



# The Correlation Between Mental Health and Corona Anxiety Among Pre-hospital Emergency Medicine Clinicians Abstract

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## Abstract

**Background:** According to the literature, pre-hospital emergency medicine clinicians' mental health has most likely been ignored during the COVID-19 outbreak.

**Objectives:** This study aimed to investigate the correlation between mental health and corona anxiety among pre-hospital emergency medicine clinicians during the COVID-19 outbreak in Isfahan, Iran.

**Methods:** A cross-sectional study was conducted in Isfahan, Iran, from May to July 2020. All participants voluntarily participated in this study, and an informed consent was obtained. Data collection was done through completing two questionnaires, including the Corona Disease Anxiety Scale (CDAS) and the General Health Questionnaire (GHQ). Data were analyzed with SPSS version 18 using the Pearson correlation test and multivariate linear regression.

**Results:** A preliminary data analysis of CDAS and GHQ showed a significant correlation between the total score of COVID-19 anxiety and general health ( $r = 0.6, P < 0.001$ ). Also, multivariate analysis showed that field of study ( $B = 0.13; P\text{-value} = 0.005$ ) and COVID-19 anxiety were significant predictors for general health ( $B = 0.6; P\text{-value} < 0.001$ ).

**Conclusions:** According to the findings, the higher the anxiety score, the poorer one's general health and the more likely they are to have mental disorders. Therefore, it is recommended to provide mental health services for pre-hospital emergency medicine clinicians during the COVID-19 pandemic.

**Keywords:** Anxiety, COVID-19, Emergency Medical Technicians, Mental Health

## 1. Background

A viral disease broke out in Wuhan, China, in December 2019. SARS-CoV-2, a novel and genetically modified virus of the coronavirus family, led to coronavirus disease 2019 (COVID-19) (1), affecting the respiratory system in people infected with the disease (2). It has spread rapidly throughout the world and affected all countries due to its very high transmissibility (3).

The dimensions of the COVID-19 crisis are extensive, and the disease's future is unclear. With the pathogenic characteristics of the virus and its high transmission and mortality rates, it is expected to threaten the mental health of individuals at different levels of society (4). According to studies, the immediate psychological reactions to COVID-19 pandemic may vary from a helplessness or fear and anxiety to depression, guilt, and aggression (1). Front-line healthcare workers, who are dealing with infected patients, more severely experience COVID-19-related nega-

tive emotions, including anxiety, concern about the contagious disease, and the possibility of being infected with or transmitting the virus to family members and others (5). The results of a study on the mental health status of society individuals in China demonstrated that the prevalence of anxiety was about 12.5% in 512 healthcare personnel, 10.35% of whom experienced mild anxiety, 1.36% had moderate anxiety, and about 0.78% had severe anxiety during the COVID-19 outbreak (6). Another study showed that the COVID-19 pandemic caused an anxiety increase among emergency medical professionals in Turkey (7). One study in Iran showed that healthcare professionals, including pre-hospital emergency medical services (EMS) clinicians, experienced a wide range of emotions such as fear, anxiety, and depression (8). Although all healthcare workers are exposed to job stress, the level of stress is not the same among these workers in different departments, and some of them are more stressed (9). Pre-hospital emergency medicine

clinicians, who are currently in close contact with the coronavirus, are among these high-risk groups. They are always on standby and should be present at the scene of an emergency as soon as possible to transfer COVID-19 patients and provide them with prompt medical interventions (10, 11). Contact with infectious patients has been reported to be one of the most critical stressors of care that causes anxiety and adverse effects on the mental health of operational staff (12-14).

