	12.3	
	<once a month	1.8	0.8		6.4	8.8	
	Never	0	0		2	0.2	
frequency of sexual relationships	>once a day	1.9	3.2	.788	2.3	4.8	.702
	4-7 times per week	15.2	20.3		11.6	16.6	
	2-3 times per week	45.6	38		41.5	31.4	
	Once a week	19	14.6		26.1	22.1	
	2-3 times per month	13.9	17.7		14.9	17.9	
	<once a month	4.4	5.7		3.6	6.9	
	Never	0	0.6		0	0.2	

Table 4. Global sexual frequency, reasons, and consequences of changing

		<u>Total</u>	<u>Men</u>	<u>Women</u>	<i>Chi</i> ²	<i>p</i>	<i>V</i>
		<u>(n=1,448)</u>	<u>(n=471)</u>	<u>(n=977)</u>			
			%	%			
quency of global sexual vity	Much less	13.3	7.2	16.2	26.025	.000	.134
	Considerable less	9.3	8.3	9.7			
	Slightly less	15.4	15.5	15.4			
	About the same	26.6	30.1	24.9			
	Slightly more	24.1	25.7	23.3			
	Considerable more	9	10.2	8.4			
	Much more	2.4	3	2.1			
asons for decreased ial frequency	Lack of intimacy	27.3	30.1	26.3	0.793	.373	.038
	Lack of sexual desire	35.3	28.1	38			
	Stress	37.5	30.1	40.2			
	Worries	41.5	38.4	42.7			
	Not being able to be with my partner	26.4	21.9	28			
	To overload by being with my partner a long time	7.8	6.2	8.4			
	Conflicts with my partner	7.7	6.2	8.2			
	Impossibility to leave home	24.8	26.7	24.1			
	Other	5.8	7.5	5.2			
sequences of lower ial activity	None	42.1	45.9	40.7	1.187	.276	.046
	Irritability	24.6	15.8	27.8			
	Conflicts	11.5	8.9	12.4			
	Psychological discomfort	22.4	17.8	24.1			
	More sexual fantasies	17.3	15.8	17.9			
	Sexual fantasies I did not have before	5.5	6.8	5			
	Sexual behaviors I did not practice before	1.5	1.4	1.5			
	Thoughts of having relationships with a family member.	0.7	1.4	0.5			
	Other	2.2	4.1	1.5			
asons for higher sexual vity	For boredom, to distract me	39.9	51.9	33.2	17.151	.000	.183
	To reduce my anxiety	29	30.6	28.1			
	To relax me	45.7	51.4	42.6			
	To make me happy	25.9	21.9	28.1			
	For a sexual drive increase	48.6	42.1	52.3			
	For investing more time with my partner.	29.2	16.4	36.3			
	Because I am alone, and nobody controls me.	6	8.7	4.5			
		6.6	9.8	4.8			

	Because people are more available to cybersex						
	Because I feel curiosity of being on lock down	1.9	2.7	1.5	.922	.337	.042
	Other	7.8	3.8	10	6.200	.013	.110
sequences of higher sexual activity	None	30.2	40.4	24.5	14.263	.000	.167
	A better mood	41.2	26.2	49.5	26.440	.000	.227
	More relaxation	44.7	38.8	48	4.068	.044	.089
	Remorse or guilt	2.9	4.9	1.8	4.011	.045	.088
	Conflicts with my partner	1	0.5	1.2	0.536	.464	.032
	Being unfaithful to my partner.	1.2	1.6	0.9	0.549	.459	.033
	Lower satisfaction of sexual behaviors	6	9.3	4.2	5.324	.021	.102
	Other	2.7	1.6	3.3	1.261	.261	.050

