



Investigating Factors Related to Anxiety and Resilience During the Coronavirus Pandemic in Northern Iranian

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Abstract

Introduction: The COVID-19 pandemic has profoundly impacted mental health in addition to physical health worldwide. This study aimed to determine factors related to anxiety and resilience during the coronavirus pandemic in the northern provinces of Iran.

Methods: In this cross-sectional study, a sample of 6,655 people completed an online survey from September to October 2021. State and trait anxiety were measured using the validated Farsi version of the State-Trait Anxiety Inventory (STAI). Psychological resilience was measured using the validated Farsi version of the Connor-Davidson Resilience Scale (CD-RISC). Linear regression analysis examined associations between demographic factors, resilience scores, and state anxiety levels.

Results: The mean age of the participants was 40.92 (SD=11.76) years and the number of women was 4,272 (64.2%). Higher state anxiety was significantly associated with female gender, being married, and being widowed. Lower state anxiety was significantly associated with being single and having higher resilience scores. In multivariate analysis adjusting for demographics and resilience, female gender ($B=4.063$, $\beta=0.168$, $P<0.001$), Divorced ($B=1.649$, $\beta=0.060$, $P=0.014$), widowed ($B=3.676$, $\beta=0.030$, $P=0.006$) and resilience score ($B=-0.405$, $\beta=-0.577$, $P<0.001$) remained as significant independent predictors, explaining 40.3% of the variance in state anxiety.

Conclusions: The findings can help health authorities, planners and policymakers identify and assist vulnerable groups during public health crises. Promoting resilience in communities is an important strategy to reduce anxiety.

INTRODUCTION

After the spread of the coronavirus in China [1], from the time of the first reported case of this pandemic in Iran so far, the total number of people infected with coronavirus in Iran has reached 7,615,822 and the number of deaths has reached 146,364 [2]. In addition to physical health, the coronavirus disease also affects the mental state of the individual and society [1, 3]. According to researchers' reports, one of the mental risks of this disease is anxiety, the prevalence of which in the subjects under study has been reported as 26 percent [3, 4]. Anxiety is a common and highly arousable

emotion that can be excessive, irrational, and unproductive [5]. It is characterized by subjective feelings of tension, worry, nervousness, and concern along with activation and discharge of the autonomic nervous system [6]. Symptoms of anxiety include excessive worry, restlessness, difficulty concentrating, irritability, muscle tension, and sleep disturbance [7]. In a study conducted at the height of the COVID-19 epidemic in Iran, 59.4 percent of participants had high levels of anxiety, and the provinces of Semnan and Sistan and Baluchistan reported the highest and lowest levels

of anxiety, respectively, while the northern provinces (Mazandaran, Gilan and Golestan) also showed severe anxiety [8]. One study showed the prevalence of anxiety in the elderly of northern Iran to be 40.8 percent [9]. A review of the literature showed that threats to one's own and loved ones' health, separation from family members and friends due to quarantine, lack of daily necessities, salary cuts, social isolation, school closures, being constantly exposed to information about pandemic statistics have exacerbated household anxiety during COVID [10-13]. Moreover, COVID anxiety can also lead to other neuro-psychological symptoms such as depression, obsession, concentration impairment, sleep disturbance, nutritional deficiencies [14].

Mental health problems persist not only during the pandemic but also as a heavy burden after its end [1]. On the other hand, according to the research, one of the most important influencing and moderating factors of anxiety that helps people adapt to adversity and promote mental health is called "resilience" [1, 4]. Resilience can be seen as individuals' ability to protect their mental health, enabling them to cope with stressful events [12]. Resilience is a combination of an individual's personality and life experiences that ultimately leads to the ability to positively adapt [1]. Thus, assessing psychological resilience can help predict people's mental health status [15]. Researchers have shown resilience as a protective factor against mental illnesses such as anxiety and depression, and associated with people's mental health level. This means that the more resilient a person is, the better their mental health and the less anxiety they will have [1].

Studies have shown that different factors such as age, gender, economic status, and marital status can influence people's anxiety and resilience. It seems that adults under 40 are at higher risk for experiencing higher levels of depression and anxiety. Also, women and married people have become more anxious compared to men and single people during corona [3, 4, 8]. It also seems that people's economic situation before the pandemic and the financial consequences of the coronavirus disease after the pandemic have caused mental distress and anxiety [4].

