

# The Mental Impact of COVID-19 Outbreak: A Population-Based Survey in Iran

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## Research Article

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# Abstract

**Background:** In March 2020, WHO has declared pandemic on COVID-19. Although the number of infected cases is increasing, information about its clinical characteristics in the Middle East especially in Iran, a country which is considered as one of the most important foci of the disease in the world is lacking. Till date, there is no available literature on the clinical data on COVID-19 patients in Iran.

**Method and Material:** In this multicenter retrospectively registered study, 113 hospitalized confirmed cases of COVID-19 admitted in university affiliated hospitals in Shiraz, Iran in from February 20 to March 20 were enrolled.

**Results:** The median age was 53 years and 71 (62.8%) were males. The most common symptoms at onset were fatigue (75: 66.4%), cough (73: 64.6%), and fever (67: 59.3%). Laboratory data revealed significant correlation between lymphocyte count, partial thromboplastin time, international normalized ratio with the severity of the disease (P value = 0.003, 0.000, 0.000, respectively). The most common abnormality in chest CT scan was ground-glass opacity (77: 93.9%), followed by consolidation (48: 58.5%). Our results revealed an overall 8% (9 out of 113 cases) mortality rate among the patients, in which the majority was among the ICU admitted patients (5: 55.6%). Also, 68 (60.2%) of our patients achieved total recovery and 7 (6.2%) were discharged with follow-up and home isolation.

**Conclusion:** In this multi-center study which included 113 hospitalized patients with diagnosis of COVID-19, 9.7% of cases were transferred to ICU and mortality rate was 8%. Furthermore, finding the source of infection and studying the behavior of COVID-19 is crucial for understanding the pandemic.

## Introduction

The 2019 novel Coronavirus (COVID-19), which comes from a viral family that was thought to be rather benign before the turn of the century, has led to a public health emergency of international concern, and according to WHO is classified as pandemic (Organization, 2020). The outbreak of 2019-nCoV, officially known as SARS-CoV-2 or COVID-19 (Organization, 2019) was first reported in December 2019, as a cluster of acute respiratory illness in Wuhan, Hubei Province, China, and spread rapidly to other areas. Since the outbreak till 18<sup>th</sup> of March 2020, the total number of confirmed cases has reached over 200,000 with over 8,000 deaths throughout the world (BNO News, 2020, Feb 26). Moreover, the number of infected cases is increasing and the disease is spreading to other countries in the world (Xiao, 2020).

In Iran, the outbreak of Coronavirus was officially confirmed in Qom Province on February 19, 2020, (anadolu Agency, 2020, Feb 19; Farsnews, 2020, February 19; Islamic Republic News Agency, 2020, Feb 19). Until March 18, 2020, Iran is the fourth most infected country in the world after China, Italy and Spain with more than 19,000 cases of COVID-19 and over 1400 deaths (BNO News, 2020, Feb 26). The absence of definite treatment, the widespread of wrong information and ignorance about the virus, lack of medical and hygiene supplies such as disinfectants and masks have triggered the general population towards an increased anxiety level throughout the country. Although no strict restriction has been exercised by the government for quarantining the cities, the number of travels to several provinces has been radically declined, and it is constantly broadcasted to stay at home. Furthermore, crowded places such as universities, schools, mosques, and some cultural and tourist sites

have been closed until further notice. All these factors along with boredom and loneliness due to having less human interaction can pose a burden on citizens' mental wellbeing (Park & Park, 2020).

Therefore, this study aims to explore and evaluate the burden of psychological problems on the Iranian general population during the outbreak of COVID-19, to provide supporting data for introducing targeted mental health support programs for the individuals during this outbreak.

## Methods

### Study design and participants

Estimation of the sample size was done by using  $n = Z^2 * P (1-P) / d^2$ , assuming a minimum prevalence of 22%, confidence level = 95%, and d (margin of error) = 0.01. The calculated sample size was 6592 participants, and with design effect = 1.3, reaching a sample size count of 8591 participants for this study. This cross-sectional web-based survey was carried out through various social media platforms. The link of the questionnaire was shared through social media in which participants could view the questions simply by clicking on the link and answer the questions. Inclusion criteria regarded all participants from 15 years and above. Also, the questionnaire was non-commercial and voluntary.

### Data collection

The questionnaire was answered by over 8500 participants anonymously from the 2<sup>nd</sup> to the 8<sup>th</sup> of March 2020. Demographic variables included age, gender, marital status, occupation (healthcare workers and non-healthcare workers), place of residence (apartment, dorm, and house), province and number of people living together. Also, the source of the individuals' information about the disease included social media and the internet, television, family and friends, scientific journals and articles, as well as health care providers such as physicians and nurses was collected. Participants rated each source of information from 1 to 5. Scores  $\geq 3$  were categorized as a considerable source of information.

