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Unveiling the Impact of COVID-19 Pandemic: Sexual Function and Satisfaction Dynamics of Married Women in West of Iran

Parnia Bagheri[1], MSc;
Sanaz Zangeneh[2], PhD;
Parisa Janjani[3], PhD;
Nader Rajabi-Gilan[4], MSc;
Mostafa Dianati-Nasab[5], PhD;
Yahya Salimi[1], PhD

[1]Department of Epidemiology, School of Public Health, Kermanshah University of Medical Sciences, Kermanshah, Iran
[2]Student Research Committee, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran
[3]Cardiovascular Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran
[4]Social Development and Health Promotion Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran
[5]Department of Complex Genetics and Epidemiology, School of Nutrition and Translational Research in Metabolism, Maastricht University, Maastricht, Netherlands

Correspondence:
Yahya Salimi, PhD;
Department of Epidemiology, School of Public Health, Kermanshah University of Medical Sciences, Postal code: 67198-51351, Kermanshah, Iran
Tel: +98 83 38262052
Email: yahya.salimi@kums.ac.ir
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Abstract

Background: The COVID-19 pandemic has caused a threat to global public health. The sexual function and satisfaction of couples during the COVID-19 pandemic have received comparatively less attention. This study aimed to assess sexual satisfaction and sexual function and their related factors among married women in the west of Iran during the COVID-19 pandemic.

Methods: A cross-sectional study was conducted among 390 married women in Kermanshah province in 2021. For data collection, a checklist consisting of demographic variables along with Larson's sexual satisfaction questionnaire and the 6-item Female Sexual Function Index were utilized. To investigate the relationship between function and sexual satisfaction, we used a hierarchical linear regression.

Results: The means (SD) of sexual satisfaction and sexual function scores were 83.25 (40.59) and 19.33 (9.82), respectively. A significant relationship was observed between sexual satisfaction and the women's occupation status, traditional marriage status, tubal ligation, a history of chronic diseases, alcohol use, the history of sexual violence, changes in sexual behavior during COVID-19, and total sexual function score. Also, the women's age, male condom use, oral contraceptive pill use, changes in sexual behavior during COVID-19, and total sexual satisfaction score associated with the sexual function of women.

Conclusion: These findings showed that during the COVID-19 pandemic, married women reported moderate sexual satisfaction and sexual dysfunction. Additionally, the results of this study could help to develop a plan to improve the sexual lives and health of women in sudden events.

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Introduction

The COVID-19 pandemic, a contagious disease, not only poses a threat to the physical health of communities and, in some cases, leads to fatalities, but also induces significant psychological stress due to the confusion and uncertainty it brings.[1] Within the context of the pandemic, heightened stress levels can impact sexual interactions among couples, affecting both sexual function and satisfaction in two main dimensions: sexual health and behaviors.[2] Changes in personal, interpersonal, and social relationships can significantly influence the quality of sexual intercourse and behaviors among couples.[3]

Sexual satisfaction plays a crucial role in preventing sexual disorders, particularly in women.[4, 5] It is considered an essential component of sexual health,

a fundamental sexual right, and an outcome of sexual well-being.[6] On the other hand, sexual function encompasses the ease with which an individual progresses through the stages of sexual response (desire, arousal, and orgasm), along with subjective feelings of satisfaction and pleasure during both partnered and solo sexual activities.[7] It holds a key position in the health and overall well-being of women.[8] Research indicates that the frequency of sexual activity and the occurrence of orgasms in each sexual encounter are closely linked to satisfaction in sexual relationships.[9, 10] Unsatisfactory sexual experiences within marital relationships can lead to feelings of deprivation, failure, and insecurity.[4, 5] A successful marriage often hinges on the satisfaction of both partners with their sexual interactions.[11] Prior studies have pointed out the impact of sudden events, such as the Wenchuan earthquake, in diminishing reproductive health, reducing the frequency of sexual intercourse, desire for pregnancy, and levels of satisfaction in sexual function and relationships.[12] Findings from various countries show that the COVID-19 pandemic has considerably influenced women's sexual lives. The result of a study in Turkey showed that sexual function in women decreased during the COVID-19 pandemic.[13] In addition, in a study in China, 43.3% of participants reported a decrease in sexual frequency during the COVID-19 pandemic.[14] About 33% of participants in a study in France reported a decrease in the frequency of sexual activity and sexual satisfaction in this pandemic.[15] The evidence in this field in Iran is limited. The results of a study in Iran on married women showed that sexual dysfunction impacted quality of life and was related to lower marital satisfaction.[16] Another study showed that pregnant and lactating women presented higher sexual dysfunction compared to non-pregnant and non-lactating women.[17]

Social reactions to the disease, including local or national restrictions that sometimes result in the closure of essential health services, are expected to affect sexual and reproductive health.[2, 18] Several studies have explored the psychosocial responses of the general population to the pandemic, encompassing anxiety, fear, depression, anger, guilt, pain, loss, post-traumatic stress, and disease-induced stigma.[19-21] Despite the growing body of evidence on the psychological implications of the COVID-19 pandemic, limited attention has been given to the impact on sexual function and satisfaction among couples in Iran. Given this gap in research, our study aimed to assess sexual function, sexual satisfaction, and their associated factors among married women in Kermanshah Province, located in Western Iran during the ongoing COVID-19 pandemic. By addressing the research gaps in this field, we aimed to identify influential factors that could pave the way for effective interventions to enhance sexual function and satisfaction during these challenging times.