The lack of comprehensive understanding regarding the factors influencing anxiety and resilience during public health crises poses significant challenges for providing effective support and interventions to vulnerable populations [16]. Addressing this knowledge gap is crucial, as it can inform targeted strategies to mitigate the detrimental psychological impacts of future pandemics or similar large-scale events [17]. By elucidating the relationship between demographic characteristics, resilience, and anxiety levels, this study aims to contribute to the development of tailored mental health resources and support systems, ultimately enhancing community preparedness and psychological well-being [18].

Given these hypotheses and the fact that few studies have examined the relationship between individuals' demographic characteristics and their level of anxiety and resilience during the pandemic, and also given the severity of the outbreak in the northern provinces for various reasons, including the proximity of the capital to them and the possibility of greater transmission from this route [19], therefore this study aims to determine factors related to anxiety and resilience during the corona period in northern Iranian (Mazandaran, Golestan and Gilan provinces). In this study, researchers seek to identify the characteristics of individuals who are most at risk for anxiety and need help to improve resilience. In this way, they will have fewer mental health problems in everyday life or future epidemics.

METHODS

This cross-sectional correlational study was conducted to assess determinants of anxiety and resilience during the COVID-19 pandemic among individuals in three northern provinces of Iran (Gilan, Mazandaran, and Golestan). The data for this study were collected from September 22 to October 22, 2021 through an online survey. The minimum sample size was determined to be 1600 by considering 45 items, 2 hidden factors (anxiety and resilience), a test power of 95%, an effect size of 0.1, and a significance level of 5% [20, 21]. Participants were recruited using convenience sampling by distributing the survey link through official communication channels of Mazandaran University of Medical Sciences, including websites, social media pages, and email lists. The survey link was also shared on public health education platforms and community groups related to the target provinces. The inclusion criteria were being a resident of Gilan, Mazandaran, or Golestan provinces, being literate with internet access, and providing informed consent. Individuals who did not consent or submitted incomplete responses were excluded from the study. At the beginning of the online survey, the study objectives, ethical code, assurance of anonymity and confidentiality, and the voluntary nature of participation were explicitly stated. Participants indicated their informed consent by clicking on a designated button to proceed with the survey. This study used a three-part questionnaire consisting of demographic information, State-Trait Anxiety Inventory (STAI-Y1), and Connor-Davidson Resilience Scale (CD-RISC) to collect data. The demographic variables studied included: age, gender, marital status (single, married, divorced, and widowed), underlying disease (yes or no), education (diploma and lower, bachelor's, master's, and doctorate), occupation (health workers and others) and economic status (good, moderate and weak).

The State Anxiety Inventory Questionnaire (STAI-Y1) has 20 questions on a 5-point Likert scale (from almost

never = 1 to almost always = 4) and is scored; A score of 4 indicates greater anxiety; However, for questions 19 and 16, 15, 11, 10, 8, 5, 2, 1, a high score indicates a lack of anxiety and is inversely scored when scoring. This questionnaire is used to assess anxiety symptoms over the past week. The STAI-Y1 questionnaire is scored between 20 and a maximum of 80. STAI-Y1 scores are commonly categorized as "low or no anxiety" (20-37), "moderate anxiety" (38-44), and "high anxiety" (45-80). The reliability of the Farsi version of the State-Trait Anxiety Inventory (STAI-Y1) used in the present study was estimated at 0.85 using Cronbach's alpha coefficient in a study by Mahram [22] conducted among an Iranian population. In present study Cronbach's alpha coefficient was 0.72.

The Connor-Davidson Resilience Scale (CD-RISC) has 25 questions on a 5-point Likert scale ("not true at all" (0), "rarely true" (1), "sometimes true" (2), "often true" (3), and "true nearly all the time" (4)) and is scored. Scoring is between 0 and 100, with higher scores indicating greater resilience. The cut-off point for the resilience questionnaire was based on the Likert score and the mean questionnaire scores, according to which, participants with mean scores less than or equal to 33.1

(low resilience), mean 34.1-66.2 (moderate resilience) and mean above 67.2 (high resilience). The reliability of the present scale in Sharif Nia et al. was estimated at 0.93 using the Cronbach's alpha coefficient [23]. In present study Cronbach's alpha coefficient was 0.92.

The completed questionnaire data were placed in an Excel file and then analyzed by SPSS software version 26. First, descriptive statistics were used to evaluate demographic characteristics. Next, the Kolmogorov-Smirnov test was used to examine the normal distribution of continuous quantitative data. Subsequently, simple linear regression was used to analyze each of the predictive variables. Also, finally, the variables that were significant in simple linear regression entered the multiple linear regression model. The significance level of all tests was considered less than 0.05.

