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The Impact of the COVID-19 Pandemic on Sexual Health in Cis Women Living in Germany



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ABSTRACT

Background: Preliminary research shows a substantial impact of the COVID-19 pandemic on women's sexual health, whereby empirical work on sexual well-being of minoritized sexual identities is still rare.

Aim: The objective of this study was to explore sexual health in heterosexual, lesbian and bisexual cis women during the first wave of COVID-19 pandemic in Germany.

Methods: An anonymous nationwide online survey was conducted among cis women during the first nationwide lockdown in Germany from April 20th to July 20th, 2020. The questionnaire was distributed via e-mail, online chats and social-media platforms.

Outcomes: Demographic variables and self-report measures from the Sexual Behavior Questionnaire (SBQ-G) "before the pandemic" and "since the pandemic" were collected.

Results: A total of 1,368 cis women participants were included: heterosexual women (n = 844), lesbian women (n = 293), bisexual women (n = 231). Results indicate overall decrease in frequency of sexual contacts and masturbation during the COVID-19 pandemic. Regarding differences before and during the pandemic lesbian women showed significant changes in sexual arousal whereas heterosexual women showed significant changes in all dimensions except capability to enjoy sexual intercourse. The data of bisexual women showed significant changes in almost all dimensions except for frequency of sexual intercourse and sexual arousal. Results of the multiple regression analysis revealed that being younger than 36 years-old, and being in a relationship as well as being heterosexual (compared with being lesbian) is positively associated with general satisfaction with sexual life during the pandemic.

Clinical Implications: The findings suggest that during a pandemic sexual and mental health care for (cis) women should be provided and address the specific needs of sexual minority groups.

Strengths & Limitations: This is the first study to describe sexual behavior in heterosexual, lesbian and bisexual women during the COVID-19 pandemic in Germany. Limitations, however, include the fact that the data described were obtained at only one time point so there is a possibility of recall bias, and that the results cannot be generalized because of the underrepresentation of women over age 46.

Conclusion: This study examined the impact of the COVID-19 pandemic and resulting social constraints on the sexual health of particular groups of lesbian and bisexual women, which may improve preparedness for future

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INTRODUCTION

The first infection with the novel coronavirus 2019 (COVID-19) in Germany was confirmed in January 2020.¹ Three months later, the World Health Organization (WHO) announced a pandemic. The world has faced the emergence of a new public health threat that not only leads to personal loss but affects all societies. To date until November 2021 more than 4.9 million people have died due to COVID-19.² The extent of this humanitarian crisis has caused critical implications for physical and mental health all over the globe. As a very contagious virus with several modes of transmission, including droplet, aerosol, bloodborne, as well as mother-to-child and animal-to-human transmission,² COVID-19 led to an unprecedented uncertainty and anxiety in all societies. In order to fight the spread of COVID-19, restrictions and non-pharmacological measures such as confinement and social distancing have been implemented in most countries. On the 22nd of March 2020 the German government announced the first nationwide quarantine as a means to inhibit the rapid transmission of COVID-19. Containment measures, such as sheltering in place and self-isolation, are proven to control the viral spread during a pandemic. Social restriction measures tremendously interfere in private and social life.³ Since the beginning of the COVID-19 pandemic alterations in several lifestyle behaviors, general life-satisfaction, and overall contentment have been documented.⁴⁻⁶ The rise in anxiety, the fear, and the uncertainty of the current and future situation created stress and predisposed to emotional illnesses.^{7,8} Some studies show a significant increase in mental disorders with an increase in depression, panic or anxiety, insomnia and post-traumatic stress disorder.^{3,9-11}

The COVID-19 pandemic drastically altered the way of life around the entire world. Fear is omnipresent and the pandemic presents unequalled challenges for every individual. Due to social quarantine, couples, families, or cohabitants suddenly spent more time together, whereas singles had less opportunities to meet a life- or sex-partner. The changing circumstances and new challenges, for example altered work-schedules, can create psychological stress, which can affect sexual and reproductive health with an impact on intrapersonal and interpersonal behavior.¹² Sexuality and sexual life are highly individual experiences and expressions of physical and mental wellbeing. According to the current WHO-definition, sexual health describes a state of physical, emotional, mental and social wellbeing in relation to

sexuality.^{13,14} With the increase of psychological disorders since the COVID-19 pandemic, sexual health is likely to be affected by the pandemic.¹² Several studies showed that mental health problems like anxiety and depression negatively affect sexual desire and arousal.^{15,16}

Changes in sexual behavior during the COVID-19 pandemic have been described by various research teams around the world with some controversial findings and the underlying mechanisms is still not clear. On the one hand some authors described a decrease in desire for reproduction and quality of sex-life,⁸ decrease in sexual desire,¹⁷ decrease in frequency of sexual contacts.¹⁸ On the other hand, other authors demonstrated that sexual intercourse is a protective factor for mental^{12,19} and showed an increase in sexual desire and in the frequency of sexual contacts⁶ during the pandemic compared to the time before the pandemic. In a German Study sample described a decline in partnered sexual activities independent from relationship status and gender.²¹ Furthermore, the frequency of masturbatory behavior in partnered participants decreased independent from gender. Single women also showed a tendency towards a decline during physical distancing measures compared to the period before, whereas single males masturbated more often.²⁰

Since sexual minorities are a vulnerable community, who are at higher risk of experiencing stigmatization and discrimination, which leads to health disparity compared to heterosexuals.²² Past studies have shown that the incidence of general distress and mental disorders like anxiety disorders, drug abuse, and suicidality is higher in sexual minorities than heterosexuals.^{23,24,57} Pandemics cause an aggravation of psychological health issues.²⁵⁻²⁷ A fulfilled sexual life can positively influence mental health. Thus alterations in sexual behavior must be considered an expression of a change in the psyche. Since mental disorders increase since the COVID-19 pandemic, sexual wellbeing is also likely to be affected by the pandemic.

Despite well-documented vulnerability of sexual minorities, there is no empirical work published that concentrates on the effects of the COVID-19 pandemic on sexual behavior in female sexual minorities in comparison to heterosexual women. In an exploratory analysis we aim to explore sexual health and wellbeing in sexual and private life (single- or relationship-life) as an indicator for sexual wellbeing among heterosexual, lesbian and bisexual women during the COVID-19 pandemic.

METHODS

Design and Procedure

We conducted an anonymous nationwide online survey using the SoSci Survey platform, an online tool to implement surveys (SoSci Survey Version 3.2.23, released 2019; SoSci Survey GmbH, Munich, Germany) and was made available to users via www.soscisurvey.de. To spread the questionnaire online, invitations with a link to access the survey were shared via E-mail distribution lists and on social communicating networks like Facebook™, Instagram™, Twitter™, and WhatsApp™. Participants were invited to forward the link of the survey (snowball sampling).