Methods

This study received the ethics committee approval from the Research Ethics Committee of Kermanshah University of Medical Sciences (IR.KUMS.REC.1399.1104). The present cross-sectional study was conducted on 426 married women in Kermanshah province, in the west of Iran. Due to the emergence of the COVID-19 pandemic, the Iranian government provided public recommendations, including reducing face-to-face interactions, staying at home, and following social distancing guidelines. As a result, data were collected via an electronic survey in March and April 2021; the questionnaire was designed on an online survey platform;[22] the link to the questionnaire was sent to the respondents via social media, including Telegram, WhatsApp, and Instagram; and duplicate respondents were controlled. To increase the accuracy of collecting data, first, we identified the regional and local channels of the province (such as the channel/groups of women and family affairs, sewing, cooking, music, handicrafts, etc.); these channels had a total of 4185 members, and after consulting with the channel admins, the link to the questionnaire was provided to women who subscribed to these groups or channels. The admins were asked to post this link on their channels at 24-hour intervals. An electronic informed consent was obtained from all the participants anonymously before registration. After receiving information about the study, the participants had the option to participate or not by responding to a question indicating their willingness to do so. Only those participants who selected "yes" were led to the survey page.

The sample size was estimated to be 380 using the following formula by considering a confidence interval of 95%, d value 5%, $Z_{\alpha/2}$ of 1.96, and a p value of 45%:[23]

$$n = \frac{(z_{1-\alpha/2})^2 * p(1-p)}{d^2}$$

Inclusion criteria for this study were being married women, being residents of Kermanshah province at the time of the pandemic, being literate, not having a history of mental disorders, not having a history of paraphilic disorders, and being over the age of 18. Because mental disorders and sexual disorders have such an essential role in sexual function and satisfaction, we excluded 22 participants with mental disorders and 14 participants with paraphilic disorders from the study and did not analyze them. Finally, the data of 390 participants were analyzed.

Measures

For data collection, a checklist consisting of demographic variables along with Larson's sexual

satisfaction questionnaire,[24] and the 6-item Female Sexual Function Index (FSFI-6) were utilized.[25]

Use of Drugs and Alcohol Throughout One's Life

We collected data on lifetime drug use by asking the question: "Have you regularly used any type of drug (including opium derivatives, cannabis, stimulants, and psychotropic substances) at least once a month for 6 months during your lifetime?" and women's lifetime alcohol use by asking the question, "Have you regularly used alcohol at least once a month for 6 months during your lifetime?" Similar questions were asked about their husbands' lifetime drug and alcohol use.[26]

A History of Chronic Diseases, Mental Disorders, and Paraphilic Disorders

The data on the history of chronic diseases, mental disorders, and paraphilic disorders were collected by asking three yes/no questions: "Do you have a history of specific chronic diseases such as cardiovascular diseases, hypertension, diabetes, organ transplants, chronic kidney diseases, hepatitis, etc.?", "Do you have a history of certain mental disorder such as depression, mania, bipolar disorders, obsessive-compulsive disorder, extreme panic or fear, psychiatric disorders, etc. with a physician's diagnosis?",[27] and "Do you have a history of paraphilic disorders like voyeuristic disorder, exhibitionistic disorder, frotteuristic disorder, sexual masochism disorder, sexual sadism disorder, pedophilic disorder, fetishistic disorder, and transvestic disorder, and so on, with a physician's diagnosis?".[28]

Subjective Socioeconomic Status

To evaluate the subjective socioeconomic status (SES) of the study participants, we used the MacArthur Scale.[29]

Changes in Sexual Behavior During COVID-19

The participants were asked two yes-or-no questions about changes in sexual behavior during the COVID-19 pandemic: "Have your sexual encounters with your husband changed in general since the COVID-19 pandemic?" and "Has the frequency of your sexual intercourse changed?" If they said yes, we asked how it had changed and gave them three options: no sex, decrease, and increase.

Sexual Violence

We asked three yes-or-no questions to collect data on sexual violence: "Do you get harmed during sexual intercourse?", "Is your sexual intercourse violent?", and "Do you experience severe pain during sexual intercourse because of your spouse's violence?". If they answered yes to at least one of the three questions about sexual violence, they were classified as a sexual violence variable.[30]

Sexual Function and Satisfaction

To assess sexual function, we used the Female Sexual Function Index-6 (FSFI-6). The scoring of this questionnaire is based on a 0–5 scale for all domains, including sexual desire, sexual arousal, lubrication, sexual satisfaction, orgasm, and pain during sexual intercourse (dyspareunia). The lowest score is 2, the highest score is 30, and a score below 26.55 is considered a sexual dysfunction.[25] The validity and reliability of the questionnaire were confirmed in Iranian culture by Ghasami et al. (2014).[31] Also, to evaluate women's sexual satisfaction, we applied Larson's sexual satisfaction questionnaire. This questionnaire consists of 25 questions (13 negative questions and 12 positive questions), and the responses are based on a 5-point Likert scale. Scores of less than 50 show no sexual dissatisfaction, scores of 51-75 low sexual satisfaction, scores of 76-100 moderate sexual satisfaction, and scores over 100 show high sexual satisfaction.[24] Bahrami et al. (2016) also confirmed the validity and reliability of the Sexual Satisfaction Questionnaire in Iranian culture.[32]

It is necessary to point out that it is stated in the questionnaires that these questions are about sexual feelings and responses over the past four weeks, and given that Iran was involved in the COVID-19 lockdown period at that time, the results of sexual satisfaction and sexual function can be affected by pandemic conditions.

