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Relationship between fear of COVID-19 and mental health in pregnant women

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ABSTRACT

Objective. The impact of crises such as the COVID-19 epidemic on the health of pregnant mothers is much bigger than that of other people in the society which can lead to irreparable consequences. The present study was conducted with the aim of determining the relationship between fear of COVID-19 and mental health in pregnant women presenting to health centres in Mashhad.
Materials and Methods. This cross-sectional study was conducted in 2022 on 205 pregnant women who presented to health centres in Mashhad. The data were collected using a demographic profile questionnaire, a mental health scale, and a fear of COVID-19 scale, whose validity and reliability have been confirmed. Data analysis was performed using SPSS version 21 and descriptive statistics, independent samples t-test, ANOVA and Pearson correlation. Value level was considered significant at $p \leq 0.05$.
Results. the mean score of fear of COVID-19, psychological well-being and psychological distress was 17.80 ± 5.72, 55.74 ± 8.51 and 34.68 ± 9.59, respectively. There was a significant relationship between fear of COVID-19 and psychological well-being ($r = -0.19$, $p = 0.008$), fear of COVID-19 and psychological distress ($r = 0.22$, $p = 0.001$), psychological well-being and psychological distress ($r = -0.50$, $p < 0.001$).
Conclusions. The results of this study showed that the Corona catching induced anxiety was related to fear of COVID-19 and psychological distress in pregnant women. It is necessary to carry out interventions to improve the mental health of pregnant women and reduce the fear caused by COVID-19 during the Corona pandemic.

INTRODUCTION

Coronavirus in humans causes a range of disorders, from mild respiratory tract infections, such as the common cold to lethal infections, such as the severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS) and Coronavirus disease 2019 (COVID-19). The COVID-19 pandemic caused thousands of deaths, along with physical and mental problems in the affected people [1-3].
As a result of the COVID-19 contagiousness and broken containment [4], many people suffered

much fear and stress in these conditions and believed that the disease threatened them, their neighbours, and their families [5]. Stress is a non-specific body response to a demand as a result of a reaction or stimulus [6]. Such factors as disease prolongation, increased hospitalizations, deaths, virus behaviour change and its increased contagion to all age groups even children, and the re-infection of patients created a kind of constant fear and stress among people [7, 8]. Such psychological reactions have had a major impact on mental health in recent decades. Furthermore, mental health disorders have been identified as one of the most common and important health problems, accounting for over one-third of disability and premature death [9, 10]. Mental health disorders can, in turn, affect physical or social health and other dimensions of health and significantly reduce the quality of life [10-12].

According to the National Burden of Disease Survey, women are more vulnerable than men which is one of the important causes of women's mortality due to pregnancy and childbirth. Meanwhile, pandemics have a greater effect on pregnant mothers' health than on other people in a society because pregnancy is one of the most sensitive periods of mothers' life which can lead to irreparable consequences. Injuries to the foetus during pregnancy can cause many physical and mental disorders in the following years of a person's life. Therefore, as mothers' health is highly important, dangerous signs during pregnancy which may significantly affect the pregnancy outcome should be detected. In addition, health promotion of pregnant mothers is one of the priorities in health programs of the Ministry of Health in Iran [13]. Considering the importance of the mental health of pregnant women, especially during the COVID-19 pandemic, the present study aimed to evaluate the relationship between fear of COVID-19 and mental health in pregnant women.

MATERIALS AND METHODS

This cross-sectional study was conducted on all pregnant women referred to health centres of Mashhad, Iran, in 2022. The present research was approved by the Ethics Committee of Mashhad University of Medical Sciences (ethics code: IR.MUMS.NURSE.REC.1400.059) and it was registered in Mashhad University of Medical Sciences with the code: 4000696. Prior to the study, written informed consent was obtained from all enrolled patients allowing data collection and analysis for research purposes. This manuscript conforms the Enhancing the QUAlity and Transparency Of health Research (EQUATOR) network guidelines.

The inclusion criteria were Iranian pregnant women (with any gestational age) living in Mashhad, having minimum basic literacy, and lack of the following criteria: having high-risk pregnancy, using psychotherapeutic drugs and narcotics, suffering from underlying and chronic diseases, and experiencing severely stressful events such as financial bankruptcy or death of first-degree relatives in the last six months. After the ethics committee at Mashhad University of Medical Sciences approved the study, the data collection was started using the stratified-cluster multi-stage method. All five healthcare centres in Mashhad were considered as classes, and the health centres in the five regions were considered as clusters. Then, one health centre was randomly selected from each class.

