

Original Research

Association between Covid-19 vaccination, fear of COVID-19 and female sexual satisfaction among a sample of Lebanese women: A pilot study

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Received (first version): 20-Oct-2022

Accepted: 22-Nov-2022

Published online: 07-Jun-2023

Abstract

Objectives: Sexual satisfaction is a sign of a healthy sex life, and is associated with global well-being, personal, and interpersonal factors. No previous research studying the association of fear of COVID-19 and coronavirus vaccine with female sexual satisfaction has been found in Lebanon. The main objective of our study was to assess the association between COVID-19 vaccination, fear of COVID-19, and female sexual satisfaction. **Methods:** This was a cross-sectional study conducted between June 2021 and February 2022 using a sample of community dwelling participants. 239 Lebanese women aged 18 to 45, residing in Lebanon participated in the study. Due to the restrictions on gatherings and the risky side of face-to-face interviews, we created the survey on Google forms. The link was shared among the participants and sent to all governorates of Lebanon (Beirut, Mount Lebanon, North, South, and Bekaa) using the snowball technique. **Results:** After adjusting the correlations over all variables, being ever infected by COVID-19 did not show a significant correlation with the sexual satisfaction scale score. However, the intake of the COVID-19 vaccine was significantly associated with more contentment ($r=0.13$). Older age was significantly associated with less communication ($r=-0.12$) and less overall sexual satisfaction ($r=-0.12$), whereas being married was significantly associated with more contentment ($r=0.25$), communication ($r=0.20$), compatibility ($r=0.16$), relational concern ($r=0.28$), personal concern ($r=0.25$) and overall sexual satisfaction ($r=0.27$) scores. Higher household crowding index (lower socioeconomic status) was significantly associated with lower overall sexual satisfaction score ($r=-0.14$) and lower subscales scores (except contentment). Higher anxiety was significantly associated with lower relational concern ($r=-0.17$) and personal concern ($r=-0.16$) scores. **Conclusion:** Our study is the first that shows an association between COVID-19 vaccination and sexual satisfaction. Although correlation does not imply causation, further research on female sexuality in the Arab world is encouraged.

Keywords: COVID-19 vaccine; female; sexual satisfaction; Lebanon

INTRODUCTION

According to Shahhosseini et al.¹, sexual satisfaction has been defined as “having the positive and pleasurable sexual experiences such a good and positive feeling and have an excited orgasm”, highlighting the interpersonal and individual aspects of sexuality.² One of the contributors to high sexual satisfaction in women is sexual communication.³ Another factor in sexual satisfaction can be an ongoing global crisis, such as the coronavirus pandemic.⁴

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The recently discovered novel coronavirus (SARS-CoV-2) has become a major public health issue that triggered an ongoing crisis in all facets of universal life.⁵ COVID-19, the infectious respiratory disease that is caused by the coronavirus. More than 500 million individuals were infected with the virus by April 14, 2022 and more than 6.1 million were deceased due to COVID-19.⁶ Along with the concrete fear of death, social distancing, and lack of knowledge of the factors associated with the virus led to anxiety and isolation in the population.⁷ Various studies^{9,14-21} show the negative correlation between aspects of the coronavirus pandemic and sexual wellbeing. Accordingly, vaccination is thought to be the best way to slow down the transmission of the virus, decrease the number of deaths, and resume the usual lifestyle.⁸ How is vaccination associated with sexual behavior? COVID-19 vaccinated people can engage in sexual activity with each other safely.⁹ Considering the lack of data on the association between COVID-19 vaccine intake and sexual satisfaction, we will be referring to studies²⁶⁻²⁸ done on vaccination against other viruses, such as the Human Papillomavirus (HPV), which is known to be transmitted through sexual activity.¹⁰ According to some studies,²⁶⁻²⁸ no correlation exists between being vaccinated and sexual activity.

As sexual satisfaction contributes to overall wellbeing,² more sexual satisfaction was associated with less anxiety in teenagers and less depression in adults,¹² while anxiety and stress were shown to contribute to a decrease in sexual desire and arousal¹³ and an increase in pain during sex.¹⁴



No previous research studying the association of fear of COVID-19 and coronavirus vaccine with female sexual satisfaction has been found in Lebanon. One of the reasons is that Lebanon is one of the Middle-Eastern countries where sexuality is still a taboo.¹⁵ This is reflected in a study that revealed that only 8.8% of single Lebanese women had adequate awareness of sexual and reproductive health.¹⁶ Another motive for the conduction of this study is that 40.9% of a Lebanese sample refused to receive the vaccine.¹⁷ Therefore, the objective of this study was to examine the association between COVID-19 vaccination, fear of COVID-19, and sexual satisfaction among Lebanese women aged 18 to 45 years.