Statistical Analysis

For quantitative and qualitative variables, the data were described using mean (standard deviation) and/or number (percentage). General characteristics of the study participants were compared between the low and high ranges of sexual satisfaction and sexual function using an independent samples t-test for continuous variables, and analysis of variance (ANOVA) or Chi-square for categorical variables. Hierarchical linear regression was conducted separately to investigate the related factors of function and sexual satisfaction. Model 1 includes demographic variables such as women's age, education, and occupation, husbands' occupation, type of marriage, the duration of the current marriage, the number of children, the types of contraception methods, and the history of chronic diseases. In model 2, in addition to the variables of model 1, the subjective SES and histories of drug and alcohol use by women and their husbands were entered. In model 3, the variable of the history of sexual violence was added to the previous variables in model 2. Finally, in model 4, changes in sexual behavior during COVID-19, total sexual satisfaction score, or total FSFI score were entered into the variables of model 3. All analyses were performed in Stata software version 12, and the significance level was set at 0.05.

Ethical Consideration

The protocol of the study was approved by The Research Ethics Board of the Deputy of Research in the KUMS (IR.KUMS.REC.1399.1104). Also, informed consent was obtained from all participants.

Results

Based on the analysis of available data of 390 married women participating in the study who lived with their husbands, the mean (SD) age of the women was 33.32 (7.27) years, and the mean age of their husbands was 36.30 (8.03) years. Nearly 63% of the participants had higher education. Seventy-three percent of the husbands had a higher education, and 38.73% were employees. About 45% of the couples used male condoms as a method of contraception, followed by withdrawal methods (19.48%) and oral contraceptives (14.08%), respectively. Almost 57% of the participants were housewives, and 42.72% were employed. The frequency of the history of chronic and mental disorder was 15.26% and 5.16%, respectively. Demographic characteristics of the participants based on sexual satisfaction and sexual function are shown in Table 1.

Of 390 participants, 66.43% reported that their sexual relationships had not changed during the COVID-19 pandemic, and 33.57% reported changes in their sexual intercourse. In addition, 60.56% reported that their number of sexual encounters remained constant, while 39.44% reported a change in their relationships. During the pandemic, 59.52% reported fewer sexual intercourses, 32.74% reported an increase in sexual intercourses, and 7.74% reported no sexual intercourses. The mean (SD) of sexual satisfaction and sexual function scores was 83.25 (40.59) and 19.33 (9.82), respectively.

Table 2 shows the results of hierarchical linear regression for the factors related to women's sexual satisfaction. The results of the final model showed that there was a significant association between sexual satisfaction and women's occupation status (β=2.68, 95% CI: 0.26, 5.09), participants who had a traditional marriage without their consent (β=-6.50, 95% CI: -12.36, -0.65) in contrast to those who had a romantic marriage, tubal ligation (β=6.54, 95% CI:1.23, 11.84) compared to withdrawal methods, a history of chronic diseases (β=-4.47,95% CI: -7.75, -1.19), alcohol use by women (β=-15.21, 95% CI: -29.09, -1.32), history of sexual violence (β=-10.12, 95% CI: -18.65, -1.59), changes in sexual behavior during COVID-19 (β=-5.26· 95% CI: -7.47, -3.06), and total sexual function (β=2.21, 95% CI: 1.94, 2.47). According to the results of hierarchical linear regression, model 4 explained 72% of the sexual satisfaction variable.

Table 1: Demographic features of the study participants based on sexual satisfaction and sexual function (n=390)