### Designed questions about the threat of COVID-19

Three questions were designed to evaluate the individuals' perspective about the risks of the disease regarding himself, his family members, and his place of residence with answers varying from yes, no and no opinion. These questions are included in table 2.

Furthermore, five questions were assigned to evaluate the individuals' fear of the disease, and consisted of five possible answers ranging from "completely agree" to "completely disagree". These questions are included in table 3.

TABLE 3. Questions regarding the risk and concerns of the general population about contracting the Corona virus.

	Frequency	Totally Agree	Agree	No Opinion	Disagree	Totally Disagree
<b>I'm terrified of contracting the Corona virus.</b>						
Depression Yes	1295	381 (29.4)	533 (41.2)	205 (15.8)	107 (8.3)	69 (5.3)
No	7296	1104 (15.1)	2959 (40.6)	1440 (19.7)	1094 (15)	699 (9.6)
Anxiety Yes	1733	656 (37.9)	641 (37)	223 (12.9)	120 (6.9)	93 (5.4)
No	6858	829 (12.1)	2851 (41.6)	1422 (20.7)	1081 (15.8)	675 (9.8)
<b>Due to the anxiety of contracting the Corona virus, I avoid going to public places.</b>						
Depression Yes	1295	529 (40.8)	487 (37.6)	94 (7.3)	123 (9.5)	62 (4.8)
No	7296	2116 (29)	3104 (42.5)	569 (7.8)	1002 (13.7)	505 (6.9)
Anxiety Yes	1733	760 (43.9)	627 (36.2)	114 (6.6)	146 (8.4)	86 (5)
No	6858	1885 (27.5)	2964 (43.2)	549 (8)	979 (14.3)	481 (7)
<b>Because I am afraid of being infected by the Corona virus, I avoid shaking hands and touching suspicious surfaces.</b>						
Depression Yes	1295	723 (55.8)	468 (36.1)	46 (3.6)	32 (2.5)	26 (2)
No	7296	3505 (48)	3122 (42.8)	227 (3.1)	244 (3.3)	198 (2.7)
Anxiety Yes	1733	1036 (59.8)	566 (32.7)	63 (3.6)	34 (2)	34 (2)
No	6858	3192 (46.5)	3024 (44.1)	210 (3.1)	242 (3.5)	190 (2.8)
<b>I'm petrified that if I contract the Corona virus, I will die.</b>						
Depression Yes	1295	307 (23.7)	355 (27.4)	250 (19.3)	227 (17.5)	156 (12)
No	7296	724 (9.9)	1566 (21.5)	1606 (22.0)	2003 (27.5)	1397 (19.1)
Anxiety Yes	1733	483 (27.9)	497 (28.7)	340 (19.6)	232 (13.4)	181 (10.4)
No	6858	548 (8)	1424 (20.8)	1516 (22.1)	1998 (29.1)	1372 (20)
<b>I'm anxious about the chances of me getting infected with Corona virus to be high</b>						
Depression Yes	1295	134 (10.3)	288 (22.2)	423 (32.7)	340 (26.3)	110 (8.5)
No	7296	211 (2.9)	947 (13)	2127 (29.2)	2625 (36)	1386 (19)

Anxiety Yes	1733	182 (10.5)	402 (23.2)	622 (35.9)	393 (22.7)	134 (7.7)
No	6858	163 (2.4)	833 (12.1)	1928 (28.1)	2572 (37.5)	1362 (19.9)
<b>Presumption of risk of infection due to Corona virus</b>	<b>Frequency</b>	<b>Agree</b>		<b>No Opinion</b>	<b>Disagree</b>	
<b>Are you worried about contracting the Corona virus?</b>						
Depression (%)	1295	840 (64.9)		209 (16.1)	246 (19)	
No Depression (%)	7296	3691 (50.6)		2307 (31.6)	1298 (17.8)	
Anxiety	1733	1246 (71.9)		211 (12.2)	276 (15.9)	
No Anxiety	6858	3285 (38.2)		1296 (18.9)	2277 (33.2)	
<b>Are you anxious about your family members contracting the Corona virus?</b>						
Depression	1295	1189 (91.8)		63 (4.9)	43 (3.3)	
No Depression	7296	6234 (85.4)		671 (9.2)	391 (5.4)	
Anxiety	1733	1630 (94.1)		45 (2.6)	58 (3.3)	
No Anxiety	6858	5793 (84.5)		389 (5.7)	676 (9.9)	
<b>Are you worried about your living place getting contaminated with the Corona virus?</b>						
Depression	1295	1105 (85.3)		86 (6.6)	104 (8)	
No Depression	7296	5436 (74.5)		659 (9)	1201 (16.5)	
Anxiety	1733	1547 (89.3)		74 (4.3)	112 (6.5)	
No Anxiety	6858	4994 (72.8)		671 (9.8)	1193 (17.4)	

The last question in this part was whether the participant had a history of travel within the last 30 days.