RESULTS

Since the data were collected via a web link (URL), 6,655 people fully responded to the questionnaire. The mean age of the participants was 40.92 (SD = 11.76) years and the number of women was 4,272 (64.2%).

Table 1. Demographic characteristics

	No (%)			P - Value	CI (95%)
	Golestan	Mazandaran	Gilan		
Gender				0.745	0.735 , 0.756
Female	(63.4) 483	(64.6) 1944	(63.9) 1845		
Male	(36.6) 279	(35.4) 1063	(36.1) 1041		
Occupation				< 0.001	-
Healthcare workers	(13.3) 101	(13.6) 408	(8.3) 240		
Others	(86.7) 661	(86.4) 2599	(91.7) 2646		
Underlying disease				0.025	0.022 , 0.029
Yes	(18.8) 143	(20.8) 626	(18.1) 521		
No	(81.2) 619	(79.2) 2381	(81.9) 2365		
Marital status				0.013	0.011 , 0.016
Single	(22.3) 170	(17.7) 532	(19.1) 551		
Married	(74.8) 570	(78.4) 2357	(77.2) 2228		
Divorced	(2.1) 16	(3.3) 98	(2.6) 74		
Widowed	(0.8) 6	(0.7) 20	(1.1) 33		
Education				0.001	0.0002 , 0.0018
Diploma and lower	(21.5) 164	(22.9) 690	(24.7) 714		
Associate degree	(8.7) 66	(9.3) 281	(10.3) 297		
Bachelor's degree	(39.1) 298	(39.2) 1179	(39.4) 1137		
Master's degree	(23.4) 178	(21.3) 640	(20.9) 603		
PhD	(7.3) 56	(7.2) 217	(4.7) 135		
Economic status				0.067	0.061 , 0.073
Poor	(13.3) 101	(13.3) 400	(15.1) 434		
Moderate	(69.4) 529	(69.5) 2090	(70.0) 2021		
Good	(17.3) 132	(17.2) 517	(14.9) 431		
Age		0.021	0.017 , 0.024		
Golestan	40.38 ± 11.35				
Mazandaran	40.62 ± 11.69				
Gilan	41.38 ± 11.91				
Resilience score		0.300	0.289 , 0.311		
Golestan	65.53 ± 16.63				
Mazandaran	64.98 ± 16.51				
Gilan	64.55 ± 16.46				
Anxiety score		0.003	0.001 , 0.004		
Golestan	46.56 ± 11.51				
Mazandaran	47.21 ± 11.59				
Gilan	47.99 ± 11.56				

Data in Table are presented as No (%) or Mean ± SD

Table 2. Regression analysis results

	Unadjusted Regression (simple)				Adjusted Regression (multiple)			
	B	β	P value	CI (95%)	B	β	P value	CI (95%)
Province								
Gilan	0.907	0.039	0.002	0.346, 1.468	0.645	0.028	0.006	0.187, 1.103
Mazandaran	-0.478	-0.021	0.094	-1.037, 0.081	-	-	-	-
Golestan	-1.030	-0.028	0.021	-1.904, -0.157	-0.324	-0.009	0.373	-1.036, 0.389
Gender (Male*/Female)	6.352	0.263	< 0.001	5.793, 6.912	4.063	0.168	< 0.001	3.603, 4.522
Age	0.011	0.011	0.383	-0.013, 0.035	-	-	-	-
Occupation	0.247	0.007	0.583	-0.635, 1.129	-	-	-	-
Underlying disease	0.307	0.010	0.392	-0.396, 1.011	-	-	-	-
Marital status								
Single	-2.606	-0.088	< 0.001	-3.315, -1.898	-0.043	-0.001	0.951	-1.421, 1.335
Married	-0.918	-0.013	0.284	-2.596, 0.760	-	-	-	-
Divorced	2.172	0.078	< 0.001	1.509, 2.835	1.649	0.060	0.014	0.340, 2.958
Widowed	5.042	0.041	0.001	2.078, 8.006	3.676	0.030	0.006	1.055, 6.297
Education	-0.119	-0.016	0.192	-0.297, 0.060	-	-	-	-
Economic status	-0.982	-0.047	< 0.001	-1.487, -0.477	-0.287	-0.014	0.154	-0.682, 0.108
Resilience score	-0.426	-0.608	< 0.001	-0.440, -0.413	-0.405	-0.577	< 0.001	-0.418, -0.391

*Reference group; province Adjusted

Among the provinces examined, Gilan exhibited the highest level of anxiety, with a mean score of 47.99 (SD = 11.56). Conversely, the Golestan province demonstrated the lowest level of anxiety, with a mean score of 46.56 (SD = 11.51). Mazandaran province's mean anxiety score of 47.21 (SD = 11.59) placed it in an intermediate position relative to the other two provinces. Other descriptive statistics are shown in Table 1 by province.