METHODS

Study design and participants

This was a cross-sectional study conducted among Lebanese women between June 2021 and February 2022 using a sample of community dwelling participants. Due to the restrictions on gatherings and the non-practical and risky side of face-to-face interviews, we created the survey on Google forms. The link was shared among the participants and sent to all governorates of Lebanon (Beirut, Mount Lebanon, North, South, and Bekaa) using the snowball technique. The questionnaire was shared on social media platforms (Facebook, LinkedIn, Instagram, and Twitter) and instant messaging applications (WhatsApp). Along with the link to the questionnaire was a message asking participants to share the questionnaire with their connections. Participants were not compensated for their participation, and their anonymity was guaranteed. The sample consisted of 239 Lebanese women aged 18 to 45, residing in Lebanon and willing to participate in the study. Based on previous studies,¹⁸⁻²¹ participants were excluded if they reported that they were pregnant, taking antidepressants or anxiolytics medication, had reproductive health problems, or refused to participate in the study.

Questionnaire and variables

The Arabic self-administered questionnaire with closed-ended questions was anonymous; the questionnaire required approximately 20 min to be completed. The questionnaire consisted of different sections. The forward and backward translation method was applied to the Sexual Satisfaction Scale for Women (SSS-W).²² The English version of the SSS-W was translated to Arabic by a Lebanese translator who was completely unrelated to the study. Afterwards, a Lebanese psychologist with a full working proficiency in English, translated the Arabic version of the SSS-W back to English. The initial English version and the second English version were compared to detect and later eliminate any inconsistencies.

The first section included the demographic questions such as age, educational level, marital status, household crowding index (reflecting the socioeconomic status of the family, and was calculated by dividing the number of persons in the house by the number of rooms in the house excluding the bathrooms and kitchen),²³ whether the participant was or had been infected with COVID-19, and whether the participant had been vaccinated against COVID-19.

The second part of the questionnaire included the following scales: *Sexual Satisfaction Scale for Women (SSS-W)* was developed in 2005 by Meston (22) from the University of Texas in the USA, and Trapnell from the University of Winnipeg in Canada. The SSS-W is a brief 30-item measure of sexual satisfaction and sexual distress, composed of five domains: sexual contentment (e.g., "I feel content with the way my present sex life is"), communication (e.g., "I usually feel completely comfortable discussing sex whenever my partner wants to"), compatibility (e.g., "I often feel that my partner and I are not sexually compatible enough"), relational concern (e.g., "I'm worried that my partner is sexually unfulfilled"), and personal sexual concern (e.g., "My sexual difficulties are frustrating to me"). Respondents rate their level of agreement/disagreement on a 5-point Likert scale. Individual domain scores are computed by adding the scores of the individual items that comprise the domain. The total score is calculated by adding the scores of the five individual domains. Higher values indicate greater sexual satisfaction.²²

Fear of COVID-19 Scale (FCV-19S) created by Ahorsu et al. in 2020, and validated in Arabic by Alyami et al.,²⁴ measures the severity of one's fear of being infected with COVID-19. Seven items are scored from 1 (Strongly disagree) to 5 (Strongly agree), with higher scores indicating greater levels of fear of COVID-19.²⁵

Patient Health Questionnaire (PHQ-9) was developed in 2001 by Kroenke et al.²⁶ and validated in Arabic.⁶² The PHQ-9 is a self-report, 9-item tool used to detect depressive symptoms and suicidality. The total score is obtained by adding each item's score, for which the minimum is 0 and the maximum is 3 (except for item 5 for which the minimum score is 1). Higher scores indicate more severe depressive symptoms.

Lebanese Anxiety Scale (LAS-10) is a 10-item scale that measures anxiety in the Lebanese population.^{28,61} The total score is obtained by adding each item's score. Higher scores indicate higher anxiety levels.

Beirut Distress Scale 10 (BDS-10) is a 10-item assessment tool that measures psychological distress in the Lebanese population.²⁹ The total score is obtained by adding each item's score, for which the minimum is 0 and the maximum is 3. Higher scores indicate higher distress.

Ethical consideration: The Psychiatric Hospital of the Cross, the largest psychiatric hospital in Lebanon (Mount-Lebanon Governorate), ethics committee approved the study protocol (HPC-011-2021). A written informed consent was obtained from each participant; submitting the form online was considered equivalent to obtaining that consent.