All participants reviewed and accepted the consent page and voluntarily participated without any compensation in the study. Data gained through the questionnaire has been treated as confidential and only for research purposes. The survey was conducted according to the Declaration of Helsinki and the Ethics Review Committee of the Faculty of Medicine, LMU Munich, approved for waiver from the Institutional Review Board approval (project number: 20-344 KB).

The survey collected self-reported data in a convenient sample within a cross-sectional study design and was carried out during the first confinement in Germany from the 20th of April to the 20th of July 2020. Inclusion criteria were a minimum age of 18 years and German language skills.

Materials

The online survey was designed to gain information on the changes of mental, sexual and reproductive health of the German population since the COVID-19 pandemic compared to the time before the pandemic. We collected general characteristics (i. e. age, gender, sexual orientation, residential environment, current employment status), parameters for physical and mental health and family planning aspects. The focus of this paper is on sexual health in cis women.

Sexual health was assessed from Sexual Behavior Questionnaire (SBQ-G).²⁸ We used the following dimensions: *Frequency and the satisfaction with the frequency of masturbation and sexual intercourse*, *sexual desire*, *sexual arousal*, *capability to enjoy sexual intercourse*, *sexual satisfaction*, and *satisfaction with relationship- or single life*. Each dimension was investigated with one specific item in the survey. The answer format for *frequency of masturbation* and *frequency of sexual intercourse* was: 1 = Never, 2 = Less than once a week, 3 = 1 to 3 times a week, 4 = 3 to 5 times a week, 5 = More than 5 times a week. The answer format for *sexual arousal* was: 1 = I do not get excited at all, 2 = I get excited with difficulty, 3 = I get aroused quite easily, 4 = I get aroused very easily. For *capability to enjoy sexual intercourse or masturbation*: 1 = I never enjoy sex, 2 = I enjoy sex occasionally, 3 = I enjoy sex often, 4 = I always enjoy sex. For *general satisfaction with sexual life* and *general satisfaction with relationship- or single life*: 1 = No satisfaction at all, 2 = Moderate satisfaction, 3 = Average satisfaction, 4 = Reasonable satisfaction and

5 = Full satisfaction. The participants were asked to answer the questions on sexual health twice: First with regard to the period 3 to 6 months prior to COVID-19 pandemic, and then regarding the time during COVID-19 pandemic. We calculated a sum score on sexual health with each score of the six dimensions of the SBQ-G. The SBQ-G has a good retest reliability (Cohens Kappa = 0.86) for women.²⁸ However, internal consistency during the pandemic (Cronbach's alpha = 0.601) and before the pandemic (Cronbach's alpha = 0.595) was only sufficiently good.

Participants

Gender identity and sexual orientation were assessed with the item "In your opinion, which of the following categories most apply to you?". The following answer categories were provided: heterosexual, homosexual, bisexual, asexual, female, male, cis ("I identify with the gender assigned at birth"), trans* ("I do not identify with the gender assigned at birth") and others. Note that we are conscious of the pathologizing nature of the term "homosexuell". In Germany, the expression "homosexuell" is still common. We report the direct translation as it appeared in the questionnaire for reasons of transparency. Multiple answers were possible. A total of N = 2463 participants participated in the online survey. For the purpose of this study, we included only cis female participants. We divided all cis participants (n = 1377) into 3 study cohorts: (i) Heterosexual women (n = 844), (ii) lesbian women (n = 293), (iii) bisexual women (n = 231), (iv) and asexual women (n = 9). Due to the low number of participants who selected asexual women we left this study group out of consideration. Eligible for analysis resulted in N = 1368 participants.

Statistical Analyses

Descriptive statistics were calculated for all cohorts (Table 1). Levene test was used to test the homogeneity of variances and the distribution of normality was evaluated using Kolmogorov-Smirnov test. Values were computed and reported as mean (M) ± standard deviation (SD). Parametric tests (paired and unpaired sample t-test, Mann-Whitney-U test and ANOVA) were used to analyze mean differences between the groups and between the 2 perspectives: "before" and "during" COVID-19 pandemic.

To examine whether sexual health has changed from before the pandemic to during the pandemic, the 2 assessments were subtracted from each other and difference scores (meaning baseline sexual health (Bsh) – pandemic sexual health (Psh)) were formed for each dimension. Here, zero means no change in sexual health. A positive score means that the values during the pandemic are lower than before the pandemic (less sexual health) and a negative score means that the values during the pandemic are higher than before the pandemic (more sexual health). To test whether the changes were significant, the difference scores were tested with one sample paired t-test with the variables before and since the pandemic. In addition, a sum score of the difference values of the dimensions of sexual health was formed

and also tested against zero. To compare the sexual health of the 3 groups before and during the pandemic, variance analyses were calculated and LSD posthoc tests were performed. The dependent variables were sum scores of the dimensions of sexual health before and during the pandemic.

For explorative reasons we furthermore conducted multivariate linear regressions to examine the association between sexual health since the pandemic and sexual identities, age, residential environment, employment status, parental status as well as relationship status. Since the dependent variable sexual health includes 6 dimensions. Thus, we conducted 6 regression models.

A 2-sided *P*-value of .05 was used for all tests. SPSS version 26 (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY) was used for statistical analysis.

RESULTS

General Characteristics

Table 1 shows a 4-group detailed comparison of the general characteristics and demographic features. A total of 1368 cis female participants were included in the sample. The majority of

the study population was between the age of 18 and 35 years (80.6 %, *n* = 1103). Whereas 493 participants were between 18 and 25 years old (36.1 %) and 610 participants were between 26 and 35 years old (44.7 %). 62 % of the participants lived in a metropolitan area (*n* = 844). 671 (49.1 %) had a university degree. Most were in a relationship (*n* = 979, 71.6 %). 28.4 % were single (*n* = 389).