## Generalized anxiety disorder

In order to assess the participants' anxiety symptoms, we used the Persian version of GAD-7 (Generalized Anxiety Disorder-7), because its validity and reliability were proved in previous studies (Naeinian, Shaeiri, Sharif, & Hadian, 2011). In this questionnaire, seven questions were asked to assess the frequency of anxiety within the last 14 days, with each question having a range of scores from 0 to 3. The higher the score, the higher functional impairment due to anxiety (ranging from 0 to 21). A score of 0 to 4, 5 to 9, 10 to 14 and 15 to 21 were referred to

as minimal, mild, moderate and severe anxiety symptoms, respectively. A cutoff score  $\geq 10$  was defined as cases with "Anxiety" with a sensitivity of 77% and specificity of 82% (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007; Spitzer, Kroenke, Williams, & Löwe, 2006).

## Depression symptoms

In order to measure depression symptoms, the Persian version of Patient Health Questionnaire–9 (PHQ–9) was used since its validity and reliability were proved in previous studies. It is considered as a multipurpose screening tool for monitoring, diagnosing and determining the severity of depression (Ardestani, Ashtiani, Rezaei, Vasegh, & Gudarzi, 2019; Dadfar, Kalibatseva, Lester, & psychotherapy, 2018). Nine questions were designed for evaluating the depression status of the participants with answers consisting of "Never", "Some days", "Most of the time" and "Always". They were allocated scores from 0 to 4, respectively. The questionnaire consisted of two main questions, "Little interest or pleasure in activities" and "Feeling sad, depressed or hopeless". If the participant answered "never" or "Some days" to both questions, he was required not to answer the remaining questions of this questionnaire. The data scale ranged from 0 to 27 and scores of under 5, 5 to 9, 10 to 14, 15 to 19, and 20 to 27 were referred to mild, moderate, moderate to severe, and severe depression symptoms, respectively (Kroenke, Spitzer, & Williams, 2001; Spitzer, Kroenke, Williams, & Jama, 1999). A cutoff score of 10, which provides adequate sensitivity (88%) and specificity (88%), was considered for categorizing "Depression" (Kroenke et al., 2001). Also, a question was asked whether answering the above-mentioned questions has affected the individual's performance in the mentioned period of time. If the answer was no, the data was ineligible and discarded from the study due to the absence of depression disorder.

## Statistical analysis

All the statistical analyses were performed by using Microsoft Excel 2007 (Microsoft Corp., Redmond, USA) and statistical package for social sciences (SPSS Inc., Chicago, Illinois, USA) version 26.0. Data are presented as mean  $\pm$  SD and proportions as appropriate. The Chi-square test or Fisher's exact test was used to compare categorical data. P-values $<0.05$  were considered statistically significant (two-tailed). Confidence interval (CI) of 95% and odds ratio was used to determine the relationship between various groups.

## Results

In our study, 8591 filled questionnaires were received from the participants, who were from 15 to 87 years old (mean =  $34.37 \pm 11.25$ ). Female participants were 5703 (66.4%) and 2888 (33.6%) were males.

As the results of our study and the scoring system from PHQ–9 show, 6680 (77.8%) of the participants had no depression symptoms, 76 (0.9%) had minimal, 540 (6.3%) had mild, 588 (6.8%) had moderate, 415 (4.8%) had moderately severe, and 292 (3.4%) cases had severe depression symptoms. Based on the cutoff mentioned in our study, 1295 (15.07%) had depression, while 7296 (84.92%) had no depression.

Based on GAD–7 scoring and our results, 3594 (41.8%) of participants had minimal, 3264 (38%) had mild, 1146 (13.3%) had moderate, and 587 (6.8%) cases had severe anxiety symptoms. Therefore, based on the cutoff mentioned above, 6858 (79.83%) of the participants had no anxiety, while 1733 (20.17%) had it. Table 1 demonstrates depression and anxiety disorder among the participants, based on their demographic features.