Statistical analysis

Data analysis was conducted using the Statistical Package for the Social Sciences, version 25.0, SPSS Inc, Chicago, Illinois, USA (SPSS). The Cronbach's alpha values were calculated for all scales and subscales. The normality of distribution of the sexual satisfaction scale and subscales scores were confirmed via a calculation of the skewness and kurtosis; values for asymmetry and kurtosis between -2 and +2 are considered acceptable to prove normal univariate distribution.³⁰ Pearson



correlations were assessed between the sexual satisfaction scale and subscales scores and all other variables. Partial correlations were evaluated between the sexual satisfaction scale and subscales scores and being infected with COVID-19, the intake of the COVID-19 vaccine, depression, anxiety and stress, while controlling for the sociodemographic variables. In addition, partial correlations were chosen as regression models for multiple purposes. First, Pearson and partial correlation can be compared in an easier way, as the two of them align between -1 to +1. Second, regression coefficients and partial correlations both generate the exact inferential results because they have equal p-values. In psychological analysis, correlations of 0.1, 0.2 and 0.3 were considered as having a small, medium and large effect sizes, respectively (31). Significance is considered with a p-value <0.05.

RESULTS

The Cronbach's alpha values were as follows: contentment (0.89), communication (0.87), compatibility (0.94), relational concern (0.93), personal concern (0.96), sexual satisfaction (0.96), fear of COVID-19 (0.90), financial wellbeing (0.95), depression (0.89), stress (0.89), and anxiety (0.92).

A total of 239 women participated in this study. The majority (92.5%) had a university level of education, 40.6% had been infected by COVID-19, and 79.5% took the COVID-19 vaccine. Other characteristics of the sample are summarized in Table 1.

Table 2 summarizes the correlations between the sexual satisfaction scale and subscales scores. All scores were highly and significantly correlated to each other.

Numbers in bold indicate significant correlations ($p < 0.05$); r =Pearson correlation coefficients obtained from the Pearson test.

Zero order and partial correlations between variables

In the zero-order analysis, fear of COVID-19 was significantly associated with lower contentment ($r = -0.14$), relational concern ($r = -0.12$) and personal concern ($r = -0.12$) scores.

After adjusting the correlations over all variables, being ever infected by COVID-19 did not show a significant correlation with the sexual satisfaction scale score or any of the subscales scores. However, the intake of the COVID-19 vaccine was significantly

	N (%)
Education	
Secondary or less	18 (7.5%)
University	221 (92.5%)
Marital status	
Single / divorced / widowed	92 (38.5%)
Married	147 (61.5%)
Ever infected by COVID-19 (yes)	97 (40.6%)
COVID-19 vaccine intake (yes)	190 (79.5%)
	Mean \pm SD
Age (in years)	31.16 \pm 7.88
Household crowding index	0.98 \pm 0.43
Depression	11.69 \pm 6.03
Anxiety	16.51 \pm 9.24
Stress	11.75 \pm 7.32
Financial burden	37.90 \pm 18.52
Fear of COVID-19	15.61 \pm 7.05
Contentment	22.69 \pm 5.83
Communication	23.92 \pm 5.45
Compatibility	24.56 \pm 5.77
Concern relational	24.80 \pm 6.01
Concern personal	25.91 \pm 6.06
Sexual satisfaction total score	96.53 \pm 19.04

associated with more contentment ($r = 0.13$). Older age was significantly associated with less communication ($r = -0.12$) and less overall sexual satisfaction ($r = -0.12$), whereas being married was significantly associated with more contentment ($r = 0.25$), communication ($r = 0.20$), compatibility ($r = 0.16$), relational concern ($r = 0.28$), personal concern ($r = 0.25$) and overall sexual satisfaction ($r = 0.27$) scores. Higher household crowding index (lower socioeconomic status) was significantly associated with lower overall sexual satisfaction score ($r = -0.14$) and lower subscales scores (except contentment). Higher anxiety was significantly associated with lower relational concern ($r = -0.17$) and personal concern ($r = -0.16$) scores (Table 3).

Table 2. Correlation between the sexual satisfaction scale and subscales scores

	Contentment	Communication	Compatibility	Relational concern	Personal concern	Sexual satisfaction
Contentment	1					
Communication	$r = 0.64$	1				
Compatibility	$r = 0.66$	$r = 0.67$	1			
Relational concern	$r = 0.52$	$r = 0.42$	$r = 0.61$	1		
Personal concern	$r = 0.57$	$r = 0.44$	$r = 0.64$	$r = 0.82$	1	
Sexual satisfaction	$r = 0.86$	$r = 0.82$	$r = 0.89$	$r = 0.75$	$r = 0.78$	1

Numbers in bold indicate significant correlations ($p < 0.05$); r =Pearson correlation coefficients obtained from the Pearson test.



