

## The proportion of death anxiety and its related factors during the COVID-19 pandemic in the Iranian population

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**A** – Study Design, **B** – Data Collection, **C** – Statistical Analysis, **D** – Data Interpretation, **E** – Manuscript Preparation, **F** – Literature Search, **G** – Funds Collection

**Summary Background.** The worldwide emergence of COVID-19 has brought about various psychological consequences, including anxiety, fear of death, etc.

**Objectives.** This study was aimed at determining the proportion of death anxiety and its covariates during the COVID-19 pandemic in Shahroud city, Iran.

**Material and methods.** This cross-sectional study was conducted on 1,215 participants. Data was collected by convenient sampling method with online tools, including an awareness and attitude checklist toward COVID-19, Templar Death Anxiety Questionnaire and the Generalized Anxiety Disorder (GAD-7) Questionnaire. The data was analyzed using descriptive and inferential statistics (multivariate linear regression analysis). The significant level for all tests was considered to be 0.05.

**Results.** The results indicated that the mean score  $\pm$  standard deviation of death anxiety and GAD were  $6.46 \pm 3.33$  and  $6.27 \pm 4.83$ , respectively. Of all participants, 49.1% reported high death anxiety. Parallel to the high anxiety level, a significant increase in death anxiety was observed ( $p < 0.001$ ). Moreover, factors such as younger age and the death of a family member due to COVID-19 were significantly correlated with death anxiety ( $p = 0.024$  and  $p = 0.001$ ).

**Conclusions.** Assessing anxiety among exposed clients and applying anxiety reduction and coping methods, such as problem-solving techniques, as well as providing comprehensive and practical information on methods to control and adapt with this disease, are recommended to be implemented in health care systems.

**Key words:** anxiety, coronavirus, death, mental health, pandemics.

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### Background

The COVID-19 outbreak not only carries the risk of death but also has imposed a severe psychological burden on community dwellers around the world [1]. In addition, it brings about various other health issues, such as stress, anxiety and depression [2]. For a variety of reasons, including being in collective quarantine, infodemic on COVID-19, ongoing reports of increased mortality and the contagious nature of the disease, some levels of anxiety are reported among all communities [3].

There is growing literature emphasizing the significant psychological impact of the recent COVID-19 outbreak [4]. In this regard, people encountering stressful events, such as life-threatening diseases, would experience death anxiety [5]. Similarly, the results of studies showed that fear of death is directly related to some anxiety disorders, such as obsessive-compulsive disorder, Generalized Anxiety Disorder (GAD), social anxiety

and panic disorder [6]. During the COVID-19 outbreak, community dwellers in China reported a psychological effect. Results showed that participants of the study reported symptoms of depression (16.5%), anxiety (28.8%) and moderate to severe stress symptoms (8.1%) [7]. In addition, in a study in China investigating the rate of GAD, depression and sleep quality during the COVID-19 outbreak showed that the prevalence of these issues was 35.1, 20.1 and 18.2%, respectively [8].

The Australian government has emphasized the psychological side effects of COVID-19 and expressed concern about its long-term effects on isolation [9]. They highlighted the influential effects of being exposed to fake or real news during the outbreak. Results of a previous study showed that more than 80% of the participants were using social media, 48% had depressive symptoms, and 22% had anxiety symptoms [10]. Moreover, those participants exposed to news, media and social networks reported more anxiety and depression.



This study is based on the Terror Management Theory (TMT) and the concept of death anxiety. The TMT postulates that psychological needs are primarily rooted in existential dilemmas [11]. Human beings have an internal desire for existence and creating opportunities for survival and longevity [12]. In addition, they are equipped with intellectual abilities making them aware of death [11]. The imminent risk of losing one's life can also serve as a trigger for the occurrence of changes in the meaning of one's existence, such as intensification of beliefs and strengthening of social and relationship bonds [13]. The instinctual awareness of terror and death exposes them to emotional reactions [14], such as anxiety. COVID-19 and its complications on different aspects of life in communities are a growing public health concern worldwide. Much uncertainty still exists about the relationship between the COVID-19 outbreak and death anxiety among community dwellers. Therefore, it is necessary to examine the various dimensions of death anxiety and its covariates.

## Objectives

The current study was aimed at determining the association of death anxiety and its covariates to the COVID-19 pandemic among Iranian community dwellers.

## Material and methods

### Study design

This study is a quantitative study with a cross-sectional approach.

### Setting

In this study was conducted through cyberspace among community dwellers. Online questionnaires were used to safely access participants in order to prevent them from the spread of disease.