Since the level of anxiety and stress and mental health status of pre-hospital emergency medicine clinicians are the factors determining the quantity and quality of their work efficiency and are related to the quality of care they provide to patients (15, 16), monitoring their psychological status is essential. COVID-19 anxiety is the most fundamental feature of this critical condition. Such anxiety leads to behavioral precautions and changes clinicians' lifestyles. Socially limited relationships and feelings of isolation are among the consequences of the pandemic. In biological disasters, labeling staff by the infectious disease is a shared experience, which, in turn, will add to their anxiety and stress, cause them to receive less social support, and threaten their mental health. Thus, they may not provide optimal services and therapeutic interventions to patients. Since it is not clear when the pandemic ends, the psychological status of pre-hospital emergency medicine clinicians must be evaluated to maintain and improve their mental health and prevent further negative consequences of the pandemic, such as poor functioning and unwillingness to continue healthcare profession (17).

## 2. Objectives

The present study aimed to investigate the correlation between COVID-19 anxiety and the general health of pre-hospital emergency medicine clinicians in Isfahan, Iran.

## 3. Methods

### 3.1. Study Design and Sampling

A cross-sectional study design was used. Since the study was performed during the COVID-19 pandemic, the quarantine measures requested less face-to-face communication, and self-administered electronic web-based questionnaires were used. In early May 2020, the questionnaires were distributed to pre-hospital emergency medicine clinicians in Isfahan, Iran, via WhatsApp and Telegram using a convenience sampling approach. The participants were encouraged to send the questionnaire link to their colleagues whom they considered appropriate for this survey. Eventually, 320 pre-hospital emergency

medicine clinicians returned the questionnaires. The inclusion criteria were willingness to participate in research, no mental disorders such as major depression, and no addiction to narcotics and psychotropic drugs based on self-report.

### 3.2. Measurements

A socio-demographic form, the General Health Questionnaire (GHQ-28), and the Corona Disease Anxiety Scale (CDAS) were used for data collection.

#### 3.2.1. The Socio-demographic Form

The socio-demographic form gathered information on age, marital status, educational level, the field of study, years of work experience, and workplace.

#### 3.2.2. The General Health Questionnaire

Goldberg developed The General Health Questionnaire (GHQ-28) in 1972 to determine a person's well-being. The questionnaire evaluates somatic complaints, depression, anxiety, insomnia, and social dysfunction (18). This questionnaire has 28 items with four subscales of physical symptoms (seven items), anxiety symptoms and sleep disorders (seven items), social functioning (seven items), and symptoms of depression (seven items). Each item is rated on a three-point Likert scale from 0 to 3. Therefore, the total score of GHQ ranges from 0 to 84, with higher scores reflecting more significant psychological disorders. In addition, scores  $\geq 23$  indicate psychological disorders. In Ebrahimi et al.'s study, the criterion validity was calculated at 0.78 by determining its correlation with the criterion variable (diagnosis based on clinical interview), and its reliability was calculated at 0.97 using Cronbach's alpha (19).

#### 3.2.3. The Corona Disease Anxiety Scale (CDAS)

Alipour et al. developed this scale in 2020 to assess the prevalence of coronavirus anxiety in Iran. The instrument includes 18 items and two factors. The items 1-9 measure physical symptoms, and the items 10-18 measure psychological symptoms. The instrument is scored on a 4-point Likert scale (never = 0, sometimes = 1, often = 2, and always = 3), with the respondents' minimum and maximum scores being 0 and 54, respectively. On this scale, higher scores represent higher levels of anxiety in individuals. Accordingly, scores between 0 - 16 indicate no or mild anxiety, 17 - 29 show moderate anxiety, and 30 - 54 show severe anxiety. In Alipour et al.'s study, the reliability coefficient was 0.91 using Cronbach's alpha (20).

### 3.3. Data Collection

After acquiring the code of ethics from the Ethics Committee of Isfahan University of Medical Sciences, pre-hospital emergency care personnel was informed about the inclusion and exclusion criteria. Then, he distributed the online survey to the clinicians on WhatsApp and Telegram. Those interested in the survey filled out the questionnaires on the Porsall website. One of the features of this website is that an online questionnaire can be submitted only when all questions are answered. Data collection was completed on 24 July 2020.