DISCUSSION

COVID-19 infection and sexual satisfaction

Being infected with coronavirus was not associated with sexual satisfaction in our study. According to Kaya et al.,³² women's sexual satisfaction decreased after getting COVID-19 and treated and discharged. We hypothesize that the absence of correlation between these two variables in our study could be due to the majority of the sample being vaccinated, which could have moderated the correlation between COVID-19 infection and sexual satisfaction.

Vaccine intake and sexual satisfaction

Results of our study showed that the intake of the COVID-19 vaccine was associated with more sexual contentment. It is worth mentioning that this is the first study to investigate this association. According to prior studies,^{14-16,19} sexual desire³³ and sexual satisfaction³⁴ decreased during the pandemic. In addition, sexual activity decreased out of transmitting or getting infected with COVID-19.^{35,36} The results could be explained by people feeling less troubled and less endangered by the risks of the pandemic after vaccination,^{37,38} and that allowing them to thrive sexually.

Fear of COVID-19 and sexual satisfaction

Fear of COVID-19 was not associated with any of the sexual satisfaction subscales.

Previous studies have shown an association between fear of COVID-19, a decrease in sexual activity and avoidance of sexual intimacy in Turkey,^{35,36} unlike our study. This might be

explained by the presence of bigger stressors in Lebanon such as the ongoing economic crisis and anxiety levels.³⁹ Furthermore, Rodrigues and Lhemiller⁴⁰ found that changes caused by COVID-19 were associated with higher sexual desire in individuals with higher fear of COVID-19.

Anxiety and sexual satisfaction

Higher anxiety was significantly associated with lower relational concern and personal concern scores, signaling less sexual satisfaction, and corroborating findings from several other studies.^{12,13,41}

Age and sexual satisfaction

In line with other studies,^{42,43} older age was significantly associated with less communication and less overall sexual satisfaction. This could be attributed to various factors (e.g. the death of a long-term spouse, hormonal changes) affecting self-esteem and responsiveness,⁴⁴⁻⁴⁶ or an increase in vaginal dryness.⁴⁷

However, the results challenge Forbes et al.⁴⁹ where sexual quality of life increases with age when taking into account other factors such as perceived control over the sexual aspects of life, thought and effort invested in the sexual aspects of life, frequency of sex, and number of sexual partners in the past year.

Marital status and sexual satisfaction

Being married was significantly associated with all subscales and overall sexual satisfaction scores, confirming previous studies.⁵⁰⁻⁵² This could be explained by considering that in

Table 3. Zero order and partial correlations between variables

	Ever infected by COVID	COVID vaccine intake	Age	Education	Marital status	HCI	Depression	Anxiety	Stress	Fear of COVID	Financial burden
Contentment											
Zero order	r=0.11	r=0.02	r=0.04	r=0.05	r=0.27	r=-0.11	r=-0.24	r=-0.27	r=-0.27	r=-0.14	r=0.07
Partial	r=0.05	r=0.13	r=-0.11	r=0.02	r=0.25	r=-0.04	r=0.002	r=-0.09	r=-0.07	r=-0.07	r=-0.04
Communication											
Zero order	r=-0.08	r=0.02	r=0.01	r=0.06	r=0.21	r=-0.18	r=-0.17	r=-0.17	r=-0.20	r=0.02	r=0.02
Partial	r=-0.03	r=0.03	r=-0.12	r=0.03	r=0.20	r=-0.13	r=-0.03	r=-0.01	r=-0.09	r=0.07	r=-0.06
Compatibility											
Zero order	r=-0.03	r=0.04	r=0.001	r=0.12	r=0.18	r=-0.18	r=-0.17	r=-0.23	r=-0.23	r=-0.11	r=0.02
Partial	r=-0.02	r=0.06	r=-0.10	r=0.09	r=0.16	r=-0.15	r=0.05	r=-0.09	r=-0.09	r=-0.06	r=-0.11
Relational concern											
Zero order	r=-0.01	r=-0.01	r=0.11	r=0.10	r=0.33	r=-0.21	r=-0.20	r=-0.29	r=-0.22	r=-0.12	r=0.11
Partial	r=0.02	r=0.03	r=-0.04	r=0.09	r=0.28	r=-0.13	r=0.07	r=-0.17	r=0.001	r=-0.04	r=0.01
Personal concern											
Zero order	r=0.01	r=0.002	r=0.04	r=0.06	r=0.27	r=-0.21	r=-0.20	r=-0.27	r=-0.21	r=-0.12	r=0.08
Partial	r=0.03	r=0.04	r=-0.10	r=0.03	r=0.25	r=-0.15	r=0.03	r=-0.16	r=0.01	r=-0.04	r=-0.04
Sexual satisfaction											
Zero order	r=0.01	r=0.05	r=0.04	r=0.09	r=0.29	r=-0.21	r=-0.23	r=-0.29	r=-0.27	r=-0.11	r=0.06
Partial	r=-0.04	r=0.08	r=-0.12	r=0.06	r=0.27	r=-0.14	r=0.02	r=-0.11	r=-0.07	r=-0.03	r=-0.07