Frequency of Sexual Intercourse and Masturbation

Changes in the frequency of sexual intercourse and masturbation from “before” to “during” confinement period are presented in Annex Table 7. Looking at the whole sample, the average weekly frequency of masturbation decreased significantly from before to during the pandemic. Only lesbian participants showed no significant difference in the score for frequency of masturbation since the COVID-19 pandemic (before the pandemic vs since the pandemic: Heterosexual women *n* = 841, *M*_{bsh} = 2.43, *SD*_{bsh} = 1.10 vs *n* = 839, *M* = 2.39, *SD* = 1.097; Lesbian women *n* = 293, *M* = 2.50, *SD* = 1.23 vs *n* = 293, *M* = 2.51, *SD* = 1.08; Bisexual women *n* = 231, *M* = 2.77, *SD* = 1.02 vs *n* = 230, *M* = 2.66, *SD* = 0.99; Annex Table 7). Concerning change in

Table 1. Comparison of general characteristics of the study groups: Demographic and socio-economic data of participants

	All participants N = 1,368 n (%)	Heterosexual women n = 844 n (%)	Lesbian women n = 293 n (%)	Bisexual women n = 231 n (%)
Age, years				
18–25	493 (36.1)	332 (39.4)	77 (26.3)	84 (36.4)
26–35	610 (44.7)	401 (47.6)	114 (38.9)	95 (41.1)
36–45	216 (15.8)	92 (10.9)	82 (28.0)	42 (18.2)
46 or older	47 (3.4)	17 (2.0)	20 (6.8)	10 (4.3)
Relationship status				
In a relationship	979 (71.6)	611 (72.4)	224 (76.5)	144 (62.3)
Single	389 (28.4)	233 (27.6)	69 (23.5)	87 (37.7)
Numbers of children				
No children	1191 (87.1)	746 (88.4)	245 (83.6)	200 (30.1)
One or more children	177 (12.9)	98 (11.6)	48 (16.4)	31 (13.4)
Residential environment				
Metropolis*	844 (62.0)	557 (66.4)	148 (50.7)	139 (60.2)
Medium sized town†	201 (14.8)	116 (13.8)	56 (19.2)	29 (12.6)
Small town‡	157 (11.5)	92 (11.0)	37 (12.7)	28 (12.1)
Rural community§	158 (11.6)	73 (8.7)	51 (17.5)	34 (14.7)
Level of education				
University degree	671 (49.1)	446 (52.9)	128 (43.7%)	97 (42.0)
Professional degree	188 (13.8)	78 (9.3)	78 (26.6%)	32 (13.9)
High school degree	504 (36.8)	318 (37.7)	86 (29.6%)	100 (43.3)
No High school degree	4 (0.3)	1 (0.1)	1 (0.3%)	2 (0.9)
Employment status				
Employed	776 (57.0)	420 (50.1)	219 (74.7)	137 (59.3)
Student	495 (36.3)	372 (44.4)	49 (16.7)	74 (32.0)
Not employed	91 (6.7)	46 (5.5)	25 (8.5)	20 (8.7)

* = 100.000 or more inhabitants,
 † = 20.000-100.000 inhabitants,
 ‡ = 5.000-20.000 inhabitants,
 § = up to 5.000 inhabitants.

the frequency of sexual contacts, only heterosexuals documented a significant decrease ($P < .001$). In contrast, lesbian and bisexual women showed no significant difference in the frequency of sexual intercourse during the COVID-19 pandemic compared with 3 to 6 months prior. No significant difference could be found between the study groups (before the pandemic vs since the pandemic: Heterosexual women $n = 844$, $M = 2.46$, $SD = 0.93$ vs $n = 838$, $M = 2.33$, $SD = 1.06$; Lesbian women $n = 293$, $M = 2.18$, $SD = 0.80$ vs $n = 292$, $M = 2.22$, $SD = 0.85$; Bisexual women $n = 231$, $M = 2.31$, $SD = 0.91$ vs $n = 231$, $M = 2.38$, $SD = 1.15$; [Annex Table 7](#)). A multivariate linear regression models ([Annex: Table 1](#)) with the score “Frequency of sexual contacts” during COVID-19 pandemic as dependent variables revealed that there is a significant positive association between younger age, being in a relationship, having no children as well as being heterosexual (compared with being lesbian) and being bisexual (compared with being heterosexual) with the frequency of sexual intercourse during the pandemic. The frequency of masturbation was significantly positive associated with being single as well as being lesbian and bisexual (compared with being heterosexual; [Annex Table 2](#)).

Sexual Arousability and Capability to Enjoy Sexual Intercourse or Masturbation

[Annex Table 8](#) show the level of sexual arousal before and during the COVID-19 pandemic. A significant trend towards increased mean scores in sexual arousal during the quarantine period, compared to before, was found in heterosexual and lesbian women. Bisexual women did not show a significant difference in sexual arousal since the beginning of the COVID-19 pandemic. There was no significant difference between the groups (before the pandemic vs since the pandemic: Heterosexual women $n = 836$, $M = 2.94$, $SD = 0.712$ vs $n = 840$, $M = 2.99$, $SD = 0.76$; Lesbian women $n = 293$, $M = 2.95$, $SD = 0.68$ vs $n = 293$, $M = 3.04$, $SD = 0.69$; Bisexual women $n = 230$, $M = 3.00$, $SD = 0.64$ vs $n = 229$, $M = 2.91$, $SD = 0.76$; [Annex Table 8](#)).

Furthermore, explorative multivariate analyses revealed a significant positive association between the score of sexual arousal during COVID-19 pandemic and being single ([Annex Table 3](#)).

Only bisexual women indicated a significant decrease in the capability to enjoy sexual contact and masturbation (before the pandemic vs since the pandemic: Heterosexual women $n = 840$, $M = 3.32$, $SD = 0.77$ vs $n = 841$, $M = 3.30$, $SD = 0.77$; Lesbians. $n = 288$, $M = 3.35$, $SD = 0.81$ vs $n = 292$, $M = 3.37$, $SD = 0.84$; Bisexual women $n = 231$, $M = 3.36$, $SD = 0.75$ vs $n = 230$, $M = 3.10$, $SD = 0.87$; [Annex Table 8](#)). In heterosexual and lesbian individuals no significant difference could be found. Results of the multivariate linear regression for “Capability to enjoy sexual intercourse or masturbation during COVID-19 pandemic” as dependent variable showed that this was significantly positively associated with younger age and living in a rural

community as well as being heterosexual (compared with being bisexual; [Annex Table 4](#)).