TABLE 1. Depression and anxiety of the general population based on demographic features

Variables	Frequency	Depression (N=1295) (%)	No Depression (N= 7296) (%)	OR (95% CI)	Anxiety (N=1733) (%)	No Anxiety (N=6858) (%)	OR (95% CI)
<b>Age group (Years)</b>							
≤20 †	894	199 (22.3)	695 (77.7)	-	221 (24.7)	673 (75.3)	-
21 to 30	2533	491 (19.4)	2042 (80.6)	0.84 (0.70- 1.01)	618 (24.4)	1915 (75.6)	0.98 (0.82- 1.17)
31 to 40	2978	414 (13.9)	2564 (86.1)	0.56 (0.47- 0.68) *	595 (20)	2383 (80)	0.76 (0.64- 0.91) *
41 to 50	1351	139 (10.3)	1212 (89.7)	0.40 (0.32- 0.51) *	222 (16.4)	1129 (83.6)	0.60 (0.49- 0.74) *
> 50	820	50 (6.1)	770 (93.9)	0.22 (0.16- 0.31) *	74 (9)	746 (91)	0.30 (0.23- 0.40) *
<b>Sex</b>							
Male †	2888	330 (11.4)	2558 (88.6)	1.58 (1.38- 1.81) **	475 (16.4)	2413 (83.6)	1.44 (1.28- 1.62) **
Female	5703	965 (16.9)	4738 (83.1)		1258 (22.1)	4445 (77.9)	
<b>Marital</b>							
Single †	3544	697 (19.7)	2847 (80.3)	0.55 (0.49- 0.62) *	825 (23.3)	2719 (76.7)	0.72 (0.66- 0.80) *
Married	5047	598 (11.8)	4449 (88.2)		908 (18)	4139 (82)	
<b>Occupation</b>							
Health worker †	1774	301 (17)	1473 (83)	1.20 (1.04- 1.38) **	365 (20.6)	1409 (79.4)	1.03 (0.91- 1.17)
Non- Health worker	6817	994 (14.6)	5823 (85.4)		1358 (20.1)	5449 (79.9)	
<b>Education</b>							
Under diploma †	548	98 (17.9)	450 (82.1)	-	140 (25.5)	408 (74.5)	-
Diploma	1590	220 (13.8)	1370 (86.2)	0.983 (0.823- 1.173)	317 (19.9)	1273 (80.1)	0.73 (0.58- 0.91) *
Academic	6453	977 (15.1)	5476 (84.9)	0.82 (0.65- 1.03)	1276 (19.8)	5177 (80.2)	0.72 (0.59- 0.88) *
<b>Living place</b>							

House/ Villa †	3238	478 (14.8)	2760 (85.2)	-	640 (19.8)	2598 (80.2)	-
Apartment	5164	782 (15.1)	4382 (84.9)	1.03 (0.91- 1.17)	1058 (20.5)	4106 (79.5)	1.05 (0.94- 1.17)
Dormitory	189	35 (18.5)	154 (81.5)	1.31 (0.90- 1.92)	35 (18.5)	154 (81.5)	0.92 (0.63- 1.35)
<b>Number of individuals in each household</b>							
1 to 4 †	7109	1052 (14.8)	6057 (85.2)	1.13 (0.97- 1.32)	1404 (19.7)	5705 (80.3)	1.16 (1.01- 1.33)
Above 4	1482	243 (16.4)	1239 (83.6)		329 (22.2)	1153 (77.8)	
<b>History of travel</b>							
Yes †	1950	316 (16.2)	1634 (83.8)	0.89 (0.78- 1.03)	385 (19.7)	1565 (80.3)	1.04 (0.91- 1.18)
No	6641	979 (14.7)	5662 (85.3)		1348 (20.3)	5293 (79.7)	
<b>Source of information</b>							
Social Media/ Internet †	7119	1066 (15)	6053 (85)	-	1413 (20.1)	5688 (79.9)	-
Physicians and Nurses	5794	859 (14.8)	4935 (85.2)	0.99 (0.90- 1.09)	1147 (19.8)	4647 (80.2)	0.99 (0.91- 1.08)
Family or Friends	4513	680 (15.1)	3833 (84.9)	1.01 (0.91- 1.12)	886 (19.6)	3627 (80.4)	0.98 (0.90- 1.08)
Scientific articles and journals	4101	556 (13.6)	3545 (86.4)	0.90 (0.80- 0.99) *	778 (19)	3323 (81)	0.94 (0.86- 1.00) *
Television/ Radio	3987	616 (15.5)	3371 (84.9)	0.99 (0.89- 1.10)	819 (20.5)	3168 (79.5)	1.04 (0.95- 1.15)

† indicate reference level

\*Significantly protective compared to the reference level

\*\*Significantly at risk compared to the reference level

Participants were asked where they obtained the disease-related information. The findings showed that social media and the internet accounted for 82.9% of their information, family and friends 52.7%, scientific articles and journals 47.7%, physicians and nurses 67.4%, and TV and Radio 46.4%.

Based on the data from our survey, the highest depression rate was in Semnan, North Center of Iran (33.3%) and the lowest was in Lorestan, west of Iran (4.5%). Also, the highest frequency of participants with anxiety (83.9%)

was seen in Alborz Province, Northern Iran and the lowest (11.4%) in Lorestan. The distribution of depression and anxiety among the participants based on their place of residence (province) is demonstrated in supplementary table 1.

