


# BMJ Open Mediating role of psychological distress and domestic violence in the association of fear of COVID-19 with marital satisfaction and sexual quality of life among women of reproductive age: An Iranian cross-sectional study

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## ABSTRACT

**Objectives** This study aimed to determine the mediating role of psychological distress and domestic violence in the association of fear of COVID-19 with marital satisfaction and sexual quality of life (QoL) among Iranian women of reproductive age.

**Methods** A cross-sectional study comprising 324 married women was conducted. Online convenience sampling was used to collect data. SPSS PROCESS macro was used for the mediation analysis. The direct and indirect effects of the fear of COVID-19 on sexual QoL and marital satisfaction were estimated comprising a 95% CI using 5000 bootstrap samples. Pairwise comparisons between the mediators were calculated by Hayes' macros.

**Results** A positive/negative or suspected history of COVID-19 infection had marginally significant relationship with marital satisfaction ( $p=0.049$ ). The total effect of fear of COVID-19 on sexual QoL was significant ( $b=-1.31$ ,  $SE=0.20$ ,  $p<0.001$ ). Fear of COVID-19 had no significant direct effect on sexual QoL ( $b=-0.22$ ,  $SE=0.19$ ,  $p=0.24$ ) but it had an indirect effect on sexual QoL via mediation of psychological distress ( $b=-0.34$ ,  $SE=0.09$ , 95% CI:  $-0.53$  to  $-0.19$ ) and domestic violence ( $b=-0.75$ ,  $SE=0.18$ , 95% CI:  $-1.12$  to  $-0.40$ ). The total effect of fear of COVID-19 on marital satisfaction was significant ( $b=-1.91$ ,  $SE=0.32$ ,  $p<0.001$ ). Fear of COVID-19 had no significant direct effect ( $b=0.20$ ,  $SE=0.25$ ,  $p=0.42$ ) on marital satisfaction but it had an indirect effect on marital satisfaction via mediation of psychological distress ( $b=-0.59$ ,  $SE=0.13$ , 95% CI:  $-0.86$  to  $-0.36$ ) and domestic violence ( $b=-1.51$ ,  $SE=0.29$ , 95% CI:  $-2.08$  to  $-0.92$ ).

**Conclusion** The fear of COVID-19 during the pandemic indirectly decreased women's marital satisfaction and sexual QoL via increased psychological distress and domestic violence. Consequently, in critical situations such as the COVID-19 pandemic, improving couples' psychological health and reducing domestic violence are likely to improve women's sexual QoL and marital satisfaction.

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ An appropriate sample size and the application of structural equation modelling provided methodological and statistical rigour to the study.
- ⇒ The cross-sectional design of study meant the directionality between variables could not be determined.
- ⇒ The reliance on self-report data provided the possibility of biases (eg, social desirability).
- ⇒ The convenience sampling method meant the study sample was not representative.

## INTRODUCTION

At the end of 2019, the outbreak of pneumonia of unknown cause in Wuhan (China) was announced by the WHO. The pathogen quickly became known as the COVID-19 and which subsequently caused a worldwide pandemic.<sup>1</sup> The outbreak of COVID-19 was recognised as a public health emergency of international concern that endangered international public health.<sup>2</sup> Epidemics of infectious diseases not only affect the physical health of individuals but also the mental health and well-being of non-infected individuals.<sup>3</sup> The prevalence of COVID-19 has increased psychological distress such as anxiety, depression and stress among general populations.<sup>4,5</sup> Due to the outbreak of COVID-19, a wave of fear and anxiety related to the rate of transmission as well as its complications and mortality emerged internationally.<sup>6-9</sup> As the virus continued to spread around the world, it brought new stresses, including physical and mental health risks, isolation and loneliness, the closure of schools and businesses, economic vulnerabilities and job losses.<sup>10,11</sup>

Consequently, the COVID-19 pandemic caused significant changes in individuals' lifestyles in individual, family and social dimensions. Changes also occurred regarding sexual aspects of individuals' lives, such as the frequency of sexual activity, sexual satisfaction and fertility decisions.<sup>12 13</sup> Measures to control the spread of the disease, such as being forced to stay at home, working from home, keeping children at home, the need to maintain physical distance and limiting physical contact with others, alongside the fear of infection resulted in changes to the dynamics of interpersonal relationships and sexual behaviours among many individuals.<sup>14 15</sup> More specifically, the negative impact of the COVID-19 pandemic on individuals' sexual lives has been reported in countries such as Spain, Italy and Iran.<sup>15</sup> Marital satisfaction and quality of sexual life are two components of sexual life that may be affected by the individual, family and social effects during critical situations such as the COVID-19 pandemic.<sup>16 17</sup>

Marital satisfaction refers to the amount and quality of enjoyment and satisfaction among individuals in relation to their married life.<sup>18</sup> Marital satisfaction affects many aspects of individual and social life.<sup>19 20</sup> Stability in marriage and marital satisfaction helps sustain the mental health of the family as well as mental health of the community more generally.<sup>21</sup> Marital satisfaction is a unique experience, as well as being a relatively stable attitude and characteristic that reflects the overall evaluation of individuals concerning their marital relationship.<sup>22</sup> Marital satisfaction also refers to adaptation of an individual's current situation in a marital relationship to his or her expected situation.<sup>23</sup> Sexual quality of life (SQoL) is another sexual component of a couple's life that might have been affected during COVID-19 pandemic.<sup>24</sup> In critical situations such as pandemics, changes in economic and social conditions can be associated with a reduction in various aspects of QoL, including sexual aspects.<sup>25</sup>

