The Causal Model of Coronavirus Anxiety in the Medical Staff Based on Coping Styles

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Abstract

Introduction: The outbreak of Covid-19 has posed a great threat to the health and psychological states of the medical staff. This study aimed to develop a causal model of coronavirus anxiety in the medical staff based on coping styles.

Method: This cross-sectional research was descriptive, of structural equations type. It was conducted from May 2020 to June 2020 with the participation of 100 medical staff in the COVID- 19 Intensive Care Unit (ICU) in Imam Reza Hospital in Mashhad during the COVID-19 pandemic selected by the census method. They answered Alipour et al.'s coronavirus anxiety and Calsbeek et al.'s coping styles online questionnaires. Research data were analyzed by SPSS (24.0) and LISREL version 8.8.

Results: According to the demographic data, 42% of participants were male and 48% were female. The results of this study indicated that the coronavirus anxiety model based on coping styles has a good fit (GFI=0.91). According to the obtained results, the causal model confirmed the relationship between coping styles and coronavirus anxiety in the medical staff based on different fitness indices (P<0.00).

Conclusion: The findings of the present study showed that problem-focused coping style has a negative relationship with coronavirus anxiety and emotion-focused coping style has positive relationship with coronavirus anxiety. Understanding the protective and high-risk coping strategies used by health care workers during pandemics is fundamental to maintain mental health among frontline workers during chronic stress such as the COVID-19 pandemic. Based on the findings of the present study, it is suggested that behavioral interventions should be performed to reduce the use of emotion-focused coping styles that can increase the anxiety of medical staff.

Keywords: Coronavirus Anxiety, Coping Styles, Medical Staff

Introduction

It has been almost two years since Coronavirus disease 2019 (COVID-19) emerged in Wuhan City, Hubei Province, China on 12 December 2019 [1]. Today, the Covid-19 is known as the main hygiene crisis in the world and has an effect on people in international levels and has converted into a global epidemic [2]. Iran was a country with high contagion statistics at the outbreak of the virus. Based on the statistical report of Iran's Ministry of Health and Medical Education, Iran was the third country with a high number of Covid-19 cases in February 2020 in global levels [3]. According to the latest World Health Organization (WHO) report on August 22, 2022, there were over 587 million confirmed cases and over 6.4 million deaths worldwide, with 7506614 confirmed cases and 143387 deaths reported in Iran [4]. The disease also has a huge impact on mental health, causing people to experience various degrees of emotional problems [5]. During the outbreak period, tension, anxiety and other negative emotions began to breed in the country, and quickly spread among the members of the whole society. Covid-19 has not only affected peoplebut has also led to anxiety and

psychological stress in the staff of health care centers who deal with it. The medical staff in hospitals caring for confirmed or suspected patients are more likely to be exposed to a high risk of infection and negative psychological stress than the general population[6]. In the present condition, the staff are under pressure to identify and treat patients. Some of the patients are in severe conditions and need Cardiopulmonary resuscitation and this issue leads to high stress in the personnel [7]. In fact, during pandemics, healthcare workers have to struggle with also the unpredictability of working schedules that require arrangements in their private and social lives [8]. Some of the problems they face include: separation of family, experiencing unusual conditions, dealing with Covid-19, increasing contagion fears, and lack of accessibility to appropriate equipment for patients. It is important to consider the health of staff in changeable and challenging conditions and reduce the risk of depression, anxiety, and exhaustion [9]. The stressful situation and exhaustion in the period of time influence personal and professional aspects of staff lives. Increasing worktime leads to a decrease in the time for staff to take care of themselves and fulfill basic needs such as nutrition and hygiene [10]. Although they are aware to continue their work for a long time as their social and professional duty, they are worried about themselves and their families and they reported that death rate reports have a psychological impact on them [11]. This is why it is important to consider the psychological and physical health of the personnel. We shouldn't ignore staff who work in ICU in this severe and stressful condition [9]. With regard to staff who deal with Covid-19 in the frontline, they should be considered as an independent population in terms of the effects of this disease on their psychological and physical health [10]. Considering the psychological consequences of Covid-19 infection, especially for the medical staff, the need for attention, support, and intervention in this group seems essential [12].

In the process of fighting Covid-19, ICU healthcare workers were responsible for the most critically infected patients, and many routine procedures in ICU including intubation, sputum aspiration, or use of nebulizers could be high risk due to the possible aerosol transmission [13]. Furthermore, shortage of medical materials, work overload, and up to 50% mortality among severe infection patients in ICU bring mental burden to ICU healthcare workers [14]. In this regard, measuring the level of anxiety of this population and its relationship with coping styles can be helpful as a practical step to maintaining and improving their mental health [15].