General Satisfaction With Sexual and Personal Life

Looking at all participants, a significant decrease in general satisfaction with sexual life since the beginning of the COVID-19 pandemic can be observed. In the subgroups, only heterosexual and bisexual women showed a significant decrease in general satisfaction with sexual life (before vs since the pandemic: Heterosexual women $n = 840$, $M = 3.54$, $SD = 1.10$ vs $n = 836$, $M = 3.41$, $SD = 1.16$; Lesbian women $n = 292$, $M = 3.33$, $SD = 1.09$ vs $n = 290$, $M = 3.26$, $SD = 1.28$; Bisexual women $n = 231$, $M = 3.65$, $SD = 1.09$ vs $n = 231$, $M = 3.30$, $SD = 1.01$; [Annex Table 9](#)). With the beginning of the COVID-19 pandemic heterosexual and bisexual cis women recalled significantly lower levels in general satisfaction with relationship- or single-life compared to the time before the pandemic. In the group of lesbian women no significant difference was found (before the pandemic vs since the pandemic: Heterosexual women $M = 3.62$, $SD = 1.31$ vs $M = 3.67$, $SD = 1.34$; Lesbian women $M = 3.74$, $SD = 1.24$ vs $M = 3.80$, $SD = 1.32$; Bisexual women $M = 3.00$, $SD = 1.33$ vs $M = 2.94$, $SD = 1.29$, [Annex Table 9](#)). The multivariate linear regression models ([Annex Table 5](#) and [6](#)) revealed that there is a significant positive association between younger age and being in a relationship as well as being heterosexual (compared with being lesbian) with general satisfaction with sexual life during COVID-19 pandemic. General satisfaction with relationship- or single-life was significantly associated only with being in a relationship.

Changing in Sexual Health Since the Pandemic

[Table 2](#) shows the difference values in sexual health in all participants from before the pandemic to during the pandemic. The sum score of the difference values of the dimensions of sexual health showed significant changes in all dimensions and a decrease in sexual health, except for sexual arousal. The sexual arousal was in trend but statistically not significant. Furthermore, the sum score shows a significant change.

[Table 2](#) shows the difference scores and results separately for the heterosexual, lesbian and bisexual groups. For heterosexual women significant changes in all dimensions except capability to enjoy sexual intercourse can be found. Except for sexual arousal (where scores are higher during the pandemic than before), scores show a decrease in sexual health. With regards to lesbian women, the results only show a significant change in sexual arousal. The difference values indicate more sexual health during the pandemic than before the pandemic. The data of bisexual participants is similar to the data of the heterosexual women: Significant changes are found almost throughout, except for frequency of sexual intercourse and sexual arousal. The difference scores indicate more sexual health before the pandemic than during the pandemic.

Table 2. Comparison of sexual health before and during the pandemic in all participants and in each group of sexual identities

Sexual Health Difference Score	All participants				Heterosexual women				Lesbian women				Bisexual women			
	M _{bsh} – M _{psh}	t	P	d	M _{bsh} – M _{psh}	t	P	d	M _{bsh} – M _{psh}	t	P	d	M _{bsh} – M _{psh}	t	P	d
Frequency of sexual intercourse	0.046	2.124	.034	0.052	0.109	3.806	<.001	0.130	-0.048	-1.121	.263	-0.048	-0.065	-1.390	.166	-0.068
Frequency of masturbation	0.040	2.369	.018	0.038	0.042	2.035	.042	0.037	-0.010	-0.254	.800	-0.009	0.100	2.265	.024	0.109
Sexual arousal	-0.034	-1.909	.057	-0.042	-0.049	-2.252	.025	-0.068	-0.092	-2.519	.012	-0.131	0.096	1.926	.055	0.128
Capability to enjoy sex	0.051	3.050	.002	0.075	0.016	0.808	.420	0.025	-0.010	-0.298	.766	-0.024	0.261	4.819	<.001	0.320
Sexual satisfaction	0.155	5.815	<.001	0.133	0.133	4.056	<.001	0.115	0.062	1.043	.298	0.059	0.352	5.148	<.001	0.333
Satisfaction with relationship- or single life	0.112	4.886	<.001	0.092	0.147	5.276	<.001	0.119	-0.094	-1.933	.054	-0.079	0.244	3.834	<.001	0.206
Sum score sexual health differences	0.359	4.558	<.001	0.246	0.396	4.270	<.001	0.313	-0.218	-1.15	.251	-0.129	0.947	4.625	<.001	0.598

M_{bsh} – M_{psh} = Difference score: meaning baseline sexual health (M_{bsh}) – pandemic sexual health (M_{psh}), t = one sample t-tests, P = P-values, d = Cohen’s d.

The comparison of sexual health of the 3 groups before (Cronbach’s alpha = 0.59) and during (Cronbach’s alpha = 0.60) the pandemic showed that pre-pandemic sexual health differed between the study groups, F(2) = 4.60, P = .010. LSD posthoc tests showed that lesbian women had significantly lower scores (M = 18.10, SD = 0.193) than heterosexual women (M = 18.63, SD = 0.114, P = .019) and bisexual (M = 18.95, SD = 0.217, P = .004) women. Results for data during the pandemic show no difference in sexual health between the groups, F(2) = 0.59, P = .550. Posthoc tests also showed no differences, P = .277.

DISCUSSION

COVID-19 and the social consequences such as the national lockdown in Germany lead to a decrease in wellbeing and increase in mental stress.^{29, 30} Sexual function is determined by psychological and physiological parameters and mental stress is a known factor to influence sexual health. Previous literature has shown that sexual satisfaction is positively associated with life satisfaction.^{31,32} Consequently, we expected the COVID-19 pandemic to impact sexual health. In 2021, Kasprowski et al published a study - documented just prior to the pandemic – indicating higher levels of wellbeing among cis heterosexual individuals compared to all people with minority sexual and gender identities in Germany. Studies during the COVID-19 pandemic confirmed these lower levels in wellbeing and mental health with minority sexual and gender identities heterosexual individuals.^{30,33,34} Thus, we expected higher levels of sexual impairment in lesbian and bisexual women compared to heterosexual women during the COVID-19 pandemic. The objective of this study was to explore sexual health in heterosexual, lesbian and bisexual cis women during the first wave of COVID-19 pandemic in Germany. The present study provides rare evidence on the impact of the COVID-19 pandemic on sexual health among heterosexual, lesbian, and bisexual women living in Germany.