Many factors can affect marital satisfaction and sexual lives of couples including physical problems,<sup>26</sup> isolation,<sup>27</sup> depression,<sup>28</sup> anxiety,<sup>28</sup> fear,<sup>27</sup> emotional instability,<sup>29</sup> intimate partner violence<sup>22 30</sup> and quality of sexual relations.<sup>26 31</sup> SQoL is an important concept for assessing short-term and long-term outcomes of sexual problems on individuals' QoL.<sup>32</sup> The COVID-19 pandemic can affect the quality of sexual life affecting individuals' mental health and well-being (via increased fear, depression, anxiety and stress) among both infected individuals and the general population.<sup>2 33–36</sup> Moreover, the pandemic may have affected individuals' sex lives in different ways. Some may abstain from sex because they are afraid of getting infected while others may increase the frequency of sexual behaviours with their partner due to spending more time at home with them.<sup>13</sup> During the COVID-19 pandemic, fear, external stresses, psychological health problems and domestic violence increased and affected the processes of the couple's relationship and created more instability for couples.<sup>17 37</sup> Domestic violence (including intimate partner violence, child abuse

and adult abuse) and sexual violence can increase during and after major disasters or crises.<sup>10 38</sup> Similarly, it appears that domestic violence increased due to quarantine and spatial distancing during the COVID-19 outbreak.<sup>39</sup> Based on a recent systematic review, it was reported that the fear of COVID-19 influenced sexual relationships and intimacy and reduced marital satisfaction.<sup>40</sup> Turliuc and Candel reported that a combination of an external stressor like fear of COVID-19 with an internal stressor like socioeconomic status can lead to different responses regarding marital satisfaction. They reported that men and women responded differently during a crisis and that couples with lower socioeconomic status are more prone to greater stress and lower levels of marital satisfaction.<sup>41</sup> In another study, Reizer *et al* reported that psychological distress mediated the association between fear of COVID-19 and couple's marital satisfaction.<sup>42</sup>

Overall, it appears that fear of COVID-19 can affect couples' relationship and sexual life in different ways through the interaction of different variables. As there is cultural difference in variables affecting marital satisfaction<sup>43 44</sup> and their sexual behaviours,<sup>45 46</sup> assessing the impact of living with the COVID-19 pandemic in different cultures is warranted. The fear of COVID-19 as external stressor and its effect on the marital relationship and SQoL among Iranian women has not been investigated in previous studies. Therefore, this study aimed to determine the mediating role of psychological distress and domestic violence in the association of fear of COVID-19 with marital satisfaction and SQoL among Iranian women of reproductive age.

## METHODS

### Design and participants

A cross-sectional study was conducted between October and December 2020. The sample comprised 324 married women recruited from urban health centres. The eligibility criteria included being married, living with spouse and having at least 6 months of cohabitation with the spouse. The exclusion criteria included having history of chronic physical or psychological disease, experience of stressful events in the past 3 months, pregnancy and lactation (less than 6 months).

### Sample size estimation

The sample size was calculated using R software. By considering (1) two mediating variables, with 95% CI and 90% test power, (2) the two-stage sampling, 5000 bootstraps and (3) the correlation of 0.5 between the predictor variable and the response, the number of participants was determined to be 260. Considering 20% loss of the sample, the sample size estimation indicated 312 participants would be needed.

### Sampling procedure

Convenience sampling using the online platform Porsline was used to host the survey. A link to the survey

was sent to midwives working in urban comprehensive health centres. They were asked to send the link to potentially eligible clients. The survey link was active until the required number of participants had been obtained.

## Measures

### Sociodemographics

The survey included two sections that asked questions concerning participant sociodemographic information (eg, age, age of spouse, duration of marriage, family economic status, occupation, spouse's occupation) and information concerning sexual reproduction (eg, number of children, monthly frequency of sexual intercourse).

### Marital satisfaction

A short version of the 115-item ENRICH Marital Satisfaction Questionnaire<sup>47</sup> was used to assess marital satisfaction. More specifically, the 47-item Persian version was used.<sup>48</sup> Items (eg, 'My partner and I understand each other perfectly') are rated on a five-point scale from 1 (completely agree) to 5 (completely disagree). The total score ranges from 47 to 235 and higher scores indicate higher marital satisfaction. Cronbach's  $\alpha$  in this study was 0.82.

### Sexual quality of life

The 18-item Female Sexual Quality of Life Questionnaire was used to assess sexual functioning and QoL among women<sup>49</sup> Items (eg, 'When I think about my sex life, I find it an enjoyable part of my whole life') are rated on a six-point scale from 1 (strongly agree) to 6 (strongly disagree). The total score ranges from 18 to 108 and higher scores indicate a better quality of female sexual life. Cronbach's  $\alpha$  in this study was 0.78.