Characteristics	Mean (SD) or number (%)						
	Total sample	Sexual satisfaction			Sexual function		
		Low	High	Pvalue	Low	High	Pvalue
Subjective socioeconomic status (SES):							
Poor	84 (21.54%)	9 (20.93%)	75 (21.61%)	0.93[a]	59 (22.52%)	25 (19.53%)	0.94[a]
Medium	149 (38.21%)	16 (37.21 %)	133 (38.33%)		98 (37.40%)	51 (39.84%)	
Rich	157 (40.26%)	18 (41.86%)	139 (40.06%)		105 (40.08%)	52 (40.63%)	
Women's Age	33.50 (7.16)	39.67 (6.54)	32.74 (6.87)	<0.001[b]	35.46 (7.14)	29.49 (5.32)	<0.001[b]
Husband's Age	36.43 (7.99)	43.55 (8.84)	35.55 (7.43)	<0.001[b]	38.72 (8.04)	31.74 (5.45)	<0.001[b]
Number of children	1.16 (1.31)	2.32 (1.58)	1.02 (1.21)	<0.001[b]	1.48 (1.40)	0.51 (0.79)	<0.001[b]
Women's Education:							
Elementary	5 (1.28%)	4 (9.30%)	1 (0.29%)	<0.001[a]	5 (1.91%)	-	0.004[a]
Junior high school	39 (10%)	11 (25.58%)	28 (8.07%)		35 (13.36%)	4 (3.13%)	
High school	100 (25.64%)	14 (32.56%)	86 (24.78%)		71 (27.10%)	29 (22.66%)	
Educated	246 (63.08%)	14 (32.56%)	232 (66.86%)		151 (57.63%)	95 (74.22%)	
Husband's Education							
Elementary	7 (1.79%)	5 (11.63%)	2 (0.58%)	<0.001[a]	6 (2.29%)	1 (0.78%)	0.49[a]
Junior high school	26 (6.67%)	9 (20.93%)	17 (4.90%)		20 (7.63%)	6 (4.69%)	
High school	72 (18.46%)	10 (23.26%)	62 (17.78%)		55 (20.99%)	17 (13.28%)	
Educated	285 (73.08%)	19 (44.19%)	266 (76.66%)		181 (69.08%)	104 (81.25%)	
Women's occupation:							
Housewife	233 (57.18%)	35 (81.40%)	188 (54.18%)	0.001[c]	156 (59.54%)	67 (52.34%)	0.17[c]
Employed	167 (42.82%)	8 (18.60%)	159 (45.82%)		106 (40.46%)	61 (457.66%)	
Husband's Occupation:							
Government employee	149 (38.21%)	13 (30.23%)	136 (39.19%)	<0.001[a]	92 (35.11%)	57 (44.53%)	0.02[a]
Handworker	26 (6.67%)	7 (16.28%)	19 (5.48%)		23 (8.78%)	3 (2.34%)	
Shopkeeper	107 (27.44%)	8 (18.60%)	99 (28.53%)		65 (24.81%)	42 (32.81%)	
Crier	15 (3.85%)	4 (9.30%)	11 (3.17%)		14 (5.34%)	1 (0.78%)	
Military	59 (15.13%)	4 (9.30%)	55 (15.85%)		39 (14.89%)	20 (15.63%)	
Retired	24 (6.15%)	5 (11.63%)	19 (5.48%)		24 (9.16%)	-	
Unemployed	10 (2.56%)	2 (4.65%)	8 (2.31%)		5 (1.91%)	5 (3.91%)	

Characteristics	Mean (SD) or number (%)						
	Total sample	Sexual satisfaction			Sexual function		
		Low	High	Pvalue	Low	High	Pvalue
Forms of marriage:							
Romantic	176 (45.13%)	4 (9.30%)	172 (49.57%)	0.02[a]	77 (29.39%)	99 (77.34%)	<0.001[a]
Traditional with consent	199 (51.03%)	31 (72.09%)	168 (48.41%)		172 (65.65%)	27 (21.09%)	
Traditional without consent	15 (3.85%)	8 (18.60%)	7 (2.02%)		13 (4.96%)	2 (1.56%)	
Duration of current marriage:							
<1	52 (13.33%)	-	52 (14.99%)	<0.001[a]	15 (5.73%)	37 (28.91%)	<0.001[a]
1-5	156 (40%)	10 (23.26%)	146 (42.07%)		97 (37.02%)	59 (46.09%)	
5-10	82 (21.03%)	8 (18.60%)	74 (21.33%)		60 (22.90%)	22 (17.19%)	
>10	100 (25.64%)	25 (58.14%)	75 (21.61%)		90 (34.35%)	10 (7.81%)	
Contraception:							
Withdrawal methods	75 (19.23%)	11 (25.58%)	64 (18.44%)	<0.001[a]	60 (22.90%)	15 (11.72%)	0.002[a]
Oral Contraceptive Pill (OCP)	52 (13.33%)	10 (23.26%)	42 (12.10%)		41 (15.65%)	11 (8.59%)	
Depot Medroxy Progesterone Acetate	26 (6.67%)	1 (2.33%)	25 (7.20%)		21 (8.02%)	5 (3.91%)	
Intrauterine Device (IUD)	20 (5.13%)	4 (9.30%)	16 (4.61%)		19 (7.25%)	1 (0.78%)	
Tubal ligation	26 (6.67%)	7 (16.28%)	19 (5.48%)		26 (9.92%)	-	
Male condoms	179 (45.90%)	6 (13.95%)	173 (49.86%)		86 (32.82%)	93 (72.66%)	
Nothing	12 (3.08%)	4 (9.30%)	8 (2.31%)		9 (3.44%)	3 (2.34%)	
History of chronic diseases*:				<0.001[c]			<0.001[c]
Yes	57 (14.62%)	25 (58.14%)	32 (9.22%)		52 (19.85%)	5 (3.91%)	
No	333 (85.38%)	18 (41.86%)	315 (90.78%)		210 (80.15%)	123 (96.09%)	
Drugs use by Women:							0.48[c]
Yes	1 (0.26%)	1 (2.33%)	-	0.004[c]	1 (0.38%)	-	
No	389 (99.74%)	42 (97.67%)	347 (100%)		261 (99.62%)	128 (100%)	
Drugs use by husbands :							
Yes	16 (4.10%)	6 (13.95%)	10 (2.88%)	0.001[c]	14 (5.34%)	2 (1.56%)	0.07[c]
No	374 (95.90%)	37 (86.05%)	337 (97.12%)		248 (94.66%)	126 (98.44%)	
Alcohol use by Women:							
Yes	2 (0.51%)	-	2 (0.58%)	0.61[c]	2 (0.76%)	-	0.32[c]
No	388 (99.49%)	43 (100%)	345 (99.42%)		260 (99.24%)	128 (100%)	
Alcohol use by husbands :							
Yes	20 (5.13%)	5 (11.63%)	15 (4.32%)	0.04[c]	17 (6.49%)	3 (2.34%)	0.08[c]
No	370 (94.87%)	38 (88.37%)	332 (95.68%)		245 (93.51%)	125 (97.66%)	
History of sexual violence:							
Yes	22 (5.64%)	11 (25.58%)	11 (3.17%)	<0.001[c]	17 (6.49%)	5 (3.91%)	0.29[c]
No	368 (94.36%)	32 (74.42%)	336 (96.83%)		245 (93.51%)	123 (96.09%)	

*Chronic diseases includes cardiovascular diseases, hypertension, diabetes, organ transplants, chronic kidney diseases, hepatitis, etc. [a]Based on ANOVA test. [b]Based on independent sample t-test. [c]Based on Chi-2 test.