Due to the changing circumstances of the Covid-19 disease, which has led to further waves of the disease, the impact of the Covid-19 outbreak on the mental health of health care workers may change over time. Therefore, investigating the psychological consequences of this disease on this vulnerable population requires further investigation [16]. Anxiety symptoms may worsen in stressful situations. Individual differences in response to stress are essential in addition to stressful situation [17]. Recently, instead of focusing on the experience of stress,

researchers have focused on how people cope with stressful events. Coping strategies identify three coping styles: problem-focused (trying to solve the problem), emotion-focused (focusing on oneself and one's emotional experiences), and avoidance-focused (avoiding the problem by engaging in alternative tasks or seeking social contacts) [18]. Anxiety is closely related to coping mechanisms [19].

Anxiety and stressors cause the medical staff to react unconsciously to overcome the problem. Anxiety and coping mechanisms of medical staff while caring for Covid-19 patients is an essential concern because each medical staff has different coping skills, and not all hospitals have sufficient resources [19].

The perceived inconsistency between the environmental demands imposed on a person and the available coping resources leads to psychological pressure and stress. If environmental demands are perceived as threatening (e.g., a stressor), the individual evaluates their available coping resources to determine whether they can cope with the stressor or not [20]. In this situation, people exposed to anxiety and mental pressure caused by the Covid-19 disease try to deal with different mechanisms to reduce mood symptoms and increase their adaptation to the situation. Therefore, at the time of widespread epidemics, when the fear of disease increases along with the confusion of daily activities, it can be essential to pay attention to coping styles in dealing with the specific disease [21].

Understanding anxiety and coping mechanisms are essential, so medical staff can manage anxiety and mental health and provide excellent service and mutual support [19]. The coping styles include ideas and actions which is applied by individuals in stressful conditions. The successful application of coping strategies helps people to manage stressful events and decrease negative emotions [22]. Research has identified two general coping strategies: one is problem-focused coping where the purpose is to solve the problem or take action to change the status quo; and the other is emotion- focused coping, which aims to reduce the emotional distress associated with stressful situations [23].

Research on the relationship between coping styles and anxiety indicated that people who have shown high levels of anxiety and psychological stress, used more negative coping styles such as avoiding the problems, fantasizing, blaming themselves, and asking for help from others. In addition, the results of this study have shown that active coping style is a protective factor against psychological distress in the early stages of coronavirus outbreak [24].

As long as the wide spread of Covid-19 continues and the country is involved in different waves of this disease or new disease strains, it seems that many factors negatively affect the professional performance of the medical staff. Therefore, it is crucial to evaluate the anxiety of the medical staff, plan future crisis management strategies, and effectively deal with the negative consequences of this disease. Accordingly, the aim of this study was to investigate causal modeling of coronavirus anxiety based on their coping styles in medical staff.
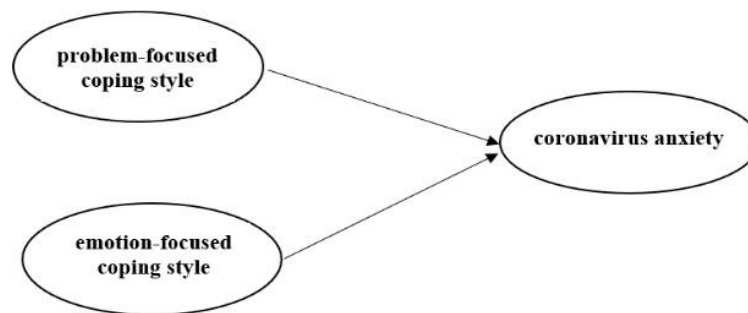
Figure 1. Conceptual research model.