### Domestic violence

The four-item Domestic Violence Questionnaire (Hurts, Insults, Threatens and Screams) was used to assess domestic verbal and physical violence.<sup>50</sup> Items (eg, 'How many times in the last 12 months has your spouse physically harmed you?') are rated on a five-point scale from 1 (never) to 5 (frequently). The total score ranges from 4 to 20 and higher scores indicate greater domestic violence. Cronbach's  $\alpha$  in this study was 0.85.

### Psychological distress

The 14-item Hospital Depression and Anxiety Scale was used to assess depression (seven items) and anxiety (seven items) among outpatient populations<sup>51</sup> (Persian version<sup>52 53</sup>). Items (eg, 'Still enjoy the things I used to enjoy') are rated on a four-point scale from 0 (not at all) to 3 (most of the time) with total score of 42. Cronbach's  $\alpha$  in this study was 0.86.

### Fear of COVID-19

The seven-item fear of COVID-19 Scale (which was originally validated in Persian) was used to assess fear of COVID-19.<sup>6 54-56</sup> Items (eg, 'I am most afraid of COVID-19') are rated on a five-point scale from 1 (strongly

disagree) to 5 (strongly agree). The total score ranges from 7 to 35 and higher scores indicate greater fear of COVID-19. Cronbach's  $\alpha$  in this study was 0.79.

Study measures are provided as online supplemental file.

### Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this study.

### Statistical analysis

Study data were analysed using SPSS software (V.24). Continuous variables were described with means and SD whereas categorical variables were described with frequencies and percentages. To assess the mediating roles of domestic violence and psychological distress in relationship between fear of COVID-19, SQoL, marital satisfaction, psychological distress and domestic violence, SPSS PROCESS macro was used.<sup>57</sup> PROCESS macro is a well-documented bootstrapping statistical technique to test the mediation effects between variables. Due to the fact that the study tested multiple mediators (eg, domestic violence, psychological distress), Model 4 was chosen. The direct and indirect effects of the fear of COVID-19 on SQoL and marital satisfaction were estimated comprising a 95% CI using 5000 bootstrapped samples. Moreover, pairwise comparisons between the mediators were calculated using Hayes' macros.<sup>58</sup>

## RESULTS

### Demographic characteristics

In this study, the mean age of the 324 married Iranian women was 35.05 years (SD=6.60), with a mean duration of marriage of 0.90 years (SD=7.07). The majority of women had university academic education (86.4%) and were employed (64.8%). The majority of participants reported having average family economic status (59.6%) (table 1).

### Difference between marital satisfaction and psychological distress based on COVID-19 infection status

The majority of participants reported that they had no history of COVID-19 infection (72.5%). The mean score of marital satisfaction (out of 235) was higher among individuals without COVID-19 history (mean=168.06, SD=35.06) compared with individuals recovered from COVID-19 (mean=162.75, SD=31.68) and individuals suspected of COVID-19 (mean=141.78, SD=35.40). These differences were statistically significant ( $p=0.049$ ). The mean score of psychological distress was higher among individuals suspected of COVID-19 (mean=17.22, SD=7.12) compared with individuals without COVID-19 history (mean=13.80, SD=7.56) and individuals recovered from COVID-19 (mean=13.11, SD=6.61).

### Relationships between fear of COVID-19, marital satisfaction and SQoL

Mean scores of marital satisfaction, fear of COVID-19, experiencing domestic violence, anxiety, depression and

**Table 1** Distribution of study variables among participants

		Range	Mean
Age (in years)		19–45	35.05 (6.60)
Spouse's age (in years)		24–59	38.62 (7.19)
Marriage duration (in year)		1–30	10.90 (7.07)
Gravid		0–7	1.42 (1.20)
No of children		0–3	1.13 (0.81)
Fear of COVID-19		7–35	17.44 (5.95)
Domestic violence (Hurts, Insults, Threatens and Screams Scale)		4–19	7.0 (3.77)
Psychological distress (Hospital Anxiety and Depression Scale)		0–42	13.73 (7.34)
Sexual quality of life (Female Sexual Quality of Life Questionnaire)		23–108	89.22 (19.51)
Sexual activity (times per month)		1–30	6.97 (5.42)
Marital satisfaction		47–229	166.03 (34.46)
		Frequency	Percent
Education	Under diploma	6	1.9
	Diploma	38	11.7
	Academic (university)	280	86.4
Spouse's education	Under diploma	17	5.2
	Diploma	49	15.1
	Academic (university)	258	79.6
Job	Housewife	114	35.2
	Employed	210	64.8
Spouse's job	Unemployed	8	2.5
	Employed	306	94.4
	Retired	10	3.1
Economic status	Poor	20	6.2
	Fair	193	59.6
	Good	111	34.3
Separate bedroom	No	52	16.0
	Yes	272	84.0
Living condition	With family	57	17.6
	Independent	267	82.4
Childbirth delivery mode	No delivery	63	19.4
	Normal delivery	63	19.4
	Caesarean section	198	61.1
Contraception	No	122	37.7
	Yes	202	62.3
COVID-19 status	No COVID-19 history	235	72.5
	Recovered from COVID-19	80	24.7
	Suspected COVID-19	9	2.8

SQoL are reported in [table 1](#). Pearson correlation coefficient analysis showed there were significant differences between these variables and marital satisfaction ([table 2](#)).