Considering the participants' demographic features, statistically significant associations were observed between age, gender, occupation, and marital status with depression symptoms ( $P$  value $<0.05$ ). There was no statistically significant association between depression and the participants' education, living place (house, apartment or dorm), the number of living individuals in a household, and the history of travel ( $P$  value = 0.071, 0.365, 0.120, and 0.113, respectively).

There was a significant correlation between age group, sex, education, marital status, and the number of living individuals together with anxiety ( $P$  value  $< 0.005$ ). However, there was no significant correlation between the place of residence, the history of travel, and occupation with anxiety ( $P$  value = 0.615, 0.608, 0.642, respectively).

Nevertheless, a significant association was seen between the source of information of the participants and their level of depression and anxiety ( $P$  value = 0.000 and 0.008, respectively).

Based on our data, the individuals who were not worried or had no opinion about their own risk of contracting the disease and their family members or their living location being affected had a significantly less level of depression and anxiety compared to those who answered yes. Those who had no anxiety about contracting the disease and those who had no opinion on whether or not they are afraid of being infected had a significantly low rate of depression and anxiety ( $P$  value $<0.001$ ). Table 2 demonstrates the association between the attitude towards the risk of infection and depression and anxiety disorder. Also, figures 1 and 2 demonstrate the distribution of depression and anxiety disorder symptom types among the general population based on their demographic features, respectively.

**TABLE 2. Distribution of depression and anxiety among the Iranian general population based on their presumption regarding the risk of infection**

	Frequency	Depression (%)	No Depression (%)	OR (95% CI)	Anxiety (%)	No Anxiety (%)	OR (95% CI)
<b>Are you worried about contracting the Corona virus?</b>							
Yes†	4531	840 (64.9)	3691 (50.6)	-	1246 (71.9)	3285 (47.9)	-
No	2553	246 (19)	2307 (31.6)	0.47 (0.40-0.55) *	276 (15.9)	2277 (33.2)	0.32 (0.28-0.37) *
No Opinion	1507	209 (16.1)	1298 (17.8)	0.71 (0.60-0.83) *	211 (12.2)	1296 (18.9)	0.43 (0.37-0.50) *
<b>Are you anxious about your family members contracting the Corona virus?</b>							
Yes†	7423	1189 (91.8)	6234 (85.4)	-	1630 (94.1)	5793 (84.5)	-
No	734	63 (4.9)	671 (9.2)	0.49 (0.38-0.64) *	58 (3.3)	676 (9.9)	0.31 (0.23-0.40) *
No Opinion	434	43 (3.3)	391 (5.4)	0.58 (0.42-0.76) *	45 (2.6)	389 (5.7)	0.41 (0.30-0.56) *
<b>Are you worried about your living place getting contaminated with the Corona virus?</b>							
Yes†	6541	1105 (85.3)	5436 (74.5)	- -	1547 (89.3)	4994 (72.8)	-
No	1305	104 (8)	1201 (16.5)	0.42 (0.35-0.53) *	112 (6.5)	1193 (17.4)	0.30 (0.25-0.37) *
No opinion	745	86 (6.6)	659 (9)	0.64 (0.51-0.81) *	74 (4.3)	671 (9.8)	0.36 (0.28-0.46) *
†indicate reference level							
*Significantly protective compared to the reference level							
**Significantly at risk compared to the reference level							

## Discussion

In the literature, several studies about the impact of public health emergencies such as SARS (Mak, Chu, Pan, Yiu, & Chan, 2009) and Ebola (Ji et al., 2017; Shultz, Baingana, & Neria, 2015) outbreaks on the public mental health

problems were presented. Currently, Iran is the 4<sup>th</sup> most infected country with COVID–19 in the world after China, Italy and Spain. Rapidly increasing numbers of cases and deaths in the past weeks, lack of medical facilities and protective tools and receiving contradictory news about the nature of the disease have caused fear, distress, and panic among the general population of Iran. On the other hand, health care workers have faced serious challenges due to the inadequacy of protective equipment and the stretching of hospitals to the breaking point due to the rapidly increasing number of patients seeking medical treatment.

Our cross-sectional survey demonstrated that 15% and 20% of participants had depression and anxiety, respectively. Being female, young and single are considered risk factors for depression and anxiety. Furthermore, the higher number of individuals in a household was also an additional risk factor for anxiety and being a non-health care worker as a risk factor for depression. Our data also showed that receiving information about the disease from scientific articles and journals was considered as a protective factor from anxiety and depression whereas having higher education was considered a protective factor for anxiety only.