Table 2: Multiple linear regression results for adjusted association between sexual satisfaction and related factors (n=390)

Variables	Model 1	Model 2	Model 3	Model 4
	Coef β [95% CI]	Coef β [95% CI]	Coef β [95% CI]	Coef β [95% CI]
Women's age	-0.47**[-0.81,-0.13]	-0.50** [-0.84, -0.16]	-0.53** [-0.85, -0.21]	-0.06 [-0.30, 0.17]
Women's education:				
Elementary	Reference	Reference	Reference	Reference
Junior high school	9.72 [-3.73, 23.19]	8.16 [-5.20, 21.52]	7.89 [-4.58, 20.38]	3.55 [-5.75, 12.86]
High school	10.32 [-2.96, 23.62]	9.43 [-3.72, 22.60]	9.95 [-2.38 ,22.28]	1.09 [-8.13, 10.33]
Educated	8.73 [-4.79, 22.25	8.81 [-4.58, 22.20]	10.16 [-2.41, 22.74]	-0.16 [-9.60, 9.27]
Women's occupation:				
Housewife	Reference	Reference	Reference	Reference
Employed	3.36 [-0.15, 6.89]	3.20 [-0.28, 6.69]	3.25*[0.02, 6.49]	2.68* [0.26, 5.09]
Husband's occupation:				
Government employee	Reference	Reference	Reference	Reference
Handworker	-5.21 [-11.50, 1.06]	-7.26* [-13.69, -0.83]	-4.86 [-10.85, 1.12]	-3.24 [-7.69, 1.21]
Shopkeeper	1.67 [-1.85, 5.19]	1.27 [-2.22, 4.77]	1.14 [-1.09, 5.39]	2.33 [-0.09, 4.76]
Crier	-2.19 [-9.95, 5.55]	-3.57 [-11.41, 4.26]	-0.88 [-8.16, 6.39]	1.06 [-4.37, 6.50]
Military	3.88 [-0.36, 8.12]	3.48 [-0.71, 7.68]	4.68** [0.77, 8.58]	1.50 [-1.43, 4.44]
Retired	7.56 [0.002-, 15.12]	6.94 [-0.55, 14.44]	5.66 [-1.28, 12.61]	4.86 [-0.31, 10.04]

Variables	Model 1	Model 2	Model 3	Model 4
	Coef β [95% CI]	Coef β [95% CI]	Coef β [95% CI]	Coef β [95% CI]
Unemployed	0.22 [-8.77 9.22]	-3.06 [-12.51, 6.39]	0.22 [-8.66, 9.12]	-1.33 [-7.96, 5.29]
Form of marriage:				
Romantic	Reference	Reference	Reference	Reference
Traditional with consent	-5.96*** [-9.21, -2.71]	-5.36** [-8.57, -2.14]	-4.98** [-7.96, -2.00]	-1.66 [-3.91, 0.58]
Traditional without the consent	-18.74*** [-27.02, -10.46]	-17.39*** [-25.60, -9.18]	-10.17** [-18.01, -2.33]	-6.50* [-12.36, -0.65]
Duration of current marriage:				
<1	Reference	Reference	Reference	Reference
1-5	-5.61** [-10.01, -1.20]	-5.64** [-9.99, -1.29]	-4.74* [-8.77, -0.71]	-2.13 [-5.14, 0.87]
5-10	-3.60 [-9.27, 2.07]	-3.69 [-9.33, 1.94]	-4.67 [-9.89, 0.54]	-2.35 [-6.24, 1.54]
>10	-1.88 [-9.41, 5.65]	-3.11 [-10.74, 4.50]	-3.17 [-10.23, 3.88]	-3.16 [-8.43, 2.11]
Number of child	-0.99 [-3.26, 1.26]	-0.83 [-3.07, 1.41]	-0.34 [-2.43. 1.73]	0.17 [-1.37, 1.72]
Contraception type:				
Withdrawal methods	Reference	Reference	Reference	Reference
Oral Contraceptive Pill	1.18 [-3.76, 6.14]	0.78 [-4.17, 5.74]	1.30 [-3.30, 5.91]	-1.63 [-5.08, 1.81]
Depot Medroxy Progesterone Acetate	6.07 [-0.13, 12.27	4.83 [-1.31, 10.99]	5.10 [-0.60, 10.80]	3.94 [-0.30, 8.20]
Intrauterine Device	0.66 [-6.59, 7.91]	0.77 [-6.45, 7.99]	1.83 [-4.89, 8.56]	0.36 [-4.66, 5.39]
Tubal ligation	8.78* [1.24, 16.31]	8.03* [0.42, 15.63]	8.30* [1.22, 15.38]	6.54** [1.23, 11.84]
Male condom	7.84*** [3.86, 11.82]	6.02** [1.97, 10.07]	6.92*** [3.17, 10.68]	1.67 [-1.18, 4.54]
No method	-4.19 [-12.67, 4.28]	-6.11 [-14.64, 2.40]	-2.30 [-10.34, 5.73]	-2.36 [-8.37, 3.64]
History of chronic diseases:				
No	Reference	Reference	Reference	Reference
Yes	-11.33*** [-16.00, -6.66]	-10.44***[-15.08, -5.80]	-10.11*** [-14.42, -5.81]	-4.47** [-7.75, -1.19]
Subjective socioeconomic status (SES):				
The poorest		Reference	Reference	Reference
Poor		-7.71 [-20.02, 4.58]	-2.75 [-14.33, 8.82]	-1.99 [-10.60, 6.62]
Medium		-9.36 [-21.68, 2.95]	-4.06 [-15.61, 7.48]	-4.15 [-12.74, 4.44]
Rich		-13.26* [-25.65, -0.86]	-8.40 [-20.00, 3.18]	-6.55 [-15.19, 2.08]
The richest		-8.94 [-21.84, 3.95]	-4.16 [-16.28, 7.95]	-6.61 [-15.63, 2.41]
Drugs use by women:				
No		Reference	Reference	Reference
Yes		-8.32 [-36.11, 19.47]	-8.14 [-33.84, 17.56]	-10.41 [-29.54, 8.70]
Alcohol use by women:				
No		Reference	Reference	Reference
Yes		-10.50 [-30.22, 9.21]	-15.48 [-34.13, 3.17]	-15.21* [-29.09, -1.32]
Drugs use by husbands:				
No		Reference	Reference	Reference
Yes		-6.65 [-13.82, 0.51]	-7.88* [-14.54, -1.23]	-1.76 [-6.77, 3.23]
Alcohol use by husbands:				
No		Reference	Reference	Reference
Yes		-6.81* [-13. 39, -0.23]	-0.91 [-7.21, 5.38]	1.81 [-2.88, 6.51]
History of sexual violence:				
No			Reference	Reference
Yes			-21.09*** [-32.43, -9.75]	-10.12** [-18.65, -1.59]
Changes in sexual behavior during COVID-19:				
No				Reference
Yes				-5.26***[-7.47, -3.06]
Total Female Sexual Function Index (FSFI) score				2.21*** [1.94, 2.47]
Constant	110.64*** [93.33, 127.95]	156.31*** [115.99, 196.63]	179.09*** [141.30, 216.87]	106.36*** [76.76, 135.95]
N	390	390	390	390
Adjusted R^2	0.39	0.42	0.50	0.72

