

RESEARCH ARTICLE

Comparing mental health status and COVID-19 event impact between survivors and the general population during the second wave of the pandemic in Iran

Maryam Hasannezhad Reskati¹ | Motahareh Kheradmand² | Mahmood Moosazadeh³ |
Touraj Assadi⁴ | Misagh Shafizad⁵ | Akbar Hedayatizadeh-Omran⁶ |
Seyed Hamzeh Hosseini⁷ | Forouzan Elyasi^{8,9} 

¹Research Ethics Committee Imam Khomeini Hospital, Mazandaran University of Medical Sciences, Sari, Iran

²Health Sciences Research center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Iran

³Gastrointestinal Cancer Research Center, Non-communicable Diseases Institute, Mazandaran University of Medical Sciences, Sari, Iran

⁴Department of Emergency Medicine, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

⁵Department of Neurosurgery, Orthopedic Research Center, Mazandaran University of Medical Sciences, Sari, Iran

⁶Gastrointestinal Cancer Research Center, Mazandaran University of Medical Sciences, Sari, Iran

⁷Psychiatry and Behavioral Sciences Research Center, Addiction Institute, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

⁸Sexual and Reproductive Health Research Center, Psychiatry and Behavioral Sciences Research Center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Iran

⁹Department of Psychiatry, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

Correspondence

Forouzan Elyasi, Psychosomatic Ward, Imam Khomeini General Hospital, Razi Ave., Sari, Mazandaran 48157-33971, Iran.
Email: forouzan.elyasi@gmail.com;

Funding information

Mazandaran University of Medical Sciences, Grant/Award Number: 7573

Abstract

Background and Aim: The coronavirus disease 2019 (COVID-19) pandemic has to date overwhelmed the survivors and the general population. The present study aimed to compare the mental health status and the COVID-19 event impact between the survivors and the general population in Mazandaran Province, Northern Iran.

Design: A web-based cross-sectional survey was used.

Methods: This study was performed using convenience sampling.

Results: In total, 1,766 participants were included in this study. The findings revealed that the posttraumatic stress disorder (PTSD) severity in both outpatient and hospitalized groups was significantly higher than that in the general population. Besides, the levels of anxiety and depression in the group receiving inpatient care and treatment had significantly elevated than those in the general population.

Conclusion: Given the high prevalence rate of mental disorders, healthcare professionals are recommended to plan for various interventions and support services to boost community mental health status.

KEYWORDS

COVID-19, event impact, general population, mental health, pandemic

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1 | INTRODUCTION

The outbreak of a new health condition in late December 2019, caused by the novel coronavirus (nCoV), originated in the city of Wuhan, China, and then spread rapidly across this country and abroad (Lai et al., 2020; Wang, Wang et al., 2020). According to the World Health Organization (WHO) official reports for emergency situations; as of August 6, 2021, a total of 4,057,758 cases have been identified with the definitive diagnosis of coronavirus disease 2019 (COVID-19) in Iran (World Health Organization, 2021).

The contagious nature of the nCoV (Cascella et al., 2021) has been correspondingly accompanied by stress and fear, including big concerns about loved ones, the future of life, and what macro-planners can do to protect human life (Mousavi et al., 2020). In this respect, isolation and self-quarantine may make people feel exhausted, and even live through loneliness and anger, and the COVID-19 survivors may become worried about the consequences of this condition, including death and severe physical disabilities. Besides, the symptoms of anxiety and mental distress may occur because of this infection and its therapeutic effects (Xiang et al., 2020).

Of note, the COVID-19-induced fear and anxiety, both before and after being infected, are damaging. Stress also counteracts stressors by stimulating the hypothalamus in the brain, accelerating the secretion of cortisol, and electrifying the sympathetic nervous system in the short run (Barrett et al., 2019). Nevertheless, such stress and anxiety can weaken the immune system at the end, and affect the body's ability to cope with the disease (Yaribeygi et al., 2017). Anxiety, fear, depression, insomnia, and posttraumatic stress disorder (PTSD) characterized by high prevalence rates have been thus reported since the pandemic (Kamal et al., 2022; Liu et al., 2020).