Table 5. General evaluation of the confinement impact on sexual life

		Total (n=1,448)	Men (n=471) %	Women (n=977) %	Chi ²	p	V
General evaluation of post confinement impact	Sexual life has improved	14.4	10.4	16.3	12.640	.002	.093
	Sexual life has not altered	47.7	53.3	45			
	Sexual life has made worse	37.9	36.3	38.7			
Improved: aspects in which has improved	I have more frequency of sexual activity	76.4	71.4	78	0.895	.344	.066
	I have not had pressure to have sex (because my partner was not or was not privacy)	8.7	12.2	7.5	1.046	.307	.071
	I have broadened the type of sexual practices in couples	30.8	30.6	30.8	0.001	.978	.002
	I have explored myself more by masturbating	24.5	14.3	27.7	3.627	.057	.132
	I have invested more time on fantasizing	33.7	34.7	33.3	0.031	.860	.012
	I have explored other sexual orientations	1.4	2	1.3	0.162	.688	.028
	I have had sex with a person I would never have done with before.	2.9	4.1	2.5	0.328	.567	.040
	Other	2.9	2	3.1	0.163	.686	.028
Worsened: aspects in which has worsened	The frequency of sexual activity has decreased.	82	71.9	86.5	16.928	.000	.176
	The frequency of sexual activity has increased.	3.5	7.6	1.6	12.750	.000	.152
	I have received pressure by other people to have sex	2.6	2.9	2.4	0.140	.709	.016
	I have not privacy to have relationships	21.3	20.5	21.7	0.105	.745	.014
	I have not been privacy to masturbate calmly	26	25.7	26.2	0.013	.910	.005
	I have had sexual fantasies that have made me feel bad	6.7	8.8	5.8	1.632	.201	.055
	I have been sexually attracted to a new person and I have felt discomfort	5.3	7	4.5	1.495	.222	.052
	I have had same sex and I have felt discomfort (for heterosexual people)	0.2	0	0.3	0.453	.501	.029
	I have had sex with someone of the other sex and I have felt discomfort (for homosexual people)	0	0	0	-	-	-
I have been unfaithful to my regular partner	0.5	0.6	0.5	0.007	.935	.003	

Note. The use of hyphens indicates that the analyzes could not be performed.

Table 6. Model fitting information

Model fitting information						
Model	Model fitting criteria			Likelihood ratio test		
	AIC	BIC	-2 Log Likelihood	Chi ²	df	p
Baseline model	746.255	756.567	742.255			
Final model	599.805	702.929	559.805	182.449	18	.000

Note: Pseudo R-Square: Cox & Snell=.133; Nagelkerke=.153; McFadden=.071.

Table 7: Parameter estimates for an improvement of the sexual life

	B	S.E	Wald	df	p	Exp(B)	95% CI Exp(B)	
							Lower CI	Upper CI
Constant	-1.508	.476	10.023	1	.002			
Gender (Men)	-.420	.194	4.701	1	.030	.657	.450	.960
Partner	.765	.183	17.405	1	.000	2.149	1.500	3.078
Privacy	.468	.261	3.214	1	.073	1.597	.957	2.663
Very stressed	.501	.408	1.507	1	.220	1.650	.742	3.670
Quite stressed	.386	.379	1.037	1	.309	1.472	.700	3.096
Some stressed	.096	.388	.061	1	.805	1.101	.514	2.356
Not stressed	Reference category for the stress experienced during the lockdown variable							
Very hard lockdown	-.594	.420	1.995	1	.158	.552	.242	1.259
Fairly Hard lockdown	-.837	.402	4.337	1	.037	.433	.197	.952
Hard lockdown	-.898	.433	4.299	1	.038	.408	.174	.952
Nice lockdown	Reference category for how the lockdown has been lived variable							

Table 8: Parameter estimates for a decrement of the sexual life

	B	S.E	Wald	df	p	Exp(B)	95% CI Exp(B)	
							Lower CI	Upper CI
Constant	-.786	.240	10.710	1	.001			
Gender (Men)	-.172	.140	1.517	1	.218	.842	.640	1.107
Partner	-.476	.130	13.338	1	.000	.621	.481	.802
Privacy	-.339	.155	4.772	1	.029	.713	.526	.966
Very stressed	.850	.279	9.254	1	.002	2.340	1.353	4.047
Quite stressed	.726	.217	11.255	1	.001	2.068	1.353	3.161
Some stressed	.403	.198	4.159	1	.041	1.496	1.016	2.204
Not stressed	Reference category for the stress during the lockdown variable							
Very hard lockdown	1.024	.308	11.053	1	.001	2.784	1.522	5.092
Hard lockdown	1.087	.215	25.570	1	.000	2.966	1.946	4.521
Fairly lockdown	.603	.180	11.238	1	.001	1.828	1.285	2.601
Nice lockdown	Reference category for how the lockdown has been lived variable							