### 3.4. Data Analysis

SPSS 18 was used for data analysis. Frequency, percentage, mean, and standard deviation were used to describe the socio-demographic characteristics, the GHQ score, and the CDAS score. The Pearson correlation test was used to assess the correlation between the GHQ and CDAS scores and their components. Multivariate linear regression was used to determine the association between significant variables and general health. The significance level was considered 0.05.

### 3.5. Ethical Considerations

This study was approved by the Ethics Committee of Isfahan University of Medical Sciences (IR.MUI.RESEARCH.REC.1399.299). The participants submitted informed consent forms before completing the questionnaires. Information on the study's objectives, confidentiality and obscurity of data, and voluntary participation were described to each participant.

## 4. Results

All the participants were male, with the mean age of 32.6 (SD = 4.67) years and the mean work experience of 14.6 years (SD = 7.97). Most of the participants were married (70.9%) and had associate and lower degrees (53.5%). The field of study of more than half of them was medical emergency (73.8%). Most of the participants worked on roads and in cities (38.6%) (Table 1).

Table 2 shows the health outcomes of the participants. The mean score for COVID-19 anxiety was 11.65 (SD = 5.54), which was lower than the midpoint of the questionnaire (score = 27). The majority of the participants had no/mild anxiety (77.8%). Psychological (8.82) (SD = 5.97) and physical (5.37) (SD = 2.38) symptoms had mean scores below the midpoint. The mean score for general health was 21.88 (9.35). None of the mean scores of the general health components was above the midpoint.

**Table 1.** Demographic Information of the Participants (N = 320)

Variables	Mean ± SD/No. (%)
Age (y)	32.6 ± 4.67
Working years (y)	14.6 ± 7.97
<b>Marital status</b>	
Married	227 (70.9)
Unmarried	93 (29.1)
<b>Educational level</b>	
Associate degree and lower	171 (53.5)
Bachelor's degree	139 (43.4)
Higher than bachelor's degree	10 (3.1)
<b>Field of study</b>	
Medical emergency	236 (73.8)
Nursing	67 (20.9)
Anesthesia technician	15 (4.7)
Operating room technology	2 (0.6)
<b>Workplace</b>	
Road and city	113 (38.6)
Dispatch	70 (23.9)
Headquarters	79 (27.0)

**Table 2.** Health Outcomes of the Participants (N = 320)

Health Variables	Mean ± SD/No. (%)	Possible Range
CDA	11.65 ± 5.54	0 to 54
<b>Severity of CDA</b>		
No or mild	249 (77.8)	
Moderate	48 (15)	
Severe	23 (7.2)	
<b>Components of CDA</b>		
PsS	8.82 ± 5.97	0 to 27
PS	5.37 ± 2.38	0 to 27
GH	21.88 ± 9.35	0 to 84
<b>Components of GH</b>		
SS	5.11 ± 3.29	
A&I	6.26 ± 4.24	
SDy	8.09 ± 3.1	
De	2.41 ± 1.56	

Abbreviations: CDA, corona disease anxiety; PsS, psychological symptoms; PS, physical symptoms; GH, general health; SS, somatic symptoms; A&I, anxiety and insomnia; SDy, social dysfunction; De, depression.

Table 3 shows the correlation between COVID-19 anxiety, general health, and their components in the participants. A significant correlation was observed between COVID-19 anxiety and general health ( $r = 0.6$ ,  $P < 0.001$ ). There was also a significant correlation between the total score of COVID-19 anxiety and all general health subscales.

The results of multivariate linear regression with enter method indicated that field of study ( $B = 0.13$ ;  $P$ -value = 0.005) and anxiety ( $B = 0.6$ ;  $P$ -value < 0.001) were significantly predictors for general health (Table 4).