The results of the mediation analyses are reported in [tables 3 and 4](#). As [table 3](#) shows, both domestic violence (b (95% CI) = -0.75 (-1.22 to -0.40), SE=0.18) and psychological distress (b (95% CI) = -0.34 (-0.53 to -0.19), SE=0.09) significantly mediated the relationship between

fear of COVID-19 and SQoL. Moreover, pairwise contrasts of the indirect effects (ie, domestic violence minus psychological distress) included zero (b (95% CI) = 0.42 (-0.002 to 0.83), SE=0.21) indicating that both mediators had equally strong effects.

As [table 4](#) shows, both domestic violence (b (95% CI) = -1.51 (-2.08 to -0.92), SE=0.29) and psychological distress (b (95% CI) = -0.59 (-0.86 to -0.36), SE=0.13)

**Table 2** Pearson correlation matrix concerning the variables of interest

Variables	SQoL	PD	FoC	DV	MS
SQoL	—	-0.471*	-0.349*	-0.575*	0.682*
PD		—	0.332*	0.381*	-0.543*
FoC			—	0.421*	-0.338*
DV				—	-0.692*
MS					—

\*p<0.01.

DV, domestic violence; FoC, fear of COVID-19; MS, marital satisfaction; PD, psychological distress; SQoL, sexual quality of life.

significantly mediated the relationship between fear of COVID-19 and marital satisfaction. Moreover, pairwise contrasts of the indirect effects (ie, domestic violence minus psychological distress) indicated that the specific indirect effect via domestic violence was larger than that via psychological distress ( $b$  (95% CI) = 0.92 (0.29 to 1.54), SE=0.32).

## DISCUSSION

This study investigated the mediating role of psychological distress and domestic violence in the association of fear of COVID-19 with marital satisfaction and SQoL among women of reproductive age. The mean score of marital satisfaction was 168.86 (out of 235). Both domestic violence and psychological distress significantly mediated the relationship between fear of COVID-19 and SQoL

with equal strong effects. Also, both domestic violence and psychological distress significantly mediated the relationship between fear of COVID-19 and marital satisfaction via a larger effect of domestic violence compared with psychological distress.

The mean score of marital satisfaction was 166.03 (out of 235). In the study by Mousavi, the results also showed that the home quarantine in COVID-19 pandemic does not have a significant effect on marital satisfaction.<sup>59</sup> In previous Iranian studies, the mean score (out of 235) for marital satisfaction was 167.64<sup>60</sup> and 185.51.<sup>61</sup> Despite the changes in the living conditions of individuals during the COVID-19 pandemic, marital satisfaction does not appear to have increased or decreased significantly in comparison to previous Iranian studies. It may be that the COVID-19 pandemic has a greater influence on

**Table 3** Models of the effect of fear of COVID-19 on sexual quality of life with psychological distress and domestic violence as mediators

	Unstand. coeff.	SE or (Bootstrapping SE)	t-value	p-value	Bootstrapping LLC; ULC
Total effect of fear of COVID-19 on sexual quality of life	-1.309	0.201	-6.333	<0.001	-1.716 to -0.903
Direct effect of fear of COVID-19 on sexual quality of life	-0.223	0.192	-1.165	0.245	-0.600 to 0.154
Direct effect of psychological distress on sexual quality of life	-0.855	0.148	-5.767	<0.001	-1.147 to -0.563
Direct effect of domestic violence on sexual quality of life	-2.626	0.303	-8.663	<0.001	-3.223 to -2.030
Direct effect of fear of COVID-19 on mediators					
Psychological distress	0.391	0.068	5.721	<0.001	0.257 to 0.526
Domestic violence	0.286	0.033	8.551	<0.001	0.220 to 0.352
Indirect effect of fear of COVID-19 on sexual quality of life					
Psychological distress	-0.335	(0.088)	—	—	-0.526 to -0.186
Domestic violence	-0.751	(0.183)	—	—	-1.122 to -0.395
(C1)	0.417	(0.209)	—	—	-0.002 to 0.825

Age, spouse age, marriage duration, education and spouse education, and COVID-19 situation were controlled for in the model.

C1, pairwise comparison psychological distress versus domestic violence; LLC, lower limit in 95% CI; ULC, upper limit in 95% CI; Unstand. coeff, unstandardised coefficient.

**Table 4** Models of the effect of fear of COVID-19 on marital satisfaction with psychological distress and domestic violence as mediators

	Unstand. coeff.	SE or (bootstrapping SE)	t-value	p-value	Bootstrapping LLC; ULC
Total effect of fear of COVID-19 on marital satisfaction	-1.91	0.32	-6.032	<0.001	-2.534 to -1.288
Direct effect of fear of COVID-19 on marital satisfaction	0.197	0.247	0.799	0.425	-0.289 to 0.683
Direct effect of psychological distress on marital satisfaction	-1.518	0.191	-7.94	<0.001	-1.894 to -1.142
Direct effect of domestic violence on marital satisfaction	-5.293	0.390	-13.553	<0.001	-6.061 to -4.524
Direct effect of fear of COVID-19 on mediators					
Psychological distress	0.391	0.068	5.721	<0.001	0.257 to 0.526
Domestic violence	0.286	0.033	8.551	<0.001	0.220 to 0.352
Indirect effect of fear of COVID-19 on marital satisfaction					
Psychological distress	-0.594	(0.128)	-	-	-0.855 to -0.356
Domestic violence	-1.514	(0.294)	-	-	-2.080 to -0.923
(C1)	0.920	(0.318)	-	-	0.290 to 1.538

Age, spouse age, marriage duration, education and spouse education, and COVID-19 situation were controlled for in the model. (C1), pairwise comparison of psychological distress versus domestic violence; LLC, lower limit in 95% CI; ULC, upper limit in 95% CI; Unstand. coeff, unstandardised coefficient.

individuals' social relationships rather than their interpersonal and marital relationships, especially as married couples are likely to have spent more time with each other during the pandemic than time spent with friends and work colleagues.