When not separating the subgroups according to their sexual identity (heterosexual, lesbian and bisexual), all participants

overall showed a significant decrease in frequency of sexual contacts and masturbation during the first confinement in Germany in spring 2020. Sexual function is known to be modulated by mental stressors, such as the COVID-19 pandemic. Persistently high levels of psychological stress entail sexual difficulties. Hamilton et al demonstrated that daily stressors predict lower scores in sexual satisfaction and sexual activity in women.³⁵ In contrast, a study on the influence of stress and depression on the quantity of sexual contacts found higher levels of frequency of sexual contacts in 18- to 20- year-old women with depression symptoms.³⁶ However, as a natural disaster, the COVID-19 pandemic creates anxiety and chronic stress, which causes poorer mental health and negatively influences sexual life. Previous studies on sexual health during the COVID-19 pandemic indicate incongruent findings. The vast majority of the studies document a reduction in sexual intercourse. Consistently with our study, Li et al documented a decline of 37% in frequency of sexual contacts during confinement in women and men living in China.¹⁸ Similarly, a study on the effect of the pandemic on sexual life of women in Italy, showed a decrease in frequency of sexual contacts.³⁷ In contrast, a recently published review on the changing of sexual behavior during the COVID-19 pandemic demonstrated no change in frequency of sexual intercourse in the population of Iran, Italy and Spain.¹² The discrepancy in literature could be influenced by national factors, as cultural aspects, and country-specific measures to fight against the dissemination of COVID-19.³⁸

Another reason for the reduction of sexual contacts, Yuksel and Ozgor identified a decrease in desire for parenthood in women since the pandemic.⁶ Consistently, a study performed in Italy reported no decrease in frequency of sexual contacts in individuals without a desire for parenthood.³⁹ Furthermore, the decline in frequency of sexual intercourse in heterosexual women is possibly linked to fear of pregnancy in times of COVID-19. Micelli et al found that over 30% of Italian couples with a wish to become parents postponed their family planning goals to the time after the pandemic.³⁹ Motives to interrupt the pursuit

during the pandemic could be economical concerns and the lack of knowledge of the effects of COVID-19 on pregnancies. On the other hand, the study also showed a rise in desire to have a child in about 12% during the COVID-19 pandemic.³⁹ Motives for the increased desire for parenthood are not to be discussed in the literature.

Looking at the sexual subgroups of our study, the univariate analyses showed that frequency of sexual intercourse was significantly decreased in heterosexual women. Furthermore, heterosexual and bisexual women masturbate significantly less during the first confinement in Germany in 2020 compared to the time before quarantine. The level of satisfaction with the frequency of sexual contacts, the level of general satisfaction with sexual life, and the level of general satisfaction with partnership- or single-life decreased significantly in heterosexual and bisexual women. Additionally, bisexual women showed a significant decrease in capability to enjoy sexual contacts. In contrast, lesbian women did not show a significant difference in satisfaction-scales and in the level of capability to enjoy sexual intercourse since the COVID-19 pandemic. In this study lesbian and heterosexual women showed significantly higher levels of sexual arousability since the pandemic. Bisexual women did not show a significant difference. Since no empirical work has been published on the sexual behavior of female sexual minorities compared with heterosexual women during the COVID-19 pandemic, it is uncertain if differences in sexual behavior exist as intra- or intergroup effects.

Comparing sexual health between the subgroups before and since the pandemic, our findings showed lower levels of sexual health only in lesbian participants before the pandemic. Whereas no significant difference could be found in heterosexual and bisexual women before the pandemic and in all groups since the pandemic. One explanation is that sexual health declined for most participants during the pandemic, and thus differences between groups due to floor effects also declined.

Results of the multiple regression analysis revealed that being younger than 36 years-old, and being in a relationship as well as being heterosexual (compared with being lesbian) is positively associated with general satisfaction with sexual life during the pandemic. Furthermore, a multivariate linear regression model showed a significant positive association between younger age, being in a relationship, having no children as well as being heterosexual (compared with being lesbian) as well as being bisexual (compared with being heterosexual) with higher frequencies of sexual intercourse during the pandemic. These findings are in line with previous literature. The quantity of sexual intercourse has been described to be an indicator for overall quality of sexual health with greater levels of sexual-, relationship- and general life-satisfaction being associated with higher frequencies of sexual intercourse.^{32,40-42}

Concerning sexual orientation, these data suggest a higher vulnerability for sexual wellbeing during the pandemic in bisexual and lesbian women. This finding is in line with previous empirical work showing that sexual minorities are psychologically more vulnerable with significantly lower levels in wellbeing and

mental health compared to heterosexual individuals.^{24,27,43,44} Compared to lesbians, data indicated increased or equivalent rates of depression and anxiety in bisexual women.^{45,57} One explanation for the higher level of mental vulnerability in lesbian and bisexual women is leading to the reduced opportunity to connect with the lesbian, gay, bisexual, trans* and queer plus (LGBTQ+) community.⁴⁶ Sexual orientation communities are a proven source of resilience for individuals of a sexual minority due to the sense of belonging.⁴⁷ Due to the confinement, sexual minorities such as lesbians and bisexuals have less access to their community and thus less social support, which can affect their sexual and general wellbeing.^{46,48}

The underlining mechanism of sexual wellbeing and mental stress is still unclear, especially during the COVID-19 pandemic. One possible explanation is leading to the experience of emotional intimacy and the physical sensation of sexual pleasure as universal aspects of human sexuality.⁴⁹ Women are more often affected by sexual dysfunctions than men, with reduced sexual desire being the most prevalent female sexual dysfunction.^{50,51} Models of sexual desire as a responsive construct promote that one's experience of sexual arousal and pleasure during sexual encounters is crucial for one's future appraisal of sexual cues. Studies conducted not in a crisis like the COVID-19 pandemic showed that cis women in heterosexual relationships experience orgasm less frequently than women in same-sex relationships.^{52,53} However, results of our study indicate that lesbian women are less likely to experience general satisfaction with sexual life than heterosexual women during the pandemic. A reduced well-being of lesbian women during the crisis could be of importance to explain why lesbian women are more affected by impairments of sexual health during the pandemic. Furthermore, inhibiting factors like sexual concerns and performance anxiety might be stronger related to sexual scripts and role expectations of lesbian women.

LIMITATIONS

This study has several limitations. First, we used a self-designed national online survey without the physical presence of an interviewer. Internet access was required to participate. This should be taken into account as a potential selection bias. Second, the study is a cross-sectional study and described data was obtained at one timepoint. As a consequence, trends or direct compromises in sexual health from before and since the COVID-19 pandemic. Future research should include longitudinal studies. Third, mostly young participants have been recruited with only 3.4% of the participants being older than 46 years. Further almost 90% of the participants were childless. This results in important selection bias, which implicates a lack of generalization of the results. Fourth, we analyzed in this manuscript only cis women without comparing with cis men or trans* individuals. Therefore, we can conclude for gender differences in our cohort. Additionally, more precise information on sexual

health could have been obtained by using validated psychometric tools like the *Orgasmometer*, a well validated instrument to investigate the intensity of orgasms. Furthermore, the SBQ-G has not yet been validated for sexual minorities. Questions on sexual health could have been more specifically adapted to the COVID-19 pandemic. This is due to the lack of validated scales. To continue, the group of bisexuals subsumes a variety of sexual orientation self-identities (including a balanced bisexuality, mostly heterosexual as well as mostly lesbian). Literature on the differences in the diversity of the community of bisexuals is sparse. For example, studies have found that bisexual individuals self-identifying as “mostly heterosexual” are at a higher risk for mental distress.^{54,55} To individualize sexual and mental health care, research is needed to identify potential differences in bisexual subgroups. Future research should concentrate on largescale longitudinal research in sexual minorities.