Method

This cross-sectional research was descriptive, of structural equations type. The present study was conducted from May 2020 to June 2020 with the participation of 100 medical staff in Covid-19 ICU in Imam Reza Hospital in Mashhad during the Covid-19 pandemic. The samples were selected by the census method. First, the researchers identified eligible people to enter the study based on the personnel list. The inclusion criteria were the willingness to participate in the study, with a role in Covid-19 ICU, occupation as a doctor, nurse, and working full time. Respondents were excluded if they could not complete the online survey independently. The total number of qualified personnel was 115, of whom 100 questionnaires were delivered to researchers. Because of the Covid-19 pandemic and the need to observe safety principles, questionnaires were sent through social network to all eligible personnel participating in the study. After data collection, SPSS software v. 24 was used to analyze the research findings. Descriptive statistics (frequency distribution, mean, and standard deviation) were used to describe the data. Then LISREL version 8.8 was used. After examining the descriptive (central and dispersion) indicators, structural equation analysis was used to fit the structural model and examine the research hypotheses. The tools used in the present study were as follows:

Corona Disease Anxiety Scale (CDAS): This questionnaire has been developed by Alipour et al. [25]. It has been designed and validated to measure the prevalence of Coronavirus anxiety in Iran. The final version of this instrument included 18 items and two factors. Items 1 to 9 measure the physical symptoms, and items 10 to 18 measure the psychological symptoms. This instrument is scored on a 4-point Likert scale (never=0, sometimes=1, often=2, and always=3); therefore, the minimum and maximum scores of the respondents in this scale are between 0 and 54. In this scale, high scores indicate a higher level of anxiety in individuals. The reliability was 0.919 and for the first and second factor was 0.87,0.86, respectively. The validity was verified by confirmatory and exploratory factor analysis. The total psychological and physical aspect of reliability was calculated by Cronbach's alpha as 0.95, 0.92 and 0.93, respectively [25].

The Coping Inventory for Stressful Situations (CISS-21): This scale has been developed by Colezbick et al. based on the Endler and Parker Stressors Situation Questionnaire, and includes 21 items and three coping styles (problem-oriented coping, emotion-oriented coping, and avoidance-oriented coping). The items of this inventory are arranged in a 5-point Likert scale (from never =1 to always= 5) [26]. Cronbach alpha, test-retest reliability coefficients, factor analysis, and divergent validity of this instrument have been confirmed. The short version includes three main coping styles: a problem-based coping style that means controlling emotion and planning to solve problems step by step. Emotion-based coping style means the person focuses on originated emotions from the problem instead of the problem and tries to reduce negative emotion. Avoidance coping style means the person avoids facing a problem. Some of the questions are in emotion-focused coping styles (Item number 3,5,10,12,14,17,20) and some in problem-focused coping styles (Item number 2,6,8,11,13,16,19). The participants answered how much they use the strategies in Likert's scale [27]. Tavousi and Saremi reported Cronbach's alpha about the problem, emotion-based and avoidance 0.81, 0.83 and 0.71, respectively. The total reliability of the questionnaire was 0.82 and in problem and emotion-focused, it was 0.83 [28].

Results

In the analysis section, first, the data were studied using descriptive statistics, and then, according to the purpose of the study to determine the predictability of coronavirus anxiety based on coping strategies, structural equation analysis was used. In the study of descriptive indicators, it was found that in relation to gender, 42% of participants were male and 48% were female. In terms of occupation, 6% of the participants in the study were doctors, 44% were nurses, and 50% were the other staff. Also, the mean of research variables, coronavirus anxiety, problem-focused style and emotion-focused style were 17.83, 12.84, and 11.83, respectively, and their standard deviation was 11.72, 4.68 and 5.21 respectively. Examining the presuppositions of structural equation analysis showed that in the normality check because the absolute value of Skewness and Kurtosis of the variables did not exceed 2 and 3, respectively, this presupposition was fulfilled. In the analysis of outlier data based on standardized residuals (between 3 and -2), Cook's distances (less than 1), and Leverage's (less than 0.5), this assumption was confirmed. Also, the non-collinearity of the predictor variables was confirmed based on the tolerance level equal to 0.45 and the VIF level equal to 0.45.

Figure 2 shows the coronavirus anxiety model based on coping styles. Accordingly, the study of standard effect coefficients shows that problem-focused coping style and

emotion-focused coping style have a direct effect of 0.26 and 0.78 on coronavirus anxiety. Also, the factor load of all items of the questionnaires used to measure the studied variables was at the appropriate level. This is Due to the fact that if the factor load of each item is higher than 0.3,its validity is confirmed [29].