Using Poursardar and *et al*'s. [14] and the following formula, and taking into account type 1 error of 0.05, power of 0.80, standard deviation of 10.53 and absolute error of 1.5, the sample size was obtained 189: $n = (z^2 \times s^2)/d^2 = (1.96^2 \times 10.53^2)/1.5^2 \approx 189$. Considering 10% drop in the sample, the final sample size was considered equal to 200.

The data collection tool included a Personal, social and obstetric characteristic questionnaire, mental health and fear of COVID-19 scale. The mental health scale is a 28-item questionnaire consisting of two constructs: psychological well-being and psychological distress. The scale is scored based on a 5-point Likert scale from 1 (completely disagree) to 5 (completely agree). The reliability ranged from 0.89 to 0.94 using the internal consistency method and Cronbach's alpha coefficient calculation. A correlation coefficient of -0.87 and 0.88 was found between the subscales of the instrument and the general score of the general health questionnaire to confirm the concurrent validity of the tool [15, 16].

The validity and reliability of the fear of COVID-19 scale were confirmed by the factor analysis method and Cronbach's alpha coefficient (0.82), respectively, in the Iranian population [17]. According to the checklist of the research unit and considering the inclusion criteria, the researcher visited the health centres and selected all pregnant women who were seeking care during pregnancy. Then, the informed consent form, demographic and

midwifery questionnaire, fear of COVID-19 scale, and mental health scale were administered to the pregnant women which were completed in the self-report fashion.

The data were analysed using SPSS software version 21. Central and dispersion indices (mean ± SD) and frequency distribution were used in order to describe the variables. Kolmogorov-Smirnov test was applied for assessing the normality of the data the results of which showed that the data distribution was normal. So, independent t-test, ANOVA and Pearson correlation were used to analyse the data. The significance level was 0.05 in all of the tests.

RESULTS

The mean score of pregnant women age, husband age and marriage years was 28.55 ± 6.04, 33.09 ± 6.03 and 7.20 ± 4.84, respectively. The average number of pregnancy, number of abortion, number of delivery, number of normal vaginal delivery (NVD), number of caesarean section (CS), number of children and gestational age was 2.02 ± 1.13, 0.30 ± 0.55, 0.77 ± 0.94, 0.42 ± 0.77, 0.35 ± 0.72, 0.77 ± 0.94 and 22.77 ± 10.63, respectively. The demographic information of pregnant women in the study is reported in **Table 1**.

The results of the present study showed that the mean score of fear of COVID-19, psychological well-being and psychological distress was 17.80 ± 5.72, 55.74 ± 8.51 and 34.68 ± 9.59, respectively and there was a significant relationship between fear and psychological well-being (r = -0.19, p = 0.008), and fear and psychological distress (r = 0.22, p = 0.001) (**Table 2**).

The results of ANOVA showed that the pregnancy type was correlated with fear factor (p = 0.027) and psychological distress (p = 0.016) so that the mean of fear in wanted pregnancy, unplanned and unwanted pregnancy group was 94.07 ± 14.93, 85.63 ± 16.89 and 94.07 ± 20.63, respectively. Also, the mean of psychological distress in wanted pregnancy group was 33.47 ± 9.08, in unplanned group was 33.67 ± 10.42 and in unwanted pregnancy group was 38.50 ± 10.16.

Corona catching induced anxiety was related to fear of COVID-19 (p < 0.001) and psychological distress (p = 0.041) so that the mean score of fear of COVID-19 in the group with mild level of anxiety was 15.24 ± 4.60, in the group with moderate level was 19.39 ± 4.55 and in the group with high level was 23.48 ± 5.98. Also, the mean score of psychological distress in the group with mild level was 33.34 ± 9.01, in the group with moderate level was 3.30 ± 10.15 and in the group with high level was 38 ± 9.82. The results of the independent t-test showed that if the women were infected with Corona during pregnancy, the mean score of psychological distress was 38.04 ± 9.20 and in the other group it was 34.25 ± 9.59, the difference of which was statistically significant (p = 0.049). The information about Corona is reported in **Table 3**.