married couples, sexual experience, mutual understanding, and intimacy increase with time.⁵³ Moreover, one's sexual satisfaction seems to be entangled with one's spouse's behavior, as married partners felt more emotionally and sexually intimate when they felt that communication in their couple was healthy.⁵⁴

HCI and sexual satisfaction

Higher household crowding index (lower socioeconomic status) was significantly associated with lower overall sexual satisfaction, in accordance with other studies.⁵⁵⁻⁵⁷ This could be justified by Ahmadi et al.'s findings⁵⁸ that women with low to no income have trouble finding themselves sexually appealing which leads them to have sex less frequently, and to feel less satisfaction. However, financial independence, according to Yoo et al.⁵⁴ and Coskun and co-authors,⁵⁹ is a contributor to higher self-esteem, which is positively associated with sexual satisfaction.

Clinical implications

Based on our results, vaccination campaigns and health professionals might be able to decrease vaccine hesitancy by presenting the evidence that vaccination is associated with higher sexual contentment in women.

Moreover, these findings can be used by couple and sex therapists to help women with low sexual satisfaction and their partners pinpoint factors associated with their sexual issues.

Limitations and Strengths

This study has multiple limitations. First, the Arabic versions of the FCV-19S and the SSS-W were not validated in Lebanon. Second, the answers were self-reported, so the participants could have misunderstood questions from the survey or answered inaccurately. Third, snowball sampling could have compromised the generalizability of the sample. Fourth, the sample size was relatively small and not representative of all Lebanese women. Additionally, the majority of the sample had a university educational level and around 80% were vaccinated against COVID-19. Furthermore, residual confounding bias is also possible since not all factors associated with female sexual satisfaction were taken into consideration in this study. In addition, given the fact that it is a cross sectional study, we cannot assess a true causal relationship between fear of COVID-19, vaccination, and female sexual satisfaction. Moreover, accumulating responsibilities (e.g. parenting, work, and community duties)^{53,54} could have been residual confounding bias.

Nevertheless, this study has several strengths: (1) it is the first

study that studies and shows an association between COVID-19 vaccination and sexual satisfaction, (2) our findings are in line with previous research, (3) they add data to the literature, and (4) they have useful clinical implications to the mental and physical health sectors.

CONCLUSION

The results showed that COVID-19 vaccine intake was associated with more sexual contentment in our sample, and anxiety associated with more relational and personal concern. The results might allow health professionals to help women and their partners identify factors associated with their sexual difficulties and use the appropriate treatment methods. Moreover, vaccination campaigns might use these findings to raise awareness about the vaccine and to combat vaccine hesitancy in the Lebanese population.

Future researchers might consider studying a different age category, using instruments that are validated in Lebanon, and using a longitudinal study design to discover long term effects of COVID-19 vaccination and fear of COVID-19 on female sexual satisfaction.

DECLARATIONS

Ethical approval and consent to participate: The Psychiatric Hospital of the Cross-ethics committee approved the study protocol (HPC-011-2021). A written informed consent was obtained from each participant; submitting the form online was considered equivalent to obtaining that consent.

Consent to publish: Not applicable.

Availability of data and materials: The authors do not have the right to share any data information as per their institutions policies.

Competing interests: The authors have no conflicts of interest to report.

Funding: None.

Disclosure statement: The authors have nothing to disclose.

Authors' contributions: BH and SO designed the study; BH drafted the manuscript; SH carried out the analysis and interpreted the results; DM, SH, and SO assisted in writing; all authors reviewed the final manuscript and gave their consent.

Acknowledgments: We would like to thank all participants who helped us during this project.

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