According to Figure 3, the calculated t-values for the coefficient of the effect of problem-focused coping style and emotion-focused coping style on coronavirus anxiety were -3.10 and 6.93, respectively. Also, due to the fact that the t-value obtained for all items related to the questionnaires used to measure the studied variables was higher than 1.96, all items gained the necessary validity to participate in the questionnaire.
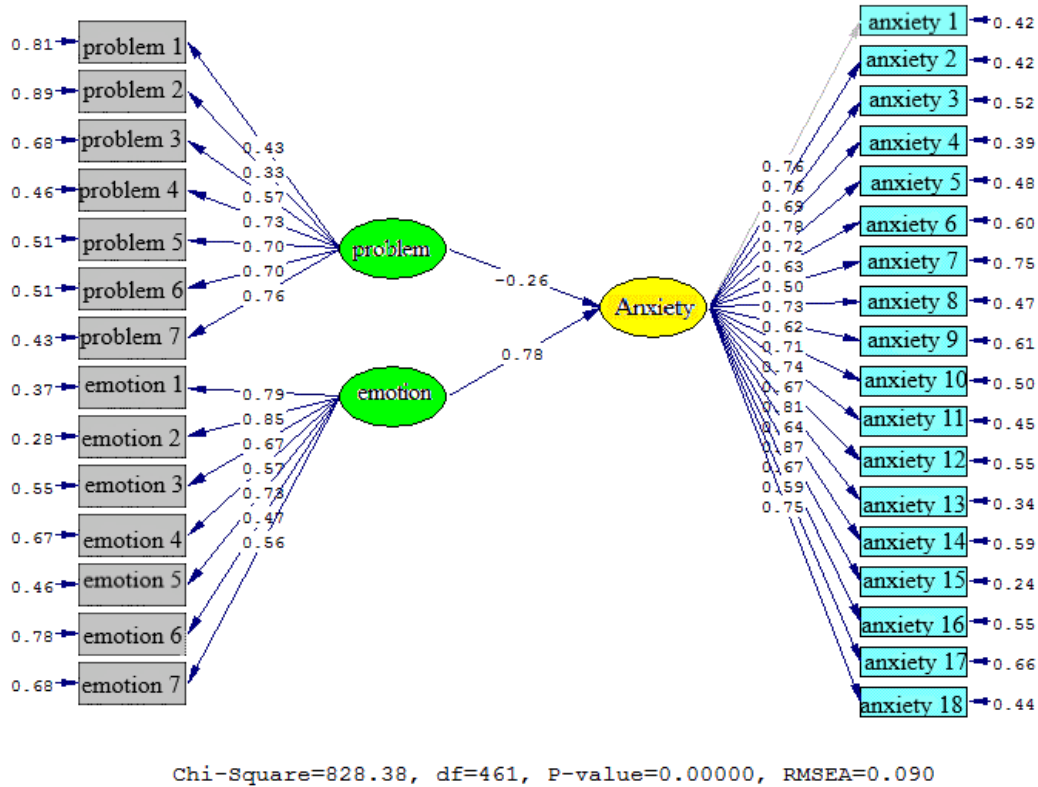

Chi-Square=828.38, df=461, P-value=0.00000, RMSEA=0.090

Figure 2. The development of coronavirus anxiety model based on coping styles in standard coefficients.

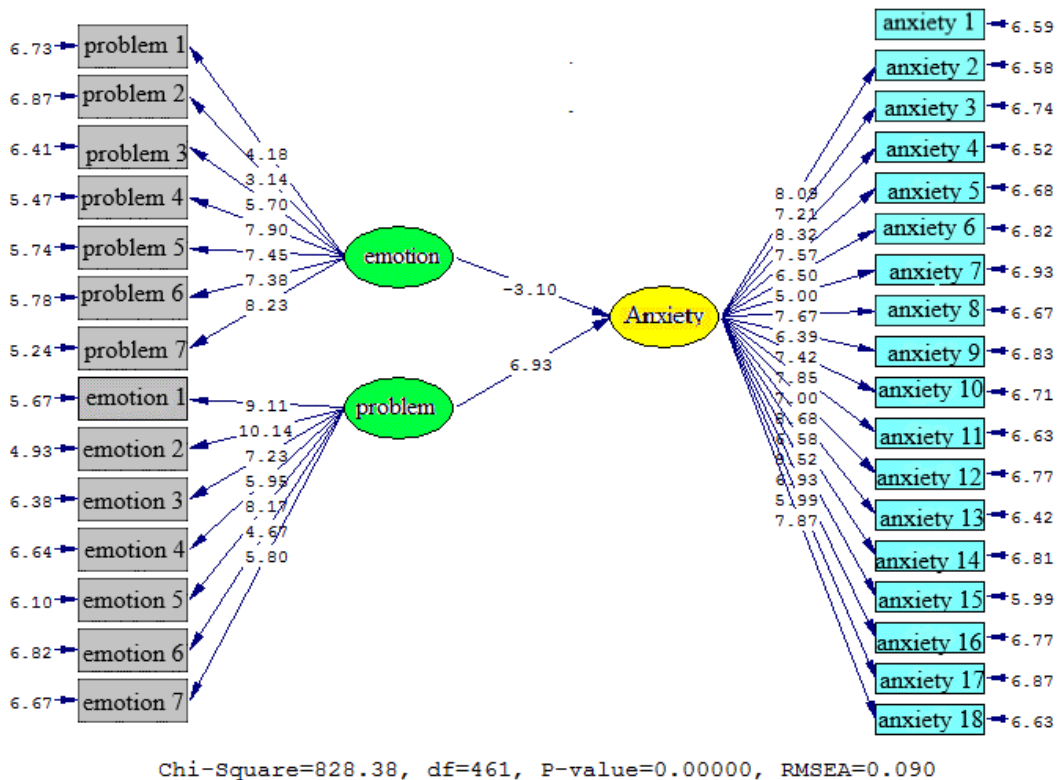Chi-Square=828.38, df=461, P-value=0.00000, RMSEA=0.090