Some previous studies have also found fatigue (31%) and cognitive impairment (21%) as the most common symptoms of mental disorders in COVID-19 survivors and those with the history of hospitalization. In the same survey of 94 patients experiencing COVID-19 and being admitted to intensive care units (ICUs); 23, 18, and 7% of the cases had also given an account of anxiety, depression, and PTSD (Prescott, 2021).

Further evaluations of 143 inpatients at a Chinese hospital (namely, 26 cases with COVID-19, 86 individuals having non-COVID-19 pneumonia, and 30 healthy controls) had similarly demonstrated that the patients with COVID-19 and non-COVID-19 pneumonia had felt more anxious and depressed, as compared with the healthy individuals (Kamal et al., 2022). In 1,210 cases of the general population in 194 cities in China, 53.8% of the respondents had comparably rated the pandemic event impact as moderate or severe, 16.5% of the cases had reported the moderate-to-severe levels of depression, and 28.8% and 8.1% of them had described the moderate-to-severe levels of anxiety and stress, respectively (Wang, Pan et al., 2020).

As well, Vahedian-Azimi et al. (2020) in Iran examined 886 people from four groups, viz., the general population, COVID-19 survivors, medical staff, and medical students. Therein, the stress, anxiety, and depression mean scores in the medical students and the patients

infected with COVID-19 had been significantly higher than those in the medical staff and the general population. The anxiety mean values were also above what is usual in males compared with the female participants. Moreover, single respondents had significantly obtained greater depression scores than their married counterparts. The depression mean scores were additionally higher in female medical staff and the general population than in males.

In a review study by Salari et al. (2020) in Iran, the prevalence rate of stress in five studies with a total sample size of 9,074 had been also obtained as 29.6, this value for anxiety in 17 studies with a sample size of 63,439 had been reported as 31.9%, and that of depression in 14 studies with a sample size of 44,531 people had been 33.7%. In the survey by Reskati et al. (2021) on 1,075 people in the general population, quarantined during the first wave of COVID-19 in Mazandaran Province, Iran, about half of the cases had been shown with the moderate-to-severe levels of stress. One-third of these individuals had correspondingly reported moderate-to-severe levels of anxiety, and one-quarter had been subjected to depression at the same levels. One-fifth of the cases had also undergone the COVID-19 event impact, ranging from probable PTSD to immunosuppression.

A study in the United Kingdom on 13,049 cases with COVID-19 suspected or confirmed had further found that the PTSD symptoms had been disproportionately higher among those in need of hospitalization, particularly the ones dependent on ventilator support, presenting with mild symptoms and treated at home (Chamberlain et al., 2021). In a Korean survey on patients with moderate-severity COVID-19, 24.3% of the cases had reported moderate-to-severe levels of depression, 14.9% of them had lived through moderate-to-severe levels of anxiety, and 5.6% of these individuals had suffered from probable PTSD. During the first week of their hospital stay, depression had also been more prevalent in inpatients than the general population (Kang et al., 2021).

Qian et al. in China had similarly observed that the COVID-19 survivors had experienced the higher levels of depression, anxiety, and PTSD, compared with the non-patients. These individuals had additionally reported negative emotions, including fear, a sense of guilt, and helplessness. Moreover, stigma and uncertainty about the virus progression had been among the main concerns said that by the patients (Guo et al., 2020). Therefore, preparing the public for possible future waves of the pandemic is currently the best strategy to minimize its more adverse effects on community mental health status (Clemente-Suárez et al., 2021).

Although preventive measures, social distancing interventions, and government initiatives have been so far implemented to curb the spread of the pandemic, people are still in need of more understanding in order for addressing their own concerns. For this purpose, it is of utmost importance to examine mental health status in individuals with reference to their various conditions, such as inpatient/outpatient care and treatment along with the non-infected general population, because the programs for their mental health monitoring can be varied according to the severity of the problems in each group. Most of the studies have been thus far performed during the first

wave of the pandemic without the segregation of the patients, so the present study was to reflect on the second wave of the disease in larger sample size by separating the information of the inpatients and outpatients. Therefore, this study aimed to compare the mental health status and the COVID-19 event impact between the survivors and the general population during the second wave of the pandemic in Iran.