There was a marginal significant difference in mean scores for marital satisfaction among different groups based on COVID-19 status (without COVID-19 history=168.07, recovered from COVID-19=162.75 and suspected for COVID-19 individuals=141.78,  $p=0.049$ ). Marital satisfaction appeared to be more affected and reduced among individuals suspected of having COVID-19. Despite the point that due to low the sample size in the suspected COVID-19 group ( $n=9$ ), it makes it difficult to interpret the comparisons; but marital satisfaction was negatively associated with psychological distress (person correlation coefficient of  $-0.543$ ). Those individuals suspected of COVID-19 experienced a higher mean score of psychological distress (17.22) compared with individuals without COVID-19 history (13.80) and individuals recovered from COVID-19 (13.11). This point was confirmed in the mediational analysis. Psychological distress and domestic violence significantly mediated the relationship between fear of COVID-19 and marital satisfaction via a larger effect of domestic violence compared with psychological distress. Experiencing domestic violence directly associated with lower marital satisfaction among females during the COVID-19 pandemic. Experiencing domestic violence was inversely associated with marital satisfaction, which is in line with previous findings.<sup>62</sup>

As aforementioned, during the COVID-19 pandemic and due to imposed lockdowns, many couples will have spent more time together at home. For some couples whose interpersonal relationships increased disruption, spending more time together may have increased the likelihood of domestic violence among such couples. Domestic violence negatively affects couples, especially women's marital satisfaction.<sup>10 38 39 63-66</sup> Consistent with the findings of this study, it has been found that increased depression was directly inversely associated with marital satisfaction. Mental health is one of the most important factors in success and continuity of marriage.<sup>67</sup> Experiencing a mental health disorder reduces the likelihood of satisfactory relationships between individuals before<sup>68-71</sup> and during the COVID-19 pandemic.<sup>41 72</sup>

Quality of sexual life was directly associated with marital satisfaction and increased quality of sexual life was associated with higher marital satisfaction. This is in line with previous studies.<sup>60</sup> Sexual factors have a positive effect on couples' marital satisfaction.<sup>73</sup> Unsatisfactory (or lack of) sexual intercourse can lead to feelings of frustration, burn-out and insecurity, as well as endangering individuals' mental health by disrupting family life.<sup>74</sup> However, in an Indian study during the COVID-19 pandemic, the frequency of sexual intercourse, sexual satisfaction and the quality of sexual life among women increased during this period.<sup>75</sup> Domestic violence and psychological distress significantly mediated the relationship between fear of COVID-19 and SQoL with equally strong effects. In this study, fear of COVID-19 was significantly associated

with SQoL. Inconsistent results regarding the association between fear of COVID-19 and SQoL have been reported in previous studies. While there was a negative association between the fear of COVID-19 and female's SQoL during the pandemic in one study<sup>76</sup> (the same as this study), in some of the previous studies, fear of COVID-19 was not significantly associated with SQoL.<sup>24,77</sup> This difference might be due to different sampling time because the COVID-19 pandemic has had both peak and plateau periods of disease transition in different countries. To the best of the present authors' knowledge, no previous study has investigated the relationship of SQoL and fear of COVID-19 through the mediating role of domestic violence and psychological distress during the COVID-19 pandemic. Similar to this study's finding, Sheikhan *et al's* study conducted before the pandemic found that sexual violence was the most significant predictor of SQoL among females and that perceived stress indirectly effected SQoL.<sup>78</sup>

### Strengths and limitations

To the best of the present authors' knowledge, this study is one of the first to investigate the mediating roles of psychological distress and domestic violence in the association of fear of COVID-19 with marital satisfaction and SQoL among Iranian women of reproductive age. While the appropriate sample size and the use of structural equation modelling in the mediation analysis could be considered as strengths of current study, there are a number of limitations. The main limitations of the study were the cross-sectional design (which meant that the directionality between variables could not be determined), the reliance on self-report data (which are subject to well-known methods biases such as social desirability), the Iranian female sample (which meant the findings cannot be generalised to women in other countries), and the convenience sampling method (which meant the sample was not nationally representative of Iranian women). Another limitation was that the research was conducted only in an urban area. These problems could be overcome in future research by recruiting larger and more representative samples, and by employing longitudinal study designs.

### CONCLUSION

This study showed that the presence of positive or suspected COVID-19 infection versus healthy status is associated with decreased marital satisfaction. Experiencing lower domestic violence, increased quality of sexual life and lower depression significantly predicted higher marital satisfaction among married Iranian women during the COVID-19 pandemic. It appears that the fear of COVID-19 can indirectly affect a female's marital satisfaction by affecting their psychological health.