Figure 3. The development of coronavirus anxiety model based on coping styles in significant coefficients.

Acceptable scientific criteria for confirming the theoretical model using data is the main issue of model fit indices that should be considered in relation to each model in the analysis of structural equations.

The Root Mean Square Error of Approximation (RMSEA) isone of the main indicators of the goodness of fit inmodeling structural equations, and if it is calculated less than 0.1, the suitability of the model is confirmed. In the present study, considering that the value of this index wasequal to 0.09, the model fit was confirmed. Also, another important fit index is the result of dividing chi-square by the degree of freedom, which if it is lower than 5, the fit isconfirmed and in this study was calculated to be equal to 1.79. In addition, if indices such as Normalized Fitness Index (NFI), comparative fitness index, Parsimony Comparative Fitness Index (PCFI), Incremental Fitness Index (IFI), and Goodness of Fit Index

(GFI) were higher than or equal to 0.9, the suitability of the model is confirmed. Due to the fact that in this model, these indices were calculated equal to 0.90, 0.92, 0.92, 0.91, and 0.90, respectively, the fit of the model was confirmed. In the following, research hypotheses are examined separately.

Examination of the first hypothesis of the study showed that problem-focused coping style had a negative effect of -0.26 on coronavirus anxiety, which is a significant causal relationship due to having a value of t equal to -3.10. Thus, the first hypothesis of the research was confirmed. Examination of the second hypothesis of the study showed that emotion-focused coping style had a positive standard effect of 0.78 on coronavirus anxiety, which is a significant causal relationship due to having a t value of 6.93 and therefore this hypothesis was also confirmed.

Table1. Fit Indicators Calculated in the Research Model

Model fit index	Index value	Desirable level	fit condition
root mean square error of approximation (RMSEA)	0.09	lower than 0.1	desirable
CMIN/df	1.79	lower than 5	desirable
comparative fitness index (CFI)	0.92	Higher or equal to 0.9	desirable
parsimony Comparative fitness index (PCFI)	0.92	Higher or equal to 0.9	desirable
Normed Fit Index (NFI)	0.90	Higher or equal to 0.9	desirable
incremental fitness index (IFI)	0.91	Higher or equal to 0.9	desirable
goodness of fit (GFI)	0.90	Higher or equal to 0.9	desirable

Discussion

The aim of this study was to develop a causal relationship model of coping styles and coronavirus anxiety in the medical staff. The findings of the present study showed that coping styles affect coronavirus anxiety and predict coping styles in the exposure of coronavirus anxiety. This result is consistent with the research of previous studies [8, 30, 31]. Successful coping strategies will help individuals manage stressful events [32] and reduce negative emotions [23]. Coping strategies are actually essential to the process of resilience and individual adaptation. When people experience a critical event, they begin an appraisal process that ends with identifying a coping strategy [33]. Indeed, the coping strategies used during the COVID-19 pandemic can explain why some people experience more anxiety than others [34]. The staff may feel more anxious when they are not able to cope with Covid-19. This is due to the fact that the Covid-19 is a new disease, a virus of which can cause a rapid spread of the disease. In such situations, the medical staff need to gain knowledge and always adapt themselves to the treatment plan. Some medical staff feel that their knowledge is insufficient and this causes them to feel inadequate, and all of this ultimately leads to a negative psychological experience [35]. Studies show that maladaptive coping styles lead to anxiety, negative psychological consequences, and stress [31, 36-39] and on the other hand, the use of appropriate coping styles are compatible with positive outcomes such as psychological resilience [6] and higher psychological well-being [40]. Indeed, appropriate coping strategies help manage stressful events and reduce negative emotions [22]. Furthermore, the findings of the present study showed that problem-focused coping style has a negative