2 | MATERIALS AND METHODS

2.1 | Participants

In this cross-sectional web-based survey, utilizing an anonymous online questionnaire, the psychological responses of the general population group (GPG), the outpatient COVID-19 survivor group (HCSG), and the hospitalized COVID-19 survivor group (HCSG, OCSG) in times of the COVID-19 pandemic were evaluated. The questionnaire was accordingly completed in Persian through an online platform, developed by the Sadra Rayaneh Novin Tabarestan Engineering Co., Mazandaran, Iran. The sampling was of the convenience type for the residents of Mazandaran Province, Northern Iran. The online questionnaire was further shared with the public through groups and channels on cyberspace, such as WhatsApp Messenger and Instagram, during the second wave of this pandemic in late June 2020. In addition, the questionnaire link was sent to the smartphones of the individuals with the history of COVID-19 as well as inpatient/outpatient care and treatment at the hospitals in Mazandaran Province, Iran, after obtaining the necessary consent and meeting the research ethics principles. At the start of the online questionnaire, all the participants were further asked to answer the items voluntarily and share the questionnaire with other people through virtual social networks if they wished.

These individuals were also requested to read the questionnaire to the elders or even those with no access to smartphones, and then register it. In addition, it was possible to record information from a computer.

To attract cooperation and meet the desire of the respondents, a questionnaire was designed to inform their mental health status qualitatively and quantitatively. Moreover, public phone numbers were placed at the end of the online questionnaire to call people who scored higher or felt the need.

2.2 | Ethical considerations

This study was approved by the Research Ethics Committee of Mazandaran University of Medical Sciences, Sari, Iran, with the permit published on the relevant website of the National Ethics Committee (IR.MAZUMS.REC.1399.158). Upon obtaining their informed consent and ensuring their information confidentiality, the participants completed the questionnaire for 49 days, from June 7

to July 27, 2020. The individuals' consent was further asked at the onset of the questionnaire, and each respondent's information was saved as an Excel file via system coding.

2.3 | Research tools

2.3.1 | Demographic-clinical characteristics information form

The demographic-clinical characteristics information form contained items on age, gender, having a child aged over/under 16, marital status, employment status, and level of education. The information was related to the clinical and medical history of long-term diseases (viz., diabetes, hypertension, cardiovascular diseases, kidney diseases, and cancer), information about illness and treatment beliefs, including the growing number of cases infected, treated, or expired, and mental health status, such as pre-existing mental disorders, the history of referring to a psychologist/psychiatrist, as well as psychiatric problems and medication use. Moreover, the history of sleep disorders, insomnia or interrupted sleep at present or in the past, along with taking sleeping pills was obtained.

2.3.2 | Impact of Event Scale-Revised (IES-R)

The IES-R (Weiss & Marmar, 1997), as a 22-item questionnaire, could be rated on a 0 (not at all) to 4 (extremely) Likert-type numbering. The scale scores could be also formed for the three sub-scales of intrusion reflection (eight items), avoidance (eight items), and hyperarousal (six items), suggesting a high degree of intercorrelation. As well, the total score of 33 or higher denoted the best cutoff for probable PTSD (Creamer et al., 2003), and the value of 37 and higher indicated that the event had suppressed the immune system functioning (Kawamura et al., 2001). The validity and reliability of the Persian version of the IES-R had been already confirmed in the Iranian population. The internal consistency coefficients of the whole questionnaire in the age group of 10–20 was also $\alpha = .887$, and that was $\alpha = .86$ in the age group over 20. Accordingly, it was endowed with acceptable internal consistency and good reliability based on the test–retest method (Panaghi et al., 2006).