### Participants

The participants of the current study were community dwellers living in Shahrud city, Semnan Province, Iran. Inclusion criteria were the ability to read and write, access to the Internet and the ability to apply mass media in cyberspace to complete the questionnaires. By sending the invitation to participate in the study, they were informed of the terms and conditions of this research. Furthermore, they had to fill in both an informed consent form and the online questionnaire page.

### Variables

The current study applied three variables, including (a) independent variables, which include demographic characteristics (age, gender, level of education, marital status, job status, place of residence, hours of follow-up for COVID-19 news and assessment of immediate and extended relatives concerning death and infectious history due to COVID-19) and awareness and attitude toward COVID-19, as well as (b) death anxiety score and (c) generalized anxiety score.

### Data sources/measurement

The participants of the study were asked to fill in the demographic profile and questions in three questionnaires of Awareness and Attitude Assessment Checklist for COVID-19, Templar Death Anxiety Scale (TDAS) and Spitzer's Generalized Anxiety Disorder (GAD-7) in a self-reported manner.

Level of awareness and attitude toward COVID-19 disease was assessed by a checklist consisting of 6 questions. 1 – Inhaling droplets from sneezing, coughing or conversation with an

infected person can spread the virus. 2 – Physical contact with objects contaminated by an infected person can cause infection. 3 – The incubation period of the coronavirus would not exceed 14 days. 4 – Contact with an asymptomatic person may also lead to the transmission of the coronavirus. 5 – At present, there are approved medications that can treat COVID-1. 6 – Drinking of warm fluids can prevent this disease. The correct answer to each one of the questions got one point. A total score of 5 or more indicates complete awareness; scores of 3 or 4 indicate relative awareness, and scores less than 3 show unawareness of coronavirus [8]. The content and face validity of the checklist were approved by 10 faculty members of Shahroud University of Medical Sciences.

The Templar Death Anxiety Scale (TDAS) consists of fifteen questions with yes/no answers. Replying yes would obtain a score of 1, and selecting no results in a score of zero; thus, the lowest and highest scores collected from each responder would be between 0 and 14 [15]. The Persian version of TDAS has been validated by Iranian researchers. Cronbach's alpha coefficients for the three factors were reported to be 68%, 49%, and 60%, respectively [16]. Templar reported a reliability coefficient of 83% using the test-retest method [15].

The GAD-7 questionnaire consists of 7 questions with a score range of 0 to 21. Each option can result in 0 for "never", 1 for "some days", 2 for "more than half of the days" and 3 for "almost every day". The higher the score on this questionnaire, the more anxiety experienced by the participants. The questionnaire has a cut-off point, with a score of 10 indicating GAD in a client. The validity of the original version of the structural questionnaire was confirmed by analysis of covariance between this scale and the 20-item General Health Questionnaire (SF-20). Cronbach's alpha of the total instrument was calculated as 0.92, and the test reliability coefficient was 0.83 in a two-week interval test-retest method. Convergent validity was assessed by comparing the correlation with the Beck anxiety questionnaire and was reported to be 0.72. Moreover, the SCL-90 was reported to be 0.74 [17]. Cronbach's alpha for internal consistency of the Iranian version of this questionnaire was calculated as 0.85. The correlation of the split-half method between two halves of the test was calculated to be 0.65. The reliability of the questionnaire using the test-retest method was calculated as 0.48 for two-week intervals. The concurrent validity of the questionnaire with the Spielberger mode anxiety scale, Spielberger adjective anxiety and SCL-90 anxiety subscale were 0.71, 0.52 and 0.63, respectively [18].

### Study size

Based on the convenient sampling method, 1,247 participants completed the questionnaires in full. Of all participants, 1,215 responders were verified to have replied to the questionnaire, and the other 23 responses were excluded from the study due to repeated entry.

### Statistical methods

The data was analyzed using descriptive statistics (mean and standard deviation for quantitative and chi-square data, frequency and percentage for qualitative data) and the inferential statistics test (multivariate linear regression analysis). The significant level for all tests was considered to be 0.05.

### Ethical considerations

The present study was approved by Shahroud University of Medical Sciences under Ethics Committee code IR. SHMU. REC.1398.177.