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### REFERENCES

- Jiang S, Xia S, Ying T, *et al*. A novel coronavirus (2019-ncov) causing pneumonia-associated respiratory syndrome. *Cell Mol Immunol* 2020;17:554.
- Xiao H, Zhang Y, Kong D, *et al*. Social capital and sleep quality in individuals who self-isolated for 14 days during the coronavirus disease 2019 (COVID-19) outbreak in January 2020 in China. *Med Sci Monit* 2020;26:e923921.
- Mamun MA, Sakib N, Gozal D, *et al*. The COVID-19 pandemic and serious psychological consequences in Bangladesh: a population-based nationwide study. *J Affect Disord* 2021;279:462–72.
- Alimoradi Z, Broström A, Tsang HWH, *et al*. Sleep problems during COVID-19 pandemic and its' association to psychological distress: A systematic review and meta-analysis. *EClinicalMedicine* 2021;36:100916.
- Ahmad Zadeh Beheshti M, Alimoradi Z, Bahrami N, *et al*. Predictors of breastfeeding self-efficacy during the covid-19 pandemic. *J Neonatal Nurs* 2022;28:349–55.
- Ahorsu DK, Lin C-Y, Imani V, *et al*. The fear of COVID-19 scale: development and initial validation. *Int J Ment Health Addict* 2022;20:1537–45.