CONCLUSION

To sum up, our findings disclose overall lower frequency of sexual contacts and masturbation in hetero- and bisexual women compared to before the COVID-19 pandemic in Germany. Furthermore, levels of sexual health were lower among heterosexual and especially bisexual women compared to lesbian individuals. Known risk factors and protective factors linked to female sexual function should be addressed by future studies as moderators for variations of the impact of chronic stress on women with distinct sexual orientations. In order to improve sexual health of sexual minorities such as lesbian and bisexual women, access to mental health care should be provided during emergencies as the COVID-19 pandemic. In times of quarantine, health care services should be guaranteed. Online platforms, teletherapy, and virtual counseling should be easily available. Especially for psychological conditions, teletherapy and online peer support groups have been proven to be an effective measure to provide psychological support during the COVID-19 pandemic.⁵⁶ As an effective health service, telehealth should be easily accessible and rapidly implemented. Known risk factors and protective factors linked to female sexual function should be addressed by future studies as moderators for variations of the impact of chronic stress on women with distinct sexual orientations.

STATEMENT OF ETHICS

All human subjects provided written informed consent with guarantees of confidentiality. In lieu of an ethical review board, the authors state that this article does not contain any studies with human participants performed by any of the authors. The Ethics Review Committee of the Faculty of Medicine, LMU Munich permitted the analysis (Reference number: 20-344 KB). Our research was carried out in accordance with the Declaration of Helsinki of the World Medical Association and informed consent was obtained from all patients. All data was collected and analyzed anonymously.

AVAILABILITY OF DATA AND MATERIALS

Data is stored in a non-publicly available repository. Data is however available from the corresponding author on request.

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Conflict of Interest: Author SM reports Research support, advisory board, honoraria and travel expenses from AbbVie, AstraZeneca, Clovis, Eisai, GlaxoSmithKline, Medac, MSD, Novartis, Olympus, PharmaMar, Pfizer, Roche, Sensor Kinetics, Teva, and Tesaro. All other authors have no conflict of interest to declare.

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STATEMENT OF AUTHORSHIP

Author FB designed the study, wrote the protocol, recruited study subjects, wrote the first draft of the manuscript, undertook the statistical analysis and managed literature searches. Authors PB and CJT provided the statistical methods, provided critical feedback and supervised the project. Author EL supervised the statistical analysis and provided critical feedback. Authors TV, LS, LH, AC, JB and SM provided literature searches and critical feedback. All authors contributed to and have approved the final manuscript.

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ANNEX

Annex 1. Linear Regression model with the score “Frequency of sexual contacts during COVID-19 pandemic” as dependent variable

	Regression coefficient	Standard error	P-value	95%-confidence interval		
				Lower	Upper	t
Intercept	0.667	0.211	.002	0.254	1.081	3.170
Sexual identities						
Heterosexual (Ref)	-	-	-	-	-	-
Lesbian	-0.131	0.061	.033	-0.251	-0.011	-2.140
Bisexual	0.185	0.065	.005	0.057	0.313	2.837
Age*	-0.151	0.061	.013	-0.270	-0.032	-2.498
Relationship status [†]	1.249	0.054	< .001	1.144	1.355	23.216
Residential environment [‡]	-0.001	0.050	.987	-0.098	0.100	0.017
Parenthood [§]	-0.141	0.071	.049	-0.281	-0.001	-1.969
Employment status	-0.068	0.058	.238	-0.182	0.045	-1.181
Statistics for the linear regression						
R ²	0.296					
Adjusted R ²	0.293					
Standard Error	0.868					
F-statistic	80.977 [¶]					

*O = under 35 years; 1 = 36 years and above

†O = single; 1= in a relationship

‡O = urban cities; 1 = rural communities under 20.000 inhabitants

§O = no child; 1 = one or more children

||O = employed; 1 = not employed including students

¶P < .001.

Annex 2. Linear Regression model with the score “Frequency of masturbation during COVID-19 pandemic” as dependent variable

	Regression coefficient	Standard error	P-value	95%-confidence interval		
				Lower	Upper	t
Intercept	3.748	0.255	<.001	3.248	4.247	14.721
Sexual identities						
Heterosexual (Ref)	-	-	-	-	-	-
Lesbian	0.162	0.074	.028	0.017	0.307	-2.198
Bisexual	0.229	0.079	.004	0.074	0.384	2.904
Age*	-131	0.073	.074	-0.275	-0.013	-1.788
Relationship status [†]	-0.487	0.065	<.001	-0.615	-0.359	-7.482
Residential environment [‡]	-0.035	0.061	.562	-0.155	0.084	-0.580
Parenthood [§]	-0.131	0.086	.128	-0.301	0.038	-1.522
Employment status	-0.078	0.070	.266	-0.215	0.059	-1.112
Statistics for the linear regression						
R ²	0.057					
Adjusted R ²	0.052					
Standard Error	1.049					
F-statistic	11.638 [¶]					

*O = under 35 years; 1 = 36 years and above.

†O = single; 1= in a relationship.

‡O = urban cities; 1 = rural communities under 20.000 inhabitants.

§O = no child; 1 = one or more children.

||O = employed; 1 = not employed including students.

¶P < .001.

Annex 3. Linear Regression model with the score “Sexual arousal during COVID-19 pandemic” as dependent variable

	Regression coefficient	Standard error	P-value	95%-confidence interval		
				Lower	Upper	t
Intercept	3.337	0.178	<.001	2.989	3.686	18.792
Sexual identities						
Heterosexual (Ref)	-	-	-	-	-	-
Lesbian	0.049	0.051	.344	-0.052	0.150	0.947
Bisexual	-0.103	0.055	.062	-0.211	0.005	-1.866
Age*	-0.070	0.051	.171	-0.171	0.030	-1.371
Relationship status†	-0.221	0.045	<.001	-0.310	-0.132	-4.873
Residential environment‡	0.082	0.043	.054	-0.001	0.166	1.932
Parenthood§	0.060	0.060	.323	-0.059	0.178	0.989
Employment status	-0.025	0.049	.602	-0.121	0.070	-0.522
Statistics for the linear regression						
R ²	0.025					
Adjusted R ²	0.020					
Standard Error	0.731					
F-statistic	4.869¶					

*0 = under 35 years; 1 = 36 years and above.
 †0 = single; 1= in a relationship.
 ‡0 = urban cities; 1 = rural communities under 20.000 inhabitants.
 §0 = no child; 1 = one or more children.
 ||0 = employed; 1 = not employed including students.
 ¶P < 0.001.