*P<0.05; **P<0.01; ***P<0.001

Table 3 shows the results of hierarchical linear regression for women's sexual function. In Model 4, a significant association was observed between sexual function and sexual behavior changes during COVID-19 (β=1.00, 95% CI: 0.34, 1.67), women's age (β=-0.10, 95% CI: -0.17, -0.03), male condom use (β=0.85, 95% CI: -0.01, 1.70), and oral contraceptive pill (OCP) (β=1.13, 95% CI: 0.12, 2.15) use compared to withdrawal method and total sexual satisfaction (β=0.19, 95% CI: 0.17, 0.22). According to the results of the hierarchical linear regression, model 4 explained 72% of the sexual function variable.

Table 3: Multiple linear regression results for adjusted association between sexual function and related factors (n=390)

Variables	Model 1	Model 2	Model 3	Model 4
	Coef β [95% CI]	Coef β [95% CI]	Coef β [95% CI]	Coef β [95% CI]
Women's age	-0.19*** [-0.29, -0.10]	-0.19*** [-0.29, -0.10]	-0.20*** [-0.29, -0.11]	-0.10** [-0.17, -0.03]
Women's education:				
Elementary	Reference	Reference	Reference	Reference
Junior high school	2.50 [-1.19, 6.20]	2.28 [-1.42, 5.98]	2.09 [-1.53, 5.73]	0.50 [-2.25, 3.26]
High school	4.09* [0.44, 7.75]	3.98* [0.33, 7.63]	3.89* [0.30, 7.48]	2.00 [-0.72, 4.73]
Educated	4.56* [0.85, 8.27]	4.53** [0.82, 8.24]	4.55** [0.89, 8.22]	2.63 [-0.15, 5.41]
Women's occupation:				
Housewife	Reference	Reference	Reference	Reference
Employed	0.12 [-0.84, 1.08]	0.007 [-0.96, 0.97]	0.05 [-0.89, 0.99]	-0.49[-1.21, 0.22]
Husband's occupation:				
Government employee	Reference	Reference	Reference	Reference
Handworker	-1.10 [-2.83, 0.61]	-1.03 [-2.81, 0.74]	-0.67 [-1.42, 1.06]	0.24 [-1.08, 1.56]
Shopkeeper	-0.01 [-0.96, 0.96]	0.03 [-0.93, 1.00]	0.17 [-0.76, 1.12]	-0.34 [-1.07, 0.37]
Crier	-1.07 [-3.20, 1.05]	-0.80 [-2.97, 1.36]	-0.33 [-2.45, 1.78]	-0.39[-2.00, 1.21]
Military	0.90 [-0.26, 2.06]	0.84 [-0.32, 2.00]	1.05 [-0.08, 2.18]	0.30[-0.56, 1.17]
Retired	0.32 [-1.75, 2.40]	0.17 [-1.89, 2.25]	0.009 [-2.01, 2.03]	-0.94 [-2.48, 0.59]
Unemployed	0.34 [-2.12, 2.81]	0.59 [-2.02, 3.21]	1.00 [-1.58, 3.60]	0.83[-1.12, 2.80]
Form of marriage:				
Romantic	Reference	Reference	Reference	Reference
Traditional with consent	-1.49** [-2.39, -0.60]	-1.44** [-2.33, -0.54]	-1.38** [-2.25, -0.52]	-0.46 [-1.13, 0.19]
Traditional without the consent	-2.87** [-5.14, -0.60]	-2.45* [-4.72, -0.17]	-1.35 [-3.63, 0.93]	0.49 [-1.24, 2.24]
Duration of current marriage:				
<1	Reference	Reference	Reference	Reference
1-5	-1.28* [-2.49, -0.07]	-1.26* [-2.47, -0.06]	-1.08* [-2.26, 0.08]	-0.20 [-1.10, 0.68]
5-10	-0.72 [-2.28, 0.83]	-0.70 [-2.26, 0.85]	-0.89 [-2.41, 0.62]	-0.05 [-1.20, 1.10]
>10	-0.12 [-2.19, 1.94]	-0.39 [-250, 1.71]	-0.48 [-2.53, 1.57]	0.33 [-1.22, 1.90]