Table 1. *Demographic and midwifery characteristic of pregnant women.*

Variable	Number (%)
Education level	
Diploma and under diploma	121 (59)
Higher than diploma	83 (41)
Husband education	
Diploma and under diploma	122 (60)
Higher than diploma	83 (1)
Occupation	
Housewife	157 (77)
Employed	47 (23)
Husband occupation	
Worker	148 (72)
Employee	57 (28)
Family income	
Less than enough	25 (12)
Sufficient or more	180 (88)
Foetal sex	
Female	66 (32)
Male	71 (35)
Female and male (twin)	4 (2)
Pregnancy planning	
Wanted pregnancy	143 (70)
Unplanned pregnancy	33 (116)
Unwanted pregnancy	29 (14)
Desire for foetal sex	
Yes	80 (46)
No	12 (1)
No differences	81 (53)

Table 2. *Relationship between fear of COVID-19, psychological distress and psychological well-being.*

	Fear of COVID-19	Psychological well-being	Psychological distress
Fear of COVID-19	1	-	-
Psychological well-being	-0.19 (0.008*)	1	-
Psychological distress	0.22 (0.001*)	-0.50 (< 0.001*)	1

*Significance level of 0.05.

Table 3. *Information about CORONA.*

Variable	Number (%)
Corona catching induced anxiety	
Low	111 (54)
Moderate	61 (30)
High	33 (16)
Corona infection before pregnancy	
Yes	72 (35)
No	133 (65)
Corona infection in pregnancy	
Yes	23 (11)
No	182 (89)
Corona infection in family or acquaintances	
Yes	153 (75)
No	52 (25)
Death duo to Corona in family or acquaintances	
Yes	51 (25)
No	154 (75)

DISCUSSION

The COVID-19 pandemic has become a clinical threat, and the stress of getting infected has imposed a psychological threat to the general population worldwide. Moreover, the vague nature of the COVID-19 and the unknown course of the disease has also caused psychological disorders in different population groups. The fear and anxiety of expectant mothers when visiting midwifery service centres is one of the key factors contributing to the COVID-19 crisis [17]. The findings of this study showed that the Corona catching induced anxiety was related to the constructs of fear of the COVID-19 and psychological distress. Therefore, the average score of fear of COVID-19 and psychological distress in pregnant mothers with high anxiety was higher than that in the group with moderate anxiety. Psychological factors are the most dangerous factors when dealing with crises. The fear of death refers to the emotional response to perceived dangers, threats and signs of death [19], which can weaken the immune system, especially in patients [20]. Feelings or physical symptoms resulting from the fear of Corona during the outbreak of the COVID-19 were interpreted as "*I am breathing faster than before, so I am infected by the COVID-19*" [21, 22]. Therefore, excessive threat and risk assessment was associated with increased health anxiety [23, 24]. Lee *et al*. (2020) showed that the fear of COVID-19 had a significant relationship with health anxiety [25]. In addition, Ahorso *et al*. (2020) reported a significant relationship between fear of COVID-19 and health anxiety [17].

The findings revealed that the average score of psychological distress in the group with a history of COVID-19 infection during pregnancy was higher. In addition to weakening the immune system, anxiety can damage mental health by harming people's moods [26]. Mental health is one of the variables that can affect disease anxiety [27]. The results indicated a significant relationship between the variables of fear of COVID-19 and psychological well-being, as well as fear of COVID-19 and psychological distress. The direct effect of the fear of COVID-19 on health anxiety is consistent with the studies of Lee *et al*. (2020) [25] and Ahorso *et al*. (2020) [17]. The studies conducted on past viral pandemics such as Ebola and bird flu showed that anxiety and health concerns during these pandemics are widespread [23]. This relationship can be explained by the fact that during the pandemic of the COVID-19, the media and environment stressed the challenges of the disease and observation of health precautions. Since the physical sensations and the person's interpretation can be affected by environmental events, increasing health concerns and fear of disease increases health anxiety [28].

Chen *et al*. (2020) studied nine pregnant women infected with the COVID-19 and showed that amniotic fluid, umbilical cord blood, throat swabs in infants, and breast milk samples infected with COVID-19 were negative in terms of virus contamination [30]. In Chen's study, three pairs of infected mothers were tested and reported negative for virus infection [30]. Zou *et al*. examined nine pregnant mothers with the COVID-19, based on which seven mothers gave birth by caesarean section, two mothers gave birth naturally with perfect health, and ten babies (a twin pregnancy) were reported to be negative for the COVID-19 infection [31]. In Liu's study in China, complications such as premature delivery, emergency caesarean section, acute respiratory syndrome, and long-term hospitalization in ICU were reported in 13 pregnant women infected with the COVID-19 [32]. The COVID-19 pandemic has created stress and anxiety for pregnant women in different regions of the world. Anxiety and stress during pregnancy were also associated with such complications as pre-eclampsia, depression, increased nausea and vomiting during pregnancy, premature birth, low birth weight, and low APGAR score [33].