Annex 4. Linear Regression model with the score “Capability to enjoy sexual intercourse or masturbation during COVID-19 pandemic” as dependent variable

	Regression coefficient	Standard error	P-value	95%-confidence interval		
				Lower	Upper	t
Intercept	3.525	0.197	<.001	3.139	3.911	17.914
Sexual identities						
Heterosexual (Ref)	-	-	-	-	-	-
Lesbian	0.037	0.057	.514	-0.075	0.149	0.652
Bisexual	-0.214	0.061	<.001	-0.333	-0.094	-3.506
Age*	-0.157	0.057	.006	-0.268	-0.045	-2.764
Relationship status†	-0.023	0.050	.648	-0.121	0.076	-0.457
Residential environment‡	0.201	0.047	<.001	-0.108	0.293	4.254
Parenthood§	-0.058	0.067	.385	-0.189	0.073	-0.868
Employment status	-0.090	0.054	.095	-0.196	0.016	-1.671
Statistics for the linear regression						
R ²	0.034					
Adjusted R ²	0.029					
Standard Error	0.810					
F-statistic	6.735¶					

*0 = under 35 years; 1 = 36 years and above.
 †0 = single; 1= in a relationship.
 ‡0 = urban cities; 1 = rural communities under 20.000 inhabitants.
 §0 = no child; 1 = one or more children.
 ||0 = employed; 1 = not employed including students.
 ¶P < 0.001.

Annex 5. Linear Regression model with the score “General satisfaction with sexual life during COVID-19 pandemic” as dependent variable

	Regression coefficient	Standard error	P-value	95%-confidence interval		
				Lower	Upper	t
Intercept	2.250	0.265	<.001	1.730	2.770	8.488
Sexual identities						
Heterosexual (Ref)	-	-	-	-	-	-
Lesbian	-0.161	0.077	.037	-0.312	-0.10	-2.088
Bisexual	-0.021	0.082	.799	-0.182	0.140	-0.255
Age*	-0.221	0.076	.004	-0.371	-0.071	-2.894
Relationship status [†]	0.878	0.067	<.001	0.745	1.010	13.005
Residential environment [‡]	0.107	0.064	.094	-0.018	0.231	1.677
Parenthood [§]	-0.133	0.090	.140	-0.310	0.044	-1.478
Employment status	0.006	0.073	.935	-0.137	0.149	0.081
Statistics for the linear regression						
R ²	0.127					
Adjusted R ²	0.123					
Standard Error	1.089					
F-statistic	27.883 [¶]					

*O = under 35 years; 1 = 36 years and above.

†O = single; 1= in a relationship.

‡O = urban cities; 1 = rural communities under 20.000 inhabitants.

§O = no child; 1 = one or more children.

||O = employed; 1 = not employed including students.

¶P < .001.

Annex 6. Linear Regression model with the score “General satisfaction with relationship- or single-life during COVID-19 pandemic” as dependent variable

	Regression coefficient	Standard error	P-value	95%-confidence interval		
				Lower	Upper	t
Intercept	1.588	0.274	<.001	1.051	2.125	5.800
Sexual identities						
Heterosexual (Ref)	-	-	-	-	-	-
Lesbian	0.068	0.080	.396	-0.089	0.225	0.849
Bisexual	-0.054	0.085	.521	-0.220	0.112	-0.642
Age*	-0.105	0.079	.185	-0.260	0.050	-1.327
Relationship status [†]	1.288	0.070	<.001	1.151	1.425	18.443
Residential environment [‡]	0.043	0.066	.512	-0.086	0.172	0.656
Parenthood [§]	0.041	0.093	.657	-0.142	0.225	0.445
Employment status	0.038	0.075	.612	-0.110	0.186	0.507
Statistics for the linear regression						
R ²	0.213					
Adjusted R ²	0.209					
Standard Error	1.125					
F-statistic	51.809 [¶]					

*O = under 35 years; 1 = 36 years and above.

†O = single; 1= in a relationship.

‡O = urban cities; 1 = rural communities under 20.000 inhabitants.

§O = no child; 1 = one or more children.

||O = employed; 1 = not employed including students.

¶P < .001.

Annex 7. Frequency of masturbation and sexual intercourse before and since the COVID-19 pandemic

	All participants		Heterosexual women		Lesbian women		Bisexual Women	
	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 months before the pandemic n (%)	During the pandemic n (%)
Frequency of masturbation	M: 2.50 SD: 1.05 <i>P</i> = .018	M: 2.46 SD: 1.08	M: 2.43 SD: 1.04 <i>P</i> = .042	M: 2.39 SD: 1.10	M: 2.50 SD: 1.10 <i>P</i> = .800	M: 2.51 SD: 1.08	M: 2.77 SD: 1.02 <i>P</i> = .024	M: 2.66 SD: 0.99
Never (1)	219 (16.0)	256 (18.8)	150 (17.8)	182 (21.7)	55 (18.8)	56 (19.1)	14 (6.1)	18 (7.8)
Less than once a wk (2)	531 (38.9)	508 (37.3)	328 (39.0)	320 (38.1)	107 (36.5)	92 (31.4)	96 (41.6)	96 (41.7)
One to 3 times a wk (3)	397 (29.1)	392 (28.8)	257 (30.6)	213 (25.4)	75 (25.6)	102 (34.8)	65 (28.1)	77 (33.5)
Three to 5 times a wk (4)	143 (10.5)	124 (9.1)	60 (7.1)	75 (8.9)	41 (14.0)	25 (8.5)	42 (18.2)	24 (10.4)
More than 5 times a wk (5)	75 (5.5)	82 (6.0)	46 (5.5)	49 (5.8)	15 (5.1)	18 (6.1)	14 (6.1)	15 (6.5)
Frequency of sexual intercourse	M: 2.37 SD: 0.90 <i>P</i> = .034	M: 2.32 SD: 1.04	M: 2.46 SD: 0.93 <i>P</i> = < .001	M: 2.33 SD: 1.06	M: 2.18 SD: 0.80 <i>P</i> = .263	M: 2.22 SD: 0.85	M: 2.31 SD: 0.91 <i>P</i> = .166	M: 2.38 SD: 1.15
Never (1)	250 (18.3)	354 (26.0)	141 (16.7)	226 (27.0)	60 (20.5)	60 (20.5)	49 (21.2)	68 (29.4)
Less than once a wk (2)	480 (35.1)	411 (30.2)	269 (31.9)	229 (27.3)	133 (45.4)	125 (42.8)	78 (33.8)	57 (24.7)
One to 3 times a wk (3)	543 (39.7)	446 (32.8)	363 (43.0)	292 (27.3)	89 (30.4)	90 (30.8)	91 (39.4)	64 (27.7)
Three to 5 times a wk (4)	68 (5.0)	111 (8.2)	49 (5.8)	60 (7.2)	10 (3.4)	16 (5.5)	9 (3.9)	35 (15.2)
More than 5 times a wk (5)	27 (2.0)	39 (2.9)	22 (2.6)	31 (3.7)	1 (0.3)	1 (0.3)	4 (1.7)	7 (3.0)