Several studies have reported the prevalence of depression and anxiety in the Iranian population in the past. According to a national survey of the mental health of Iranians in 2011, the levels of depression and anxiety were reported 12.7% and 15.6%, respectively (Vandad Sharifi, Hajebi, & Radgoodarzi, 2015). In a survey on the adult population of Iran, Noorbala, et al reported the depression rate of 10.39% in 2015 (Noorbala et al., 2017). The already existing level of anxiety and depression would most likely rise among the general population of Iran during the COVID–19 outbreak. Similar studies during the COVID–19 outbreak in China reported higher rates of anxiety and depression which ranged from 34 to 48% and 18 to 22%, respectively (Gao et al., 2020; Huang & Zhao, 2020). Compared to the Iranian population, these higher rates of anxiety and depression could be due to the strict quarantine by the government of China and the higher rate of infected cases and deaths, or because of using different methods and cut off points for the questionnaires. Previous studies have shown quarantining to be a predictive factor for developing depression up to 3 years post-outbreak due to risk factors such as inadequate supplies and financial loss (Jeong et al., 2016; Liu et al., 2020).

Our results showed that females and younger people are at a higher risk of developing anxiety and depression compared to males and older individuals. This was confirmed by what Huang et al reported in the outbreak of COVID–19 in China (Huang & Zhao, 2020). A WHO based survey reported that the rate of depression decreases as people get older, even though it is accompanied by other comorbid diseases (Kessler et al., 2010). Additionally, studies on the Iranian population stated that females are at higher risk for psychiatric diseases (Modabernia, SHODJAI, Moosavi, JAHANBAKHSH, & FALAHI, 2007; Mohammadi et al., 2005).

In a study by Gao et al (Gao et al., 2011), married individuals were more prone to anxiety. This is in contrast to our results that demonstrated marriage to be a protective factor for both anxiety and depression, which is also supported by other studies (Stordal et al., 2001; Vicente et al., 2004). This might be caused by marriage as an element for an increased human to human interaction which can subsequently reduce the risk of mental health problems. Our study also showed that crowded households (above 4 individuals) had higher levels of anxiety and those who lived in dormitories had higher levels of depression. In a study which was done during the SARS outbreak in 2007, Su et al stated that those who had been diagnosed with depression had poor neighborhood relationships (Su et al., 2007). These results can be supported by the fact that although factors such as close human to human contact in small families and marriage can protect the person against mental disorders, more

crowded households and environments can increase the chance of infection by the virus due to increased contact, and result in augmented anxiety and depression during outbreaks.

Non-healthcare workers and individuals with lower levels of education had a risk of developing depression and anxiety, respectively. This might be due to the fact that health care providers and people with higher education have better knowledge about the virus and are able to take protective measures against it and, as a result, have lower levels of depression. This is supported by Gao et al who presented in their study that higher educational level results in lower levels of anxiety and depression (Gao et al., 2020). Additionally, those who received information about the disease from scientific articles and journals, rather than other sources such as social media, had a lower rate of depression and anxiety. It can be inferred that evidence-based information from scientific articles can reduce depression and anxiety by providing the reader with trustworthy information. Similar studies also reported that people who used mass media as their source of information had higher rates of depression due to “infodemic” (Gao et al., 2020).

Based on our data, the individuals who didn't worry about the disease contracting themselves, their family members, or infecting their living place had a significantly less level of depression and anxiety. So, the virus jeopardizes the individual both physically and mentally. The highest concern among people with anxiety and depression was the infection of a family member. That is why most of them agreed to avoid contact with suspicious or infected surfaces and individuals. These results show that being worried about the close ones at the time of outbreak can have a burden on the mental health of individuals in society.

It is worth mentioning that based on our results, individuals believed that compared to others, they are less at the risk of contracting the virus. Similar results were also reported by Klein et al in China (Klein & Weinstein, 1997). Individuals, particularly concerning familiar risks that are based on volitional control, tend to recognize their disease risk optimistically and therefore being more pessimistic compared to less-controllable risks posed and affected by others (Sjöberg, 2000; Weinstein, 1984, 1988). Both cognitive and emotional matters including fear and worry have a significant attitude on managing health threats. In other words, since the individual is in control of avoiding the contraction of the disease, he is less anxious; while he is both worried about his dear ones and is not in control of their protective measures. This understanding and emotional bond make him struggle to manage his health threats.

As the final point, the results of this study shed light on the unseen burden of COVID-19 outbreak on the mental health of the general population of Iran. Although locking down the cities can have a good effect on controlling the spread of the disease, it can also lead to more serious mental health problems in that area. Health authorities should be aware of this burden and be prepared to take immediate action whenever needed.