- 7 Pakpour AH, Griffiths MD. The fear of COVID-19 and its role in preventive behaviours. *JCD* 2020;2:58–63.
- 8 Rajabimajid N, Alimoradi Z, Griffiths M. Impact of COVID-19-related fear and anxiety on job attributes: a systematic review. *Asian J Soc Health Behav* 2021;4:51.
- 9 Alimoradi Z, Ohayon MM, Griffiths MD, et al. Fear of COVID-19 and its association with mental health-related factors: systematic review and meta-analysis. *BJPsych Open* 2022;8:e73.
- 10 Bradbury-Jones C, Isham L. The pandemic paradox: the consequences of COVID-19 on domestic violence. *J Clin Nurs* 2020;29:2047–9.
- 11 Kniffin KM, Narayanan J, Anseel F, et al. COVID-19 and the workplace: implications, issues, and insights for future research and action. *Am Psychol* 2021;76:63–77.
- 12 Ko N-Y, Lu W-H, Chen Y-L, et al. Changes in sex life among people in Taiwan during the covid-19 pandemic: the roles of risk perception, general anxiety, and demographic characteristics. *Int J Environ Res Public Health* 2020;17:5822.
- 13 Yuksel B, Ozgor F. Effect of the COVID-19 pandemic on female sexual behavior. *Int J Gynaecol Obstet* 2020;150:98–102.
- 14 Canello R, Soranna D, Zambra G, et al. Determinants of the lifestyle changes during COVID-19 pandemic in the residents of northern Italy. *Int J Environ Res Public Health* 2020;17:6287.
- 15 Ibarra FP, Mehrad M, Di Mauro M, et al. Impact of the COVID-19 pandemic on the sexual behavior of the population. The vision of the East and the West. *Int Braz J Urol* 2020;46:104–12.
- 16 Fernandes CS, Magalhães B, Silva S, et al. Marital satisfaction of Portuguese families in times of social lockdown. *The Family Journal* 2022;30:148–56.
- 17 Pietromonaco PR, Overall NC. Applying relationship science to evaluate how the COVID-19 pandemic may impact couples' relationships. *Am Psychol* 2021;76:438–50.
- 18 Ward PJ, Lundberg NR, Zabriskie RB, et al. Measuring marital satisfaction: a comparison of the revised dyadic adjustment scale and the satisfaction with married life scale. *Marriage Fam Rev* 2009;45:412–29.
- 19 Assaroudi A, Jalilvand M, Oudi D, et al. The relationship between spiritual well-being and life satisfaction in the nursing staff of mashhad hasheminezhad hospital (2011). *Modern Care Journal* 2012;9:2.
- 20 Salehi SHD, Gavzan SAlamian, Motevalian SF. Relationship between spiritual health with marital satisfaction. *Journal of Babol University of Medical Sciences* 2017;19:47–52.
- 21 Sadeghi MA, University SB, Mousavi J, et al. Couple's personality similarity and marital satisfaction. *Contemporary Psychology* 2016;10:67–82.
- 22 Okhakhume A, Oguntayo R, Aroniyiaso O. Influence of socio-economic status and marital satisfaction on domestic violence among couples living in Nigeria. *International Journal of Applied Psychology* 2016;6:179–84.
- 23 Habibeh Morteza RG, Alibeigi Mahnaz, Mirakhorloo Shirin, et al. Relationship between marital and occupational satisfaction in the Iranian health center employees. *Koomesh Journal of Semnan University of Medical Sciences* 2018;20:300–9.
- 24 Khorshidi M, Alimoradi Z, Bahrami N, et al. Predictors of women's sexual quality of life during the COVID-19 pandemic: An Iranian cross-sectional study. *Sexual and Relationship Therapy* 2022;5:1–14.
- 25 Tran BX, Nguyen HT, Le HT, et al. Impact of COVID-19 on economic well-being and quality of life of the Vietnamese during the National social distancing. *Front Psychol* 2020;11:565153.
- 26 Panuzio J, DiLillo D. Physical, psychological, and sexual intimate partner aggression among newlywed couples: longitudinal prediction of marital satisfaction. *J Fam Violence* 2010;25:689–99.
- 27 Dalgleish TL, Johnson SM, Burgess Moser M, et al. Predicting change in marital satisfaction throughout emotionally focused couple therapy. *J Marital Fam Ther* 2015;41:276–91.
- 28 Kasalova P, Prasko J, Holubova M, et al. Anxiety disorders and marital satisfaction. *Neuro Endocrinol Lett* 2018;38:555–64.
- 29 Knoke J, Bureau J, Roehle B. Attachment styles, loneliness, quality, and stability of marital relationships. *J Divorce Remarriage* 2010;51:310–25.
- 30 Stith SM, Green NM, Smith DB, et al. Marital satisfaction and marital discord as risk markers for intimate partner violence: a meta-analytic review. *J Fam Violence* 2008;23:149–60.
- 31 Sawyer AG, Ball AD. Statistical power and effect size in marketing research. *Journal of Marketing Research* 1981;18:275–90.
- 32 Maasoumi R, Lamyian M, Montazeri A, et al. The sexual quality of life-female (SQOL-F) questionnaire: translation and psychometric properties of the Iranian version. *Reprod Health* 2013;10:25.
- 33 Nguyen HC, Nguyen MH, Do BN, et al. People with suspected COVID-19 symptoms were more likely depressed and had lower health-related quality of life: the potential benefit of health literacy. *JCM* 2020;9:965.
- 34 Olashore A, Akanni O, Fela-Thomas A, et al. The psychological impact of COVID-19 on health-care workers in african countries: a systematic review. *Asian J Soc Health Behav* 2021;4:85.
- 35 Alimoradi Z, Gozal D, Tsang HWH, et al. Gender-Specific estimates of sleep problems during the COVID-19 pandemic: systematic review and meta-analysis. *J Sleep Res* 2022;31:e13432.
- 36 Alimoradi Z, Broström A, Tsang HWH, et al. Sleep problems during COVID-19 pandemic and its' association to psychological distress: a systematic review and meta-analysis. *EClinicalMedicine* 2021;36:100916.
- 37 Alimoradi Z, Lin C-Y, Pakpour A. Domestic violence during COVID-19 pandemic: an issue that needs comprehensive attention and intervention. *Asian J Soc Health Behav* 2022;5:1.
- 38 Usher K, Bhullar N, Durkin J, et al. Family violence and COVID-19: increased vulnerability and reduced options for support. *Int J Ment Health Nurs* 2020;29:549–52.
- 39 Béland L-P, Brodeur A, Haddad J, et al. Covid-19, family stress and domestic violence: remote work, isolation and bargaining power. *SSRN Journal* 2020; 10.2139/ssrn.3627031 Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3627031](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3627031)
- 40 Epifani I, Wisyaningrum S, Ediati A. Marital distress and satisfaction during the COVID-19 pandemic: a systematic review. *International Conference on Psychological Studies (ICPSYCHE 2020)*, Semarang, Indonesia. Atlantis Press, 2021:109–15.
- 41 Turliuc MN, Candel OS. Not all in the same boat. socioeconomic differences in marital stress and satisfaction during the COVID-19 pandemic. *Front Psychol* 2021;12:635148.
- 42 Reizer A, Koslowsky M, Geffen L. Living in fear: the relationship between fear of COVID-19, distress, health, and marital satisfaction among Israeli women. *Health Care Women Int* 2020;41:1273–93.
- 43 Dobrowolska M, Groyecka-Bernard A, Sorokowski P, et al. Global perspective on marital satisfaction. *Sustainability* 2020;12:8817.
- 44 Rehman US, Holtzworth-Munroe A. A cross-cultural examination of the formation of marital communication behavior to marital satisfaction. *J Fam Psychol* 2007;21:759–63.
- 45 Træen B, Stülhofer A, Janssen E, et al. Sexual activity and sexual satisfaction among older adults in four European countries. *Arch Sex Behav* 2019;48:815–29.
- 46 Espin OM. Cultural and historical influences on sexuality in hispanic/ latin women: implications for psychotherapy. In: *Latina realities*. Routledge, 2018: 83–96.
- 47 Fowers BJ, Olson DH. Predicting marital success with prepare: a predictive validity study. *J Marital Fam Ther* 1986;12:403–13.
- 48 Solymanian A. Evaluation of irrational on marital dissatisfaction. Tehran, Iran: Tarbiat Modarres University, 1994.
- 49 Symonds T, Boolell M, Quirk F. Development of a questionnaire on sexual quality of life in women. *J Sex Marital Ther* 2005;31:385–97.
- 50 Sherin KM, Sinacore JM, Li XQ, et al. Hits: a short domestic violence screening tool for use in a family practice setting. *Fam Med* 1998;30:508–12.
- 51 Zigmund AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67:361–70.
- 52 Bradley C, Tamburini M. The hospital anxiety and depression scale (HADS): translation and validation study of the Iranian version. *Health and Quality of Life Outcomes* 2003;1:1.
- 53 Lin C-Y, Pakpour AH. Using Hospital anxiety and depression scale (HADS) on patients with epilepsy: confirmatory factor analysis and Rasch models. *Seizure* 2017;45:42–6.
- 54 Alimoradi Z, Lin C-Y, Ullah I, et al. Item response theory analysis of the fear of COVID-19 scale (FCV-19S): a systematic review. *Psychol Res Behav Manag* 2022;15:581–96.
- 55 Lecuona O, Lin C-Y, Rozgonjuk D, et al. A network analysis of the fear of COVID-19 scale (FCV-19S): a large-scale cross-cultural study in Iran, Bangladesh, and Norway. *Int J Environ Res Public Health* 2022;19:6824.
- 56 Lin C-Y, Hou W-L, Mamun MA, et al. Fear of COVID-19 scale (FCV-19S) across countries: measurement invariance issues. *Nurs Open* 2021;8:1892–908.
- 57 Hayes AF. Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. Guilford Press, 2017.
- 58 Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Methods* 2008;40:879–91.
- 59 Mousavi SF. Psychological well-being, marital satisfaction, and parental burnout in Iranian parents: the effect of home quarantine during COVID-19 outbreaks. *Front Psychol* 2020;11:553880.
- 60 Ziaee T, Jannati Y, Mobasheri E, et al. The relationship between marital and sexual satisfaction among married women employees