Number of child	-0.26 [-0.88, 0.35]	-0.29 [-0.91 0.32]	-0.21 [-0.82, 0.39]	-0.15 [-0.61, 0.30]
Contraception type:				
Withdrawal method	Reference	Reference	Reference	Reference
Oral Contraceptive Pill	1.38* [0.01, 2.74]	1.36 [-0.001, 2.74]	1.44* [0.09, 2.78]	1.13* [0.12, 2.15]
Depot Medroxy Progesterone Acetate	0.63 [-1.07, 2.33]	0.56 [-1.14, 2.26]	0.68[-0.97, 2.34]	-0.37 [-1.64, 0.89]
Intrauterine Device	-0.09 [-2.08, 1.90]	-0.06 [-2.06, 1.94]	0.16 [-1.79, 2.12]	0.01 [-1.47, 1.51]
Tubal ligation	-0.24 [-2.31, 1.82]	-0.08 [-2.02, 2.19]	0.11 [-1.94, 2.17]	-1.21 [-2.79, 0.36]
Male Condom use	2.12*** [1.03, 3.21]	1.87** [0.75, 3.00]	2.07*** [0.98, 3.17]	0.85* [-0.01, 1.70]
No method	-1.33 [-3.66, 0.99]	-1.45 [-3.81, 0.90]	-0.56 [-2.91, 1.77]	0.13 [-1.65, 1.91]
Chronic diseases:				
No	Reference	Reference	Reference	Reference
Yes	-2.66** [-3.55, -0.98]	-2.15** [-3.44, -0.86]	-2.04** [-3.29, -0.79]	-0.29 [-1.27, 0.68]
Subjective socioeconomic status (SES):				
The poorest		Reference	Reference	Reference
Poor		-0.84 [-4.25, 2.56]	-0.22 [-3.60, 3.14]	0.25 [-2.29, 2.81]
Medium		-0.59 [-4.01, 2.81]	0.15 [-3.20, 3.52]	0.89[-1.65, 3.44]
Rich		-1.02 [-4.45, 2.41]	-0.33 [-3.70, 3.04]	1.08 [-1.47, 3.65]
The richest		0.73 [-2.83, 4.31]	1.27 [-2.24, 4.80]	2.01[-0.65, 4.68]
Drugs use by women:				
No		Reference	Reference	Reference
Yes		1.36 [--6.34, 9.06]	1.40 [-6.08, 8.88]	2.82 [-2.84, 8.49]
Alcohol use by women:				
No		Reference	Reference	Reference
Yes		-0.17 [-5.63, 5.29]	-0.66 [-6.09, 4.76]	2.57 [-1.55, 6.70]
Drugs use by husbands:				
No		Reference	Reference	Reference
Yes		-2.07* [-4.05, -0.08]	-2.30* [-4.24, -0.37]	-0.96 [-2.45, 0.51]
Alcohol use by husbands:				
No		Reference	Reference	Reference
Yes		-1.97* [-3.80, -0.15]	-1.07 [-2.90, 0.76]	-0.96 [-2.35, 0.42]
History of sexual violence:				
No			Reference	Reference
Yes			-0.94 [-3.37, 1.48]	-0.43 [-2.27, 1.40]

Variables	Model 1	Model 2	Model 3	Model 4
	Coef β [95% CI]	Coef β [95% CI]	Coef β [95% CI]	Coef β [95% CI]
Changes in sexual behavior during COVID-19:				
No				Reference
Yes				1.00**[0.34, 1.67]
Total Sexual Satisfaction score				0.19*** [0.17, 0.22]
Constant	26.85*** [22.10, 31.61]	30.75*** [19.57, 41.92]	34.32*** [23.32, 45.32]	-0.07[-9.38, 9.23]
N	390	390	390	390
Adjusted R^2	0.47	0.48	0.51	0.72

*P<0.05; **P<0.01; ***P<0.001

Discussion

This study examined the sexual satisfaction and function of married women in Iran during the COVID-19 pandemic and the factors influencing these aspects. Previously, research on this topic in Iran focused mainly on the pre-pandemic period. The unique circumstances of this study limit direct comparisons with earlier Iranian studies, highlighting the need for new insights into married life during the pandemic.