Simple Linear Regression Results

Linear regression analysis showed that gender ($B=6.352$, $\beta=0.263$, $P<0.001$) had a significant positive correlation. This means anxiety was higher in women. The results of simple linear regression also showed significantly higher anxiety levels in Gilan province ($B=0.907$, $\beta=0.039$, $P=0.002$) and lower levels in Golestan province ($B=-1.030$, $\beta=-0.028$, $P=0.021$) compared to the national average, while Mazandaran did not differ significantly ($B=-0.478$, $\beta=-0.021$, $P=0.094$). Additionally, for every one-level increase in response to divorced ($B=2.172$, $\beta=0.078$, $P<0.001$) and widowed ($B=5.042$, $\beta=0.041$, $P=0.001$) variables, there was a significant positive correlation in predicting increased anxiety. On the other hand, for every one-level increase in response to single ($B=-2.606$, $\beta=-0.088$, $P<0.001$), economic status ($B=-0.982$, $\beta=-0.047$, $P<0.001$) and resilience score ($B=-0.426$, $\beta=-0.608$, $P<0.001$) variables, there was a significant negative correlation in predicting increased anxiety.

Multiple Linear Regression Results

Based on Table 2, the adjusted regression analysis showed that given the variables remaining in the model, for everyone level increase in response to female gender ($B=4.063$, $\beta=0.168$, $P<0.001$), divorced ($B=1.649$, $\beta=0.060$, $P=0.014$), widowed ($B=3.676$, $\beta=0.030$, $P=0.006$), Gilan province ($B=0.645$, $\beta=0.028$, $P=0.006$) and resilience score ($B=-0.405$, $\beta=-0.577$, $P<0.001$), anxiety levels in northern Iranians were significant and

predictable. In contrast, anxiety levels in Golestan province did not remain significant after adjustments ($B=-0.324$, $\beta=-0.009$, $P=0.373$). In total, these variables explained 40.3% of the variance in anxiety in northern Iranians (Table 2).

DISCUSSION

The present study showed that female gender, being married and widowed were associated with higher levels of anxiety, while being single and having higher resilience scores were negatively associated with anxiety. Based on the results, gender was identified as a contributing factor to individuals' anxiety. Women had higher anxiety scores compared to men. This finding is consistent with the studies by Jeong and Ozdil which showed that women usually experience higher levels of anxiety during viral epidemics [13, 24]. Women's potential vulnerability to stressful factors, including lower socioeconomic status, limited resources, energy deficiency, role conflict, greater concerns about family health [25], psychological challenges, and low self-esteem, may potentially contribute to the observed relationship [26]. In contrast to the results of this study, a study in Cuba showed that there was no significant difference in anxiety levels between men and women [27].

The present study revealed significant regional disparities in anxiety levels across the northern Iranian provinces. Gilan exhibited markedly higher levels of anxiety, even after controlling for confounding factors. This points to distinct regional characteristics, potentially environmental, socioeconomic, or cultural, contributing to heightened anxiety among Gilan's residents [28]. Conversely, Golestan displayed lower anxiety levels in the unadjusted model, suggesting potential protective regional factors, though this effect diminished after adjustments [29]. Provinces like Golestan that more strictly followed health protocols, social distancing, and travel restrictions saw fewer

deaths and they had less anxiety, excessive travel to provinces like Gilan on weekends contributed to high anxiety [30]. These findings highlight the complex interplay between regional contexts and mental well-being [31]. Further research into the specific socio-cultural and environmental landscapes of these regions is warranted to elucidate the underlying drivers of these disparities and inform tailored interventions promoting psychological health.

being single was associated with a significant decrease in anxiety scores. This finding is consistent with studies showing that single people experience lower levels of anxiety compared to married people [32]. The lack of concern about the health of a spouse and children as well as greater freedom of action and flexibility in single people can reduce their anxiety. However, when the effect of other variables was controlled, this relationship was no longer significant. The disappearance of this significant relationship in the multiple regression model means that other variables such as gender, economic status, and resilience may have been able to moderate the effect of being single on anxiety. Of course, individual differences in single people's access to social support and the use of different coping strategies cannot be overlooked [33, 34].