## Results

The finding of the current study showed that 52.9% of the participants were male, and 64% were married. The participants

Parameters	Mean ± SD	n (%)
Age (years)	33.70 ± 10.69	
Gender	female male	572 (47.1) 643 (52.9)
Marital status	married single	777 (64.0) 438 (36.0)
Residence	rural urban	52 (4.3) 1163 (95.7)
Job	self-employed, retired health professional (physician, nurse, medical student, etc.) employees of government agencies, municipalities, banks and others teachers and students	515 (42.4) 212 (17.4) 264 (21.7) 224 (18.4)
COVID-19 infection in first or second degree relatives	yes no	217 (18.6) 949 (81.4)
Death of relatives due to COVID-19	yes no	60 (5.1) 1106 (94.9)
Attitude and knowledge toward COVID-19	lack of knowledge general knowledge quite knowledgeable	15 (1.2) 417 (34.3) 783 (64.4)
	<b>Mean ± SD</b>	
Follow COVID-19 news (hours/day)	2.22 ± 1.73	

N – number, GAD – generalized anxiety disorder, % – percent, SD – standard deviation.

who reported that their immediate and extended relatives have been infected with or died from the COVID-19 virus were 217 (18.6%) and 60 (5.1%), respectively. The average daily time spent on following news on COVID-19 was 1.73 ± 2.22 hours. 64.4% of the participants were fully aware of COVID-19. Detailed findings of the study are summarized in Table 1.

According to the results of the present study, almost half of the participants (49.1%) reported high death anxiety, and 253 (20.8%) subjects reported high anxiety (Table 2).

The chi-square test found that the proportion of low death anxiety was significantly higher in men ( $p = 0.014$ ). There was no significant relationship between participants' death anxiety and other demographic characteristics (Table 3).

**Table 2. Mean score and proportion of GAD and death anxiety during the COVID-19 outbreak in Shahroud city**

Parameters		n (%)
Death anxiety	low	619 (50.9)
	high	596 (49.1)
GAD	low	962 (79.2)
	high <sup>a</sup>	253 (20.8)
	<b>Mean ± SD</b>	
Death anxiety	6.46 ± 3.33	
GAD	6.27 ± 4.83	

N – number, GAD – generalized anxiety disorder, % – percent, SD – standard deviation, <sup>a</sup>GAD was defined as individuals who scored ≥ 10 points.

**Table 3. Frequency of death anxiety based on demographic characteristics during the COVID-19 outbreak in Shahroud city**

Parameters		Death anxiety		p
		Low n (%)	High n (%)	
Gender	female	270 (43.6)	302 (50.7)	0.014
	male	349 (56.4)	294 (49.3)	
Marital status	married	395 (63.8)	382 (64.1)	0.919
	single	224 (36.2)	214 (35.9)	
Job	self-employed, retired	249 (40.2)	266 (44.6)	0.457
	health staff (physician, nurse, medical student, etc.)	112 (18.1)	100 (16.8)	
	employees of government agencies, municipalities, banks and others	142 (22.9)	122 (20.5)	
	teachers and students	116 (18.7)	108 (18.1)	
Residence	rural	26 (4.2)	26 (4.4)	0.889
	urban	593 (95.8)	570 (95.6)	
COVID-19 infection in first or second degree relatives	yes	102 (17.3)	115 (20.0)	0.229
	no	489 (82.7)	460 (80.0)	

N – number, % – percent, p – p-value.

**Table 4. Role of independent parameters on death anxiety of the study participants in the multivariate linear regression model**

Parameters	$\beta$	SE	t	p
Constant value	9.525	1.242	7.666	< 0.001
GAD	0.251	0.019	13.515	< 0.001
Age	-0.019	0.008	-2.262	0.024
Death of relatives due to COVID-19 infection	1.347	0.408	-3.303	0.001

SE – standard error, p – p-value, GAD – generalized anxiety disorder.

The single most striking observation to emerge from the data comparison was that according to the multivariate linear regression model, 15% of the death anxiety variance is explained by the variables within the model. Thus, with the increase of each unit of anxiety and death of relatives due to COVID-19, death anxiety increases by 0.251 and 1.347, respectively. Moreover, the death anxiety score decreases by 0.019 units by the increasing in each year of age (Table 4).

## Discussion

It can be concluded that a good number of participants in this study reported high death anxiety. In addition, parallel to a high anxiety level, a significant increase in death anxiety was observed. Moreover, factors such as younger age and the death of a family member due to COVID-19 were significantly correlated with death anxiety in the participants.

The results of the present study showed that the majority of participants were enjoying an acceptable level of awareness of COVID-19. One of the possible reasons for this finding is proper accessible public education to community dwellers and their follow up on COVID-19. Social mass media can play an important role to alleviate fear and anxiety in the community during the COVID-19 outbreak [4].