relationship with coronavirus anxiety and emotion-focused coping style has a positive relationship with coronavirus anxiety. These findings are consistent with the results of previous studies [21, 41-44]. In the explanation of this finding, it can be said that people use their abilities by applying problem-oriented coping strategies in accordance with the situation and realism, and by requesting social support and cognitive processing for the optimal solution to the problem, they experience the desired result; This causes the continuation and strengthening of positive emotions and authoritative and conscious regulation. This positive feedback process enriches the fundamental areas of a person's life and increases the quality of life. The positive regulation of emotion resulting from using effective coping strategies again affects the use of effective coping strategies and self-efficacy. Conversely, emotion-oriented strategies can reduce their quality of life by creating frequent emotional disorders [45]. Emotion-focused coping styles are commonly referred to as ineffective styles [46] because they are less effective in reducing stress [41] and due to the uncontrollable nature of the stressful event and the high emotional response, using this kind of coping style probably increases anxiety [43]. People who typically use emotional coping styles confront different situations in an uncompromising manner, they are always in acute and constant anxious, and they estimate events more stressfully. The level of their resistance to stress decreases, which in turn increases their level of coronavirus anxiety. As a result, with increasing emotional coping style, the amount of coronavirus anxiety also increases [21]. On the other hand, the results of the present study showed that the use of problem-solving coping strategies is effective in increasing mental health and reducing anxiety [47].

Also, problem-solving coping style is known as an adaptive strategy to deal with stressful events [48]. People who engage in problem-focused coping strategies, focus on gathering information needed to deal with the factors that cause stress and anxiety, thereby they reduce their anxiety levels [49] . In fact, using problem-focused coping strategies that are an active and focused approach to problem management rather than ineffective assessments (e.g., depressive response) is very effective in reducing anxiety and can help people to manage their emotional state successfully [50]. In fact, in the problem-focused style, the person tries to reduce the effects of the problem, and research shows that people who use this coping style have more mental health [51] .

This study faced some limitations. First, the available sampling method may have reduced the generalizability of our results. Second, the present survey relied only on self-report questionnaires, which may decrease the objectivity of data collection. This research cannot be generalized to describe the anxiety and coping strategies of the medical staff in other cities and private sector treatment centers. Also, as this survey was conducted from May to June 2020 and at the peak of the COVID-19 epidemic in Iran, it was impossible to communicate with the participants in person. For this reason, an online tool was used.

We conducted this study at the peak of the COVID-19 outbreak in Iran when knowledge about the epidemic was limited, and information was changing rapidly. It is suggested to combine quantitative and qualitative methods in future research to better understand this disease's psychosocial impact on the medical staff. This study suggests that prospective studies should consider more factors such as job satisfaction during epidemic and vaccination periods and include other psychological distress symptoms.

It is necessary to carry out support measures for the medical staff during the outbreak of pandemics to reduce anxiety and mental pressure, and hospitals must take adequate measures in this field. These measures include strengthening safety training, ensuring a fair number of nurses for emergency departments, reducing the number of night shifts, ensuring sufficient rest time, updating the latest information rapidly, and encouraging medical staff to share clinical experiences and feelings. More attention should be paid to women and those with children and more support for their families.

The present study examined the first few months after the start of the epidemic. Given that epidemiologists have already predicted more waves of Covid-19, healthcare professionals may continue to face work pressures associated with Covid-19 pandemic for as long as the disease persists. It is natural that in the early stages of an epidemic or during the emergence of a new wave, the intensity and impact of stressors are different. Therefore, this study is a valid starting point for future research. It is interesting to check how Coronavirus's coping styles and anxiety in the medical staff change at different times, for example, whether new stressful factors increase Coronavirus's anxiety and whether the old stressful elements will disappear.

Conclusion
According to the findings, the problem-focused coping style has a negative relationship with coronavirus anxiety and the emotion-focused coping style has a positive relationship with coronavirus anxiety. Hence, it is necessary to study behavioral interventions in order to reduce the use of emotion-focused coping styles that can increase the anxiety of medical staff during the prevalence of Covid-19.

Conflict of interest
There was no conflicts of interest.

Ethical Approval
All ethical principles, such as informing participants on the general purpose of this study, giving the right to participate in the study or leaving it, and the confidentiality of information were all considered.

Acknowledgment

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