## Limitations

This study had several limitations. Firstly, the study was cross-sectional which makes it difficult to precisely explain causal relationships. Therefore, further longitudinal studies are essential to be conducted in the future. Secondly, since COVID-19 can be transmitted via droplets or close contacts, a web-based approach was adapted for this study. However, there are several biases such as illiteracy and the absence of internet access that might affect the results.

## Conclusion

In conclusion, this study identified a major mental health burden on public health during the time of the COVID–19 outbreak in Iran. Females, singles, younger adults and non-health care workers are at higher risk of developing mental health problems compared to those who have higher education and those who obtain their information about the disease from scientific articles and journals. Therefore, establishing a targeted mental health support program, surveillance and monitoring of consequences of psychological problems during the time of public emergencies such as disease outbreak are advised.

## Declarations

### Authors' contributions

AE, RS, and AB designed the study. AE, RS, and KR collected the data. AM and RS carried out the statistical analysis. AE drafted the manuscript. RS revised and proofread the manuscript. All authors read and approved the final version of the manuscript.

### Ethical statement

We hereby declare that informed consents were obtained from the participants of our study. Also, the study was approved by the Medical Ethics Committee of Shiraz University of Medical Sciences with the code number IR.sums.med.rec.1398.669. The purpose of this research was completely explained to the participants and participants were assured that their information will be kept confidential by the researcher.

### Availability of data and materials

SPSS data of the participant can be requested from the authors. Should you be interested in obtaining the data, please write to the corresponding author.

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### Disclosures

Authors have no competing interests and financial relationships with commercial interests.