The elevated anxiety levels observed among divorced individuals during the COVID-19 pandemic may be attributed to the lack of emotional and social support typically found in marital relationships, as well as the loneliness and isolation commonly experienced post-divorce, both of which can increase vulnerability to mental health issues like anxiety. Moreover, the financial strains and economic challenges faced by divorced individuals, including loss of spousal income, asset division costs, and child custody expenses, can exacerbate stress and anxiety [35].

Widowed individuals were more vulnerable to pandemic-related anxiety compared to other marital status groups. Possible reasons could include feelings of loneliness and isolation, loss of spousal support, and financial and livelihood problems [36], requiring more attention to this vulnerable group.

A significant negative relationship was observed between better economic status and anxiety. This finding seems reasonable, as financial stability can reduce stress and anxiety. However, in the adjusted regression model, where other variables were also controlled, this relationship was no longer significant. One possible explanation is that economic status was influenced by other variables such as resilience, gender, marital status, etc. and when they are controlled, it has no effect on anxiety.

A significant negative relationship between resilience score and anxiety. Resilience means the ability to cope with difficult conditions and positively adapt to changes. Resilient people manage life stresses better and become less anxious [36]. It can be concluded that resilience is

an important protective factor against anxiety, and enhancing it can help reduce anxiety in difficult situations. Also, despite the sustained sanctions imposed on Iran, people have faced numerous challenges. They have capitalized on limited resources and exceptional capacities despite the bleak prospects. This long-term adjustment has likely contributed to Iranians' remarkable resilience [8]. Developing and implementing programs aimed at fostering psychological resilience could be an effective strategy to mitigate anxiety levels during public health crises like the COVID-19 pandemic, as evidenced by the findings of this study linking higher resilience with reduced anxiety. Potential interventions include coping skills training (e.g., problem-solving, stress management, emotion regulation), self-efficacy enhancement programs, peer support groups and social connectedness initiatives, mindfulness-based interventions, physical activity and recreational programs, and family-focused psychoeducation on creating a supportive environment [37, 38]. Tailoring these programs to the unique cultural contexts and needs of the target population, along with continuous evaluation and monitoring, is crucial for ensuring their effectiveness. Enhancing community resilience through such evidence-based approaches could ultimately bolster psychological well-being and preparedness for future large-scale adversities [39].

Based on the results obtained, no significant relationships were observed between variables of age, occupation, underlying diseases, married, and education with individuals' anxiety levels. These findings were inconsistent with some previous studies [8, 13, 40, 41]. Possible hypotheses for not observing statistically significant relationships in this study included the limited age range of participants, small sample size of health workers compared to other occupations, lack of distinction between frontline and other health care workers, not specifying the type of underlying disease, the likelihood of adaptation over time or the use of effective coping mechanisms by people with chronic illnesses [42], and the presence of a supportive spouse may have conferred significant advantages in coping with pandemic-related stressors [43]. Given the lack of significant relationships observed, it appears that these variables did not have much effect on individuals' anxiety levels in the present study. However, more precise studies with better control of different variables seem necessary.

CONCLUSION

The study's findings provide valuable insights for health authorities and policymakers in identifying vulnerable groups and developing targeted interventions during public health crises. Understanding the factors contributing to heightened anxiety, such as marital status and lack of social support, enables the creation of

tailored mental health resources and support networks. Promoting resilience through community-based programs focused on coping mechanisms, stress management, and fostering social connections emerges as a crucial strategy. Ultimately, integrating these insights into preparedness plans can bolster communities' psychological well-being and resilience, better equipping them to navigate future crises effectively.

Suggestions and Limitations

Based on the results of the present study, it is suggested that some limitations be considered in future studies. It is suggested to examine the precise effect of socioeconomic variables and the type of underlying disease. Also, the limited access of the elderly to the Internet was one of the limitations of this study. In addition, a more precise examination of the role of variables such as occupation, exposure to danger, and psychological adaptation is recommended. Also, given the lack of a significant relationship between education and anxiety, the effect of education on anxiety cannot be inferred definitively, and further research is needed in this area. Finally, longitudinal studies are useful to elucidate the mechanisms involved and determine causal relationships between these factors and anxiety.

ETHICAL CONSIDERATIONS

At the beginning, the objectives of the study, the code of ethics of the study, assurance to the participants about anonymity, confidentiality of information, and voluntary participation of individuals were placed on the first page of the designed link. This study was approved by the Ethics Committee of Mazandaran University of Medical Sciences IR.MAZUMS.REC.1402.543.

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AUTHORS' CONTRIBUTION

Conceptualization and supervision: SAGH and MHGH; Methodology and data analysis: HSN; Data collection: RF and PN; Investigation, original draft preparation, review, and editing: all authors.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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