Annex 8. Group comparison of sexual life and relationship characteristics: Before and since the COVID-19 pandemic

	All participants		Heterosexual women		Lesbian women		Bisexual Women	
	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 months before the pandemic n (%)	During the pandemic n (%)
Sexual arousal	M: 2.95 SD: 0.69	M: 2.98 SD: 0.74	M: 2.94 SD: 0.71	M: 2.99 SD: 0.75	M: 2.95 SD: 0.68	M: 3.04 SD: 0.69	M: 3.00 SD: 0.64	M: 2.91 SD: 0.76
	<i>P</i> = .057		<i>P</i> = .025		<i>P</i> = .012		<i>P</i> = .055	
I do not get excited at all (1)	12 (0.9)	15 (1.1)	8 (1)	9 (1.1)	2 (0.7)	3 (1)	2 (0.9)	3 (1.3)
I get excited with difficulty (2)	309 (22.7)	306 (22.5)	202 (24.2)	190 (22.6)	66 (22.5)	49 (16.7)	41 (17.8)	67 (29.3)
I get aroused quite easily (3)	790 (58.1)	756 (55.5)	475 (56.8)	467 (55.6)	173 (59)	180 (61.4)	142 (61.7)	109 (47.6)
I get aroused very easily (4)	231 (17)	255 (18.7)	137 (16.4)	152 (18.1)	49 (16.7)	55 (18.8)	45 (19.6)	48 (21)
No sex or masturbation (5)	17 (1.3)	30 (2.2)	14 (1.7)	22 (2.6)	3 (1)	6 (2)	0 (0.00)	2 (0.9)
Capability to enjoy sexual intercourse or masturbation	M: 3.34 SD: 0.77	M: 3.28 SD: 0.82	M: 3.32 SD: 0.77	M: 3.30 SD: 0.80	M: 3.35 SD: 0.81	M: 3.37 SD: 0.84	M: 3.36 SD: 0.75	M: 3.10 SD: 0.87
	<i>P</i> = .002		<i>P</i> = .420		<i>P</i> = .766		<i>P</i> < .001	
I never enjoy Sex (1)	6 (0.4)	5 (0.4)	2 (0.2)	1 (0.1)	1 (0.3)	2 (0.7)	3 (1.3)	2 (0.9)
I enjoy sex occasionally (2)	210 (15.4)	272 (20)	129 (15.4)	149 (17.7)	54 (18.4)	55 (18.8)	27 (11.7)	68 (29.6)
I enjoy sex often (3)	495 (36.3)	452 (33.2)	326 (38.8)	311 (37)	83 (28.3)	75 (25.7)	86 (37.2)	66 (28.7)
I always enjoy Sex (4)	626 (45.9)	599 (43.9)	363 (43.2)	354 (42.1)	150 (51.2)	153 (52.4)	113 (48.9)	92 (40)
No sex or masturbation (5)	27 (2)	35 (2.6)	20 (2.4)	26 (3.1)	5 (1.7)	7 (2.4)	2 (0.9)	2 (0.9)

Annex 9. General satisfaction with sexual life, relationship or single life before and since the COVID-19 pandemic

	All participants		Heterosexual women		Lesbian women		Bisexual Women	
	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 mo before the pandemic n (%)	During the pandemic n (%)	3-6 months before the pandemic n (%)	During the pandemic n (%)
General satisfaction with sexual life	M: 3.51 SD: 1.10	M: 3.36 SD: 1.16	M: 3.54 SD: 1.10	M: 3.41 SD: 1.16	M: 3.33 SD: 1.09	M: 3.26 SD: 1.28	M: 3.65 SD: 1.09	M: 3.30 SD: 1.01
	$P < .001$		$P < .001$		$P = .298$		$P < .001$	
No satisfaction at all (1)	68 (5)	96 (7.1)	37 (4.4)	54 (6.5)	22 (7.5)	30 (10.3)	9 (3.9)	12 (5.2)
Moderate satisfaction (2)	191 (14)	232 (17.1)	125 (14.9)	141 (16.9)	41 (14)	60 (20.7)	25 (10.8)	31 (13.5)
Average satisfaction (3)	336 (24.7)	356 (26.3)	191 (22.7)	204 (24.4)	84 (28.8)	62 (21.4)	61 (26.4)	90 (39.1)
Reasonable satisfaction (4)	511 (37.5)	431 (31.8)	322 (38.3)	280 (33.5)	110 (37.7)	80 (27.6)	79 (34.2)	71 (30.9)
Full satisfaction (5)	257 (18.9)	241 (17.8)	165 (19.6)	157 (18.8)	35 (12)	58 (20)	57 (24.7)	27 (11.3)
General satisfaction with relationship or single-life	M: 3.91 SD: 1.14	M: 3.80 SD: 1.26	M: 3.96 SD: 1.10	M: 3.82 SD: 1.25	M: 3.82 SD: 1.24	M: 3.92 SD: 1.29	M: 3.86 SD: 1.17	M: 3.61 SD: 1.26
	$P < .001$		$P < .001$		$P = .054$		$P < .001$	
No satisfaction at all (1)	79 (5.8)	120 (8.8)	37 (4.4)	71 (8.5)	27 (9.3)	27 (9.4)	15 (6.5)	22 (9.6)
Moderate satisfaction (2)	99 (7.3)	96 (7.1)	60 (7.1)	60 (7.2)	21 (7.2)	19 (6.6)	18 (7.8)	17 (7.4)
Average satisfaction (3)	182 (13.4)	233 (17.2)	120 (14.3)	142 (16.9)	29 (10)	32 (11.1)	33 (14.3)	59 (25.7)
Reasonable satisfaction (4)	503 (37)	390 (28.8)	306 (36.4)	246 (29.3)	113 (39)	82 (28.6)	84 (36.4)	62 (27)
Full satisfaction (5)	498 (36.6)	517 (38.1)	317 (37.7)	320 (38.1)	100 (34.5)	127 (44.3)	81 (35.1)	70 (30.4)