The study found moderate sexual satisfaction during the pandemic, which is lower compared to the pre-pandemic estimate reported by Afzali in 2016.[33] In our study, key factors affecting sexual satisfaction included women's occupational status, non-consensual traditional marriages, tubal ligation, chronic diseases, alcohol use, history of sexual violence, changes in sexual behavior during the pandemic, and the overall FSFI score. By contrast, Afzali's pre-pandemic study found that sexual satisfaction was significantly related to the husband's occupation, low and inadequate income, and dissatisfaction with gender roles.[33] A study in Luxembourg showed that sexual satisfaction declined compared to before the COVID-19 restrictions from 71.1% to 53.6%; having a steady relationship before the COVID-19 restrictions, engaging in sexting, reporting good mental health, and not altering alcohol intake were associated with an increase in the score of sexual satisfaction.[34] International studies have shown similar findings. In Northern Ethiopia, moderate sexual satisfaction was reported by 50.4% of the participants, with significant associations found between sexual satisfaction and factors like partner communication, sexual self-esteem, and sexual function.[35] In line with the results of the present study, the authors found that female sexual dysfunction was associated with lower sexual satisfaction and sexually dysfunctional attitudes.[36] Additionally, a positive correlation was observed between sexual satisfaction and orgasm frequency.[36]

Cultural, religious, and social factors have always influenced women's sexual satisfaction and function, even before the pandemic. The study results highlight the vulnerability of women during the pandemic, with moderate sexual dysfunction. Predictors of sexual function during the pandemic included changes in sexual behavior, women's age, condom and oral contraceptive use, and overall sexual satisfaction scores. Another finding of the current study, changes in sexual behavior during COVID-19, women's age, male condom use, OCP use, and total score of sexual satisfaction were stronger predictors for the sexual function of women. In line with the results of the present study, in a systematic review study during the COVID-19 pandemic, women's sexual function and sexual satisfaction declined throughout this time, with the majority of studies highlighting an increase in sexual distress, sexual avoidance, and solitary sexual behaviors.[37] Also, a study on Turkish women during the COVID-19 pandemic found a score of 17.56 (2.01), and the score of the same people who participated 6–12 months before the outbreak of the disease was 20.52 (2.82).[13] Similar to the results of our study, other studies have also reported sexual dysfunction in women during this pandemic, and more studies and follow-ups are needed to investigate interventions for improvement. In the study of Lianjun et al. (2011), the mean of FSFI score was higher than our study and women's age, depression, low education, alcohol usage, menopause or postmenopause, chronic disease, partner's poor health status, presence of sexual dysfunction in the spouse, dystocia, and living apart from the relationship were all independent risk factors for low sexual function in urban Chinese women.[38] Similar results were reported by a study conducted in Iran on married women, which found that sexual dysfunction was related to lower marital satisfaction.[16]

According to our findings, 33.57% of the women stated that their sexual relations changed during the COVID-19 pandemic. In the study, preliminary results of Garcia-Cruz and Peraza showed that sexual intercourse was not affected during the pandemic, and in the UK, 41% had similar sexual intercourse before the pandemic, and this was 39% in France.[39] According to a study conducted in three Southeast Asian countries (Bangladesh, India, and Nepal), 45% of the participants reported that their sexual life was under the influence of COVID-19 pandemic restrictions and about 3.3% had increased the frequency of sexual intercourse during the pandemic, which is due to spending more time with their sexual partner, and intimacy

and reassurance between couples.[40] In the present study, 39.44% reported changes in the frequency of sexual intercourse, so that 59.52% mentioned reduced sexual intercourse, 32.74% reported increased sexual intercourse, and 7.74% reported no sexual intercourse during this period. However, in a study by Yuksel and Ozgor, compared to 6-12 months before the outbreak of the disease, the mean number of sexual intercourses increased significantly (2.4 vs. 1.9).[13] The best of our knowledge, no study was conducted in Iran regarding the changes in the frequency of sexual intercourse during this period, but most women in other countries reported a decrease in the frequency of sexual intercourse during the pandemic.[14, 41, 42]

This study has some strengths and limitations. The feasibility and usefulness of online surveys have previously been demonstrated,[43] women could discuss their sexual issues more freely in cyberspace; however, there is a possibility of selection bias that may affect the generalizability of our study results. Using comprehensive questionnaires, which cover multiple dimensions of the sexual life of participants is another limitation. Only literate respondents with appropriate Internet access were able to participate in the present study. Also, the measures used in the study are all self-reported in nature. Although they provide useful information, sometimes these questionnaires can reduce the validity of the obtained results. Finally, due to the cross-sectional nature of this study, the cause-and-effect relationship cannot be determined.

Conclusion

Although all the factors involved in the level of sexual satisfaction and sexual function are not under the control of women, providing educational and preventive programs to increase awareness of sexual behavior based on women's background profiles in this situation can be helpful. Also, the study findings can be considered an effective step to study and recognize some of the most important aspects of women's lives in critical situations by researchers and policymakers.

Authors' Contribution

All authors contributed to the study design. PB performed data collection. PB and YS performed statistical analysis, interpretation of data, and wrote all drafts of the manuscript. YS, SZ, PJ, MD, and NRG provided substantial feedback on the drafts of the manuscript. All authors read and approved the final manuscript.

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Conflict of Interest

The authors declare no conflict of interest.

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