The results of the present study showed that the bad history of midwifery was related to the fear of COVID-19. Therefore, the average score of fear of COVID-19 was higher in people with a bad history of midwifery.

The results of a systematic review by Kazemi *et al*. (2021) revealed that there is an increased risk of abortion in mothers with a positive test result of SARS-CoV-2. Reports related to abortion in pregnant women with COVID-19 showed that most miscarriages due to COVID-19 in the first trimester were due to placental insufficiency. Placental inflammation during the viral infection may result in foetal growth retardation and induce abortion [34]. Zahang *et al*. (2020) also reported that no significant difference was observed between the two groups regarding the type of delivery, gestational age, birth weight, premature delivery, meconium excretion, foetal position disturbance, and asphyxia. However, a significant difference was reported regarding the use of Carboprost protamine in mothers with COVID-19 compared to healthy mothers [35]. Tajbakhsh (2021) reported that women during the COVID19 pandemic experienced a sense of insecurity in their financial, psychological, and social statuses [37], which could have affected their mental health [36].

The findings by Aziz-Ahari *et al*. (2021) showed an increased risk of preterm labor in the suspected mothers compared to that at the same time the year before the COVID-19 pandemic [38]. Higher rates of preterm delivery can also be considered as a consequence of maternal complications in the suspected mothers because there is the possibility of disease transmission from mother to foetus, which is unknown and requires more studies with a larger population [38, 39]. The findings of a study by Arakaki *et al*. (2020) showed an association between severe COVID-19 in pregnant women and gestational age ≥ 24 weeks and maternal age ≥ 32. The rate of preterm delivery due to the infection was significantly higher in severe COVID-19 cases [40].

Meanwhile, as the COVID-19 pandemic could be the most challenging recent global threat, it is critical to meet the health needs of pregnant women, especially their mental health, by taking timely and appropriate measures to control and reduce the consequences of the COVID-19.

A limitation of the present study is that the participants were selected only from the volunteer pregnant women referred to health centres affiliated to Mashhad University of Medical Sciences in Khorasan-e-Razavi Province, Iran, as mentioned earlier. The strength of this study is that the results can help reduce stress and increase the mental health of expectant mothers during the COVID-19 pandemic.

CONCLUSIONS

The results of this study showed that the Corona catching induced anxiety was related to the constructs of fear of COVID-19 and psychological distress, so that the average score of psychological distress in the group with a history of COVID-19 infection during pregnancy was higher. Also, the results indicated a significant relationship between the variables of fear of COVID-19 and psychological well-being, as well as fear of COVID-19 and psychological distress. Moreover, bad history of midwifery was related to the fear of COVID-19. Therefore, the average fear of COVID-19 score was higher in people with a bad history of midwifery.

The global pandemic of COVID-19 presented one of the most critical situations for the health systems. The COVID-19 is still spreading in some countries, and the World Health Organization has not announced an end to this disease. Pregnant mothers are at higher risk of COVID-19 than other members of the society because of experiencing a polluted environment, facing an unpredictable environment, and the stressful nature of the pregnancy. Pregnant mothers should receive periodic information about the function of the virus due to the unknown nature of the disease. The stress caused by the COVID-19 can be reduced by holding resilience training courses, fostering empathy, and increasing communication between and among pregnant mothers by spending more time for communicating with the family. Besides, strengthening the safety culture, emphasizing compliance with health issues, preventing disease, reducing stress, and increasing mental health should be considered for pregnant mothers as priorities during the COVID-19 pandemic.

COMPLIANCE WITH ETHICAL STANDARDS

Authors contribution

H.Y., F.Z.K., E.J., M.A.: Conceptualization, data curation, formal analysis, writing – original draft, writing – review & editing. H.Y., F.Z.K., E.J.: Investigation, writing – review & editing.

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Study registration

This research was registered in Mashhad University of Medical Sciences with code: 4000696.

Disclosure of interests

The authors declare that they have no conflict of interests.

Ethical approval

This research was approved by the Ethics Committee of Mashhad University of Medical Sciences (ethics code: IR.MUMS.NURSE.REC.1400.059).

Informed consent

All participants were provided with necessary explanations about the objectives and each enrolled patient gave informed consent to allow data collection and analysis for research purposes prior to the start of the study.

Data sharing

The datasets used and analysed during the current study are available under reasonable request to the corresponding author.

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