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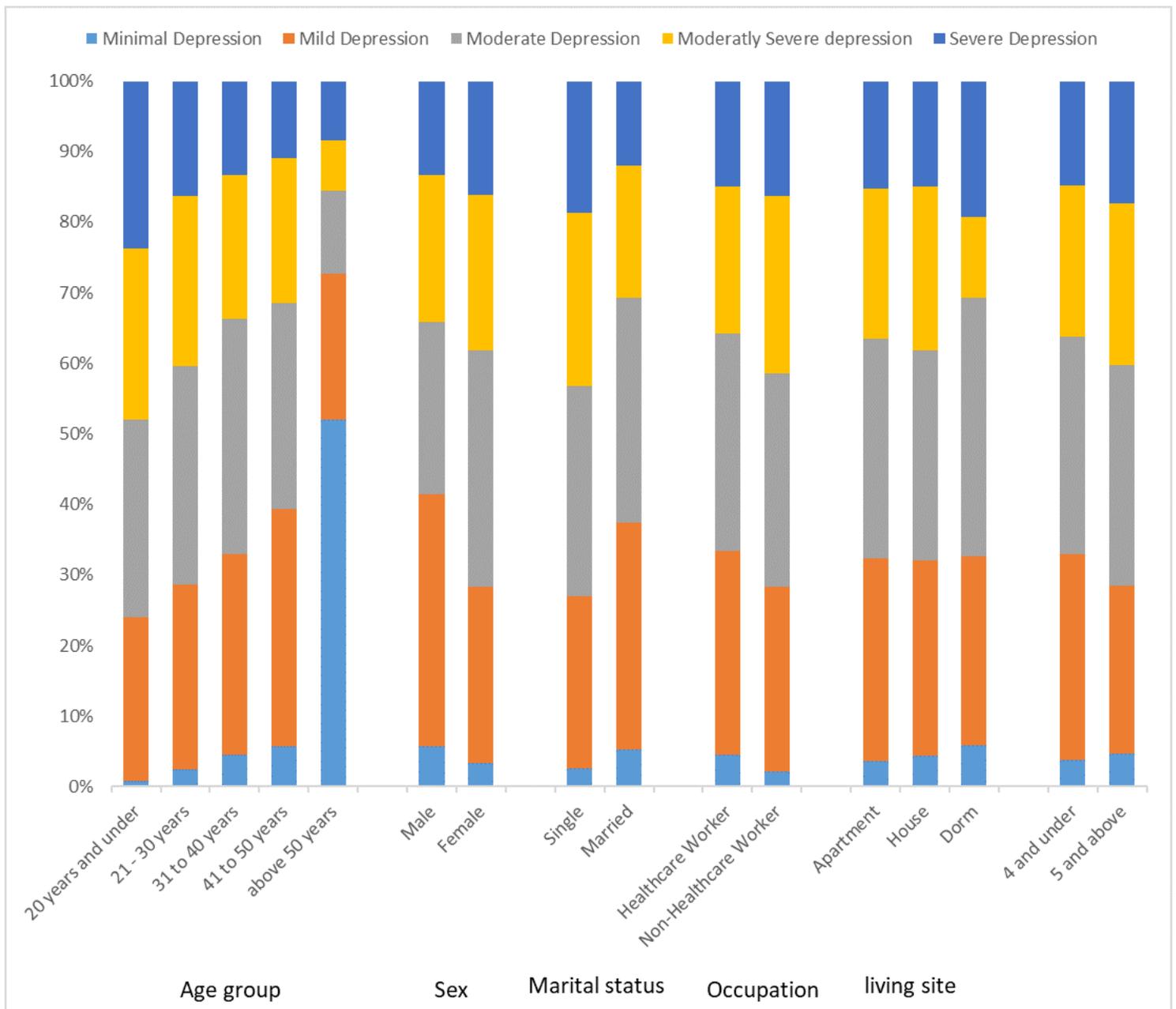
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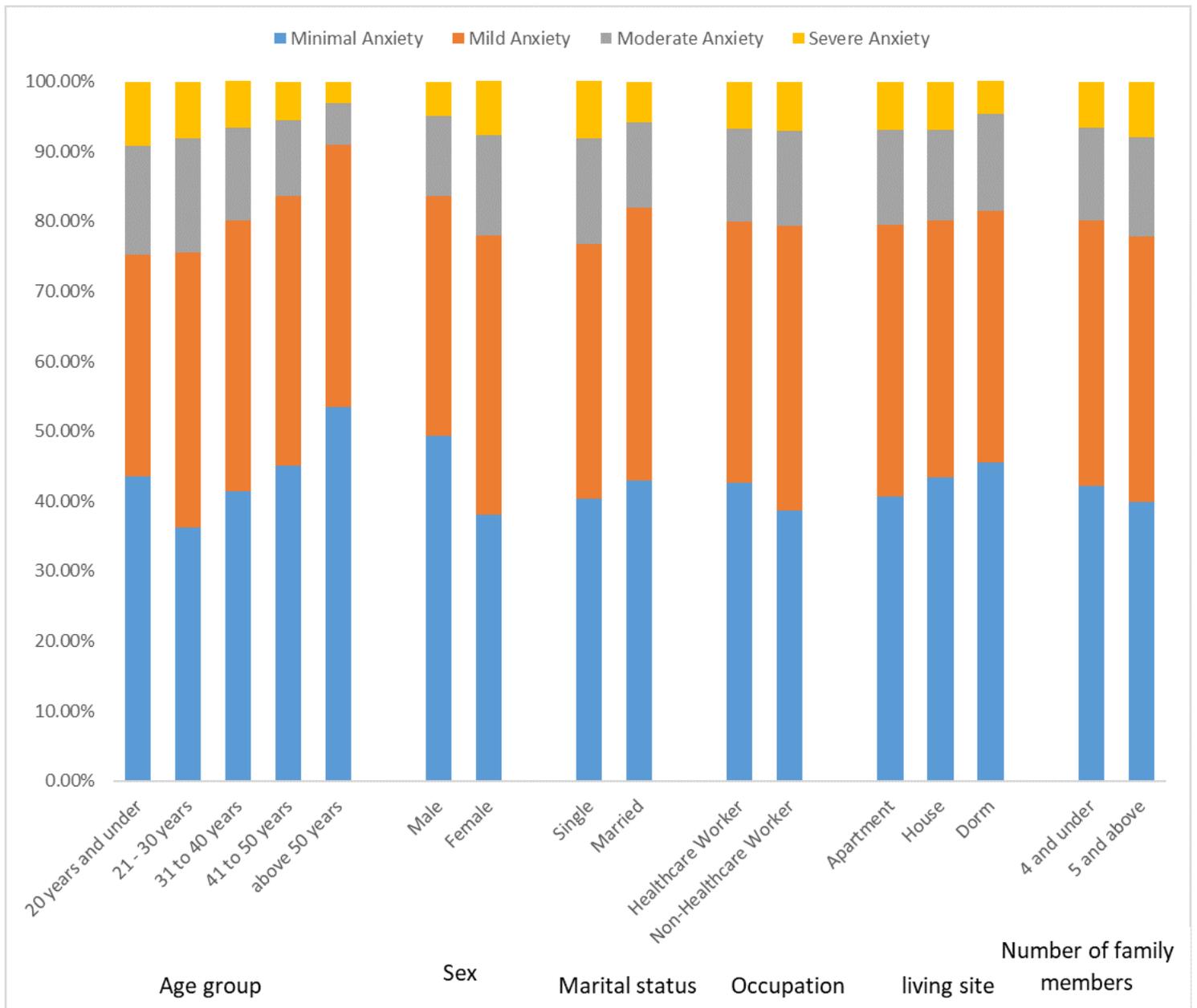
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## Figures



**Figure 1**

Distribution of depression symptom types among the general population based on demographic features



**Figure 2**

Distribution of anxiety symptom types among the general population based on demographic features

## Supplementary Files

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