## 5. Discussion

This study investigated the correlation between COVID-19 anxiety and the general health level of pre-hospital emergency medicine clinicians. This is the first study examining pre-hospital emergency medicine clinicians in Iran during the COVID-19 pandemic. The results showed the negative effect of the COVID-19 pandemic on the mental health of pre-hospital emergency medicine clinicians so that 22.2% of the participants suffered from moderate to severe anxiety. Since pre-hospital emergency medicine clinicians are at the frontline of dealing with COVID-19 and are exposed to infection by being present at the bedside of suspected or confirmed COVID-19 patients, they will experience COVID-19 anxiety. The dramatic spread of the disease in the world has decreased the psychological capacity of personnel, exposing them to psychological disorders such as anxiety and depression (21). Several factors seem to be effective in generating such anxiety, including concerns about being infected with the virus, concerns about the lack of personal protective equipment, concerns about transmitting the virus to others and family, and feelings of inefficiency in managing COVID-19 patients (22). Many studies have evaluated the psychological consequences of the COVID-19 pandemic, including depression, anxiety, sleep disorders, and PTSD, in healthcare providers, particularly in China.

A literature review showed that some studies reported a high percentage of adverse psychological consequences, and others underestimated them. The lowest reported prevalence of anxiety, depression, and stress among healthcare providers was 24, 12, and 30, respectively. In addition, the highest prevalence of anxiety, depression, and stress was 67, 56, and 63, respectively (23). Such discrepancies are due to differences in the study population, sampling time according to disease peak incidence in countries, data collection instruments, and research methods.

The results of the present study showed a significant positive correlation between COVID-19 anxiety and general health among pre-hospital emergency medicine clinicians. A significant positive correlation was also observed

between the total score of COVID-19 anxiety and all dimensions of general health and between the total score of general health and both dimensions of coronavirus anxiety. As the increased GHQ score decreases mental health, the positive correlation between the GHQ and CDAS scores is justifiable, indicating that greater anxiety leads to poorer mental health among pre-hospital emergency medicine clinicians.

Showing the correlation between stress and mental health in pre-hospital emergency medicine clinicians, Adriaenssens et al. also supported the significant positive correlation between coronavirus anxiety and mental health (24). Coronavirus anxiety in this study was significantly associated with all aspects of mental health (physical symptoms, social dysfunction, depression, and anxiety) among pre-hospital emergency medicine clinicians. The present study also showed a significant positive correlation between coronavirus anxiety and mental health dimensions, including anxiety and depression, which is consistent with the results of Weinberg's study, confirming the effect of stress on the mental health of healthcare providers (25). Zhang similarly found that COVID-19 anxiety in the workplace was associated with a degree of insomnia, anxiety, depression, and obsession in staff (26). This finding is consistent with the results of a study by Yao on physicians and nurses at a corona referral hospital in Wuhan, China (21), and García-Fernández's study (27). The result was coherent with the finding of Bai et al. found that emergency personnel exposed to patients suspected of having SARS showed signs of physical discomfort such as fatigue, anxiety while communicating with these patients, irritability, insomnia, decreased ability to decide and concentrate, feelings of isolation from others, and decreased function (28).

Social functioning is one's interaction with their environment and ability to fulfill their roles in the workplace, community, and family relationships. One source of anxiety for healthcare providers, including pre-hospital emergency medicine clinicians, is workplace changes during the COVID-19 disease. Some of these personnel may not have experience working in the current situation and may feel inefficient in managing patients, which may play a role in disrupting their social functioning. On the other hand, social distancing to break the virus transmission chain has limited the social interactions of people. However, healthcare providers also suffer from additional concerns due to close contact with COVID-19 patients, such as the possible infection of self or colleagues and the stigma of being called carriers of coronavirus due to their contact with infected or suspected patients, which, in turn, limit their social interactions and thus their social functioning.