The results of the present study showed that about one-fifth of the participants in the study experienced high anxiety. Meanwhile, the results of the study in China showed that 34% of the general population experienced anxiety during the COVID-19 outbreak [8]. The differences in results can be due to the difference between cultural and social construction or even the difference in the severity of COVID-19 in terms of infection and mortality in the studied communities. The results of a study in China showed that approximately 25% of participants experienced a higher level of anxiety during the COVID-19 outbreak, which is consistent with the results of the present study [19]. Since COVID-19 is highly contagious, the fear of COVID-19 is likely due to its novelty and the uncertainties about how bad the current outbreak might become [4]. In addition, community dwellers may experience depression, fear and anger in the current context of isolation and quarantine. It has been shown that in the absence of interpersonal communication, anxiety disorders are more likely to occur or become exacerbated [20]. Even people without experience of COVID-19 infection are psychologically affected by the widespread COVID-19 disease. A significant increase in fear in the community and a decrease in economic and social activities may have psychological and social consequences [21]. It has been well recognized that exposure to natural and human disasters is associated with a wide range of negative health consequences, including post-traumatic stress disorder, depression and GAD [22]. In the case of experiencing anxiety in society, the experience of excessive disasters likely weakens the sense of security and hope for the future. As a result, the risk of mood and anxiety disorders increases. Other research suggests that stable social and economic stressors may also pose a greater risk in this regard [23].

The results showed that almost half of the participants in the study experienced high death anxiety. Death anxiety has been studied in previous recent outbreaks. For example, the results of a study in Mexico showed that death anxiety, depression and stress were 17%, 3% and 3%, respectively, in the influenza A/H1N1 outbreak [24]. Differences in the results can be justified by stating the time interval between the studies, the difference in the cultural and social status of the communities and the type of disease in the study pandemic. Another possible reason for the higher outbreak of death anxiety in the present study can be the existence of numerous rumors about the consequences of COVID-19. This anxiety may be due to a type of psychological problem called "headline stress disorder", in which there is a high emotional response to news media reports, such as feel-

ings of anxiety and stress. Although it is not a medical diagnosis, this can lead to physical and psychological problems [25].

The results showed that the majority of male subjects experience a lower level of death anxiety. This finding is in line with the results of previous studies that found more anxiety in female subjects [26, 27]. Previous literature supports that GAD is directly related to death anxiety [28]. It supports the results of the study which indicated that death anxiety was significantly associated with a generalized anxiety disorder. Similarly, the results of a study in Saudi Arabia (2020) found that generalized anxiety is significantly related to stress level [29]. Furthermore, the results of the present study showed that death anxiety had a significant inverse relationship with people's age. Similar studies in Iran found that among the Iranian population, death anxiety declines with age [30, 31]. Based on this result, it can be concluded that with increasing age, people's opinion of death and life after death becomes more realistic, and as a result, they express less fear and anxiety when confronting critical situations, of which death may also be a part (e.g. outbreak of infectious diseases, natural disasters, war, terrorism, etc.).

The results showed that death anxiety is significantly associated with the death of relatives. It can be stated that with the death of the participants' relatives, they showed a more realistic image of the lethality of COVID-19. In fact, they may feel that their life is jeopardized by corona virus infection. They may even reconsider their view of safety and health in the face of the virus and act strictly and obsessively in this regard, which in itself will cause anxiety in people. However, in the present study, there was no significant relationship between relatives and anxiety in individuals. The probable reason for the discrepancy between the results may be due to a high level of awareness about the disease, or the participants in the present study may have used problem-based coping methods [32].

Since the study was limited to subjects with access to the Internet, it was not possible to collect data from other potential subjects. Moreover, it is unfortunate that the study did not include the subjects' details, such as a history of COVID-19 and economic status.

Shahroud County in the Semnan Province is located in the northeast of Iran and has a population of about 218,628 based on the results of the latest census in 2016 [33]. Khosravi et al. (2020) found that COVID-19 was prevalent in Shahroud County [34]. It is predictable that the COVID-19 outbreak imposes a high mental burden on communities, such as fear of death and anxiety among community dwellers all over the world.

## Conclusions

Considering the adverse effects of anxiety on community dwellers' mental health, this is not merely an issue for hospitalized patients. Health care providers at the community level, especially general physician and nurses, are in a good position to recognize anxiety and implement strategies to alleviate it. Moreover, it is suggested that superior managerial organizations, along with mental health associations and professionals, implement empowerment and comprehensive mental support programs for community dwellers.

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