- at Golestan University of medical sciences, Iran. *Iran J Psychiatry Behav Sci* 2014;8:44–51.
- 61 Hajihassani M, Sim T. Marital satisfaction among girls with early marriage in Iran: emotional intelligence and religious orientation. *International Journal of Adolescence and Youth* 2019;24:297–306.
  - 62 Ramezani S, Keramat A, Motaghi Z. The relationship of sexual satisfaction and marital satisfaction with domestic violence against pregnant women. *Int J Pediatr* 2015;3:951–8.
  - 63 Anurudran A, Yared L, Comrie C, *et al.* Domestic violence amid COVID-19. *Int J Gynaecol Obstet* 2020;150:255–6.
  - 64 Kofman YB, Garfin DR. Home is not always a Haven: the domestic violence crisis amid the COVID-19 pandemic. *Psychol Trauma* 2020;12:S199–201.
  - 65 Boserup B, McKenney M, Elkbuli A. Alarming trends in US domestic violence during the COVID-19 pandemic. *Am J Emerg Med* 2020;38:2753–5.
  - 66 Taub A. A new covid-19 crisis: domestic abuse rises worldwide. the new York times, 2020. Available: <https://chescocf.org/wp-content/uploads/2020/04/Domestic-Abuse-Rises-Worldwide-New-York-Times.pdf>
  - 67 Ghazivakili Z, Norouzinia R, Kabir K, *et al.* Mental health of people who are going to marry and its relation to some of their demographic factors. *Aumj* 2014;3:81–8.
  - 68 Alipour Z, Kazemi A, Kheirabadi G, *et al.* Relationship between marital quality, social support and mental health during pregnancy. *Community Ment Health J* 2019;55:1064–70.
  - 69 Alipour A, Rahimi A, Zare H. The relationship between mental health and marital satisfaction of married students, Payame Noor University of Tehran. *Studies in Medical Sciences* 2013;24:557–65.
  - 70 Mansouri NM, Etemadi O, Fatehizade M, *et al.* The survey of pre-marriage instruction effects on couple's satisfaction level in Isfahan. *Studies in Medical Sciences; The Journal of Urmia University of Medical Sciences* 2011;24:557–65.
  - 71 Shahi A, Ghaffari I, Ghasemi K. Relationship between mental health and marital satisfaction. *Journal of Kermanshah University of Medical Sciences* 2011;15:2.
  - 72 Martínez Libano J, Mercedes Yeomans M. Couples satisfaction during the Covid-19 pandemic: a systematic review. *Psychology and Education* 2021;58:1848–60.
  - 73 Zaheri F, Dolatian M, Shariati M, *et al.* Effective factors in marital satisfaction in perspective of Iranian women and men: a systematic review. *Electron Physician* 2016;8:3369–77.
  - 74 Tavakol Z, Nikbakht Nasrabadi A, Behboodi Moghadam Z, *et al.* A review of the factors associated with marital satisfaction. *Galen Medical Journal* 2017;6:197–207.
  - 75 Mahanty C, Kumar R, Mishra BK. Analyses the effects of COVID-19 outbreak on human sexual behaviour using ordinary least-squares based multivariate logistic regression. *Qual Quant* 2021;55:1239–59.
  - 76 Gönenç IM, Öztürk Özen D, Yılmaz Sezer N. The relationship between fear of COVID-19, quality of sexual life, and sexual satisfaction of women in turkey. *International Journal of Sexual Health* 2022;34:377–85.
  - 77 Bostani Khalesi Z, Pouralizadeh M, Maroufizadeh S. Sexual function and sexual quality of life in relation to the COVID-19 pandemic in Iranian couples. *Sexual and Relationship Therapy* 2021:1–9.
  - 78 Sheikhan Z, Ozgoli G, Zahiroddin A, *et al.* Effective factors on sexual quality of life in Iranian women: a path model. *Advances in Nursing and Midwifery* 2019;28:15–21.