**Table 3.** Correlation Among General Health, Anxiety Caused by COVID-19, and Their Components in the Participants (N = 320)

	GH	CDA	Components of GH				Components of CDA	
			A&I	SS	SDy	De	PsS	PS
<b>GH</b>								
r	1							
P-value								
<b>CDA</b>								
r	0.600 <sup>a</sup>	1						
P-value	0.000							
<b>Components of GH</b>								
<b>A&amp;I</b>								
r	0.899 <sup>a</sup>	0.616 <sup>a</sup>	1					
P-value	0.000	0.000						
<b>SS</b>								
r	0.802 <sup>a</sup>	0.518 <sup>a</sup>	0.702 <sup>a</sup>	1				
P-value	0.000	0.000	0.000					
<b>SDy</b>								
r	0.035	0.248 <sup>a</sup>	0.295 <sup>a</sup>	0.211 <sup>a</sup>	1			
P-value	0.529	0.000	0.000	0.000				
<b>De</b>								
r	0.740 <sup>a</sup>	0.507 <sup>a</sup>	0.662 <sup>a</sup>	0.447 <sup>a</sup>	0.384 <sup>a</sup>	1		
P-value	0.000	0.000	0.000	0.000	0.000			
<b>Components of CDA</b>								
<b>PsS</b>								
r	0.524 <sup>a</sup>	0.936 <sup>a</sup>	0.557 <sup>a</sup>	0.445 <sup>a</sup>	0.199 <sup>a</sup>	0.410 <sup>a</sup>	1	
P-value	0.000	0.000	0.000	0.000	0.000	0.000		
<b>PS</b>								
r	0.594 <sup>a</sup>	0.920 <sup>a</sup>	0.589 <sup>a</sup>	0.520 <sup>a</sup>	0.265 <sup>a</sup>	0.538 <sup>a</sup>	0.724 <sup>a</sup>	1
P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

<sup>a</sup> Correlation is significant at the 0.01 level (2-tailed).

**Table 4.** Multivariate Linear Regression Model of Some Variables<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	P-Value
	B	SE	Beta		
(Constant)	160.153	10.211		130.341	0.000
Marital status	-10.109	0.933	-0.054	-10.189	0.235
Workplace	-0.259	10.016	-0.011	-0.255	0.799
Field of study	10.709	0.602	0.133	20.839	0.005
Educational level	-0.187	0.655	-0.013	-0.286	0.775
Coronavirus anxiety	0.532	0.040	0.600	130.356	0.000

<sup>a</sup> Dependent variable: general health

### 5.1. Limitations

This study has several limitations. First, the study was cross-sectional and could not investigate the long-term psychological consequences of COVID-19. Second, the study was web-based, and some of the staff did not participate in the study, which might have led to selection bias. Third, the data was acquired using self-report questionnaires and was not verified using medical documents.

### 5.2. Consequences of Policy

The results of the current study indicated that the COVID-19 pandemic initiated psychological outcomes for pre-hospital emergency medicine clinicians. Since such staff are in critical situations in the clinic, anxiety can adversely affect the safety and quality of services they provide to patients and ultimately reduce their productivity. Therefore, managers are recommended to identify personnel prone to psychological disorders and provide them with counseling and educational interventions to improve the quality of their medical services and maintain and promote their mental health.

### 5.3. Conclusions

According to the results of the present study, approximately one-fifth of pre-hospital emergency medicine clinicians experienced moderate to severe coronavirus anxiety following exposure and contact with patients with or suspected of having COVID-19, which had a positive significant correlation with their general health.

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### Footnotes

**Authors' Contribution:** Study concept and design: F. G. H. and S. G.; Analysis and interpretation of data: F. G. H. and S. G.; Drafting of the manuscript: M. K.; Critical revision of the manuscript for important intellectual content: S. G. and F. G. H.; Statistical analysis: R. S.

**Conflict of Interests:** The authors declare no conflicts of interest.

**Data Reproducibility:** It was not declared by the authors

**Ethical Approval:** This study was approved by the Ethics Committee of Isfahan University of Medical Sciences (IR.MUI.RESEARCH.REC.1399.299). [ethics.research.ac.ir/EthicsProposalView.php?id=144453](https://ethics.research.ac.ir/EthicsProposalView.php?id=144453)

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**Informed Consent:** The participants submitted informed consent forms before completing the questionnaires.

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