2.3.3 | Depression, Anxiety, and Stress Scale-21 Items (DASS-21)

The DASS-21 was recruited to assess the respondents' mental health status (Lovibond & Lovibond, 1995), using 21 items. In the depression, anxiety, and stress sub-scales, the scores of 17, 16, and 20 and higher were also considered very severe, respectively. The internal consistency of the DASS-21 sub-scales in the Iranian population had been further reported by 0.77, 0.79, and 0.78 for depression, anxiety, and stress, respectively (Sahebi et al., 2005).

TABLE 1 Socio-demographic characteristics of the OCSG, GPG, and HCSG participants

Variables	Study groups			p-Value		
	GPG (G) N (%)	OCSG (O) N (%)	HCSG(H) N (%)	G and O	G and H	O and H
Gender						
Male	319 (28.5%)	168 (45.7%)	140 (50.4%)	.0001*	.0001*	.236
Female	801 (71.5%)	200 (54.3%)	138 (49.6%)			
Age (years old)						
18–30	317 (28.3%)	69 (16.5%)	32 (11.5%)	.0001*	.0001*	.011*
31–40	452 (40.4%)	114 (17.4%)	91 (32.7%)			
41–50	223 (19.9%)	100 (24.8%)	81 (29.1%)			
51–60	107 (9.6%)	71 (31.3%)	49 (17.6%)			
Over 60	1 (0.9%)	14 (23.3%)	25 (9%)			
Marital status						
Single	285 (25.4%)	75 (20.4%)	40 (14.4%)	.0001*	.0001*	.221
Married	800 (71.4%)	260 (70.7%)	209 (75.2%)			
Divorced	31 (2.8%)	23 (6.3%)	18 (6.5%)			
Deceased spouse	4 (0.4%)	10 (2.7%)	11 (4%)			
Having children						
Under 16	203 (18.1%)	110 (29.9%)	78 (28.1%)	.0001*	.0001*	.067
Over 16	413 (36.9%)	118 (32.1%)	90 (32.4%)			
Both	130 (11.6%)	40 (10.9%)	49 (17.6%)			
Childless	374 (33.4%)	100 (27.2%)	61 (21.9%)			
Level of education						
Elementary school	12 (1.1%)	16 (4.3%)	25 (9%)	.0001*	.0001*	.0001*
High school	249 (22.2%)	102 (27.7%)	98 (35.3%)			
Bachelor's/Master's degree	737 (65.8%)	218 (59.2%)	150 (54%)			
PhD	122 (10.9%)	32 (8.7%)	5 (1.8%)			
Long-term diseases						
Yes	173 (15.4%)	86 (23.4%)	133 (47.8%)	.001*	.0001*	.0001*
No	947 (84.6%)	282 (76.6%)	145 (52.5%)			

Abbreviations: G, general population; GPG, general population group; H, hospitalized; HCSG, hospitalized COVID-19 survivor group; O, outpatient; OCSG, outpatient COVID-19 survivor group.

*p-Value < .05.

2.4 | Sample size

Given that in the study by Mohammadi et al. (2020), the prevalence rate of stress among COVID-19 survivors had been reported by 57%, population proportion sampling was used. Considering the 57% prevalence rate, the sample size was estimated by 1,569 cases, at 95% confidence interval (CI), 5% margin of error, 0.025 level of precision, and $Z = 2$. Since sampling was online and it was not possible to stop it on the web pages, 1,766 people finally participated in the study.

2.5 | Statistical analysis

The descriptive statistics were initially calculated for the demographic variables in each group. The scores of the DASS-21 and the IES-R sub-scales were also said that as mean and standard deviation (SD).

One-way analysis of variance (ANOVA) and Tukey's test for post-hoc analysis were further used to compare the mean values of the DASS-21 and the IES-R for pairwise comparisons. In this study, the Chi-square test and the univariate/multivariate logistic regression models were also recruited to assess the relationship between the demographic variables, in relation to previous mental status, medical history variables, those associated with beliefs about COVID-19 and its treatment, and the DASS-21 and IES-R sub-scales. The significance level was further considered as $p < .05$ and all the statistical tests were performed using the SPSS Statistics software package (ver. 24).

3 | RESULTS

A total of 1,766 participants were included in this study, of which 1,120 cases were in the GPG, 368 individuals were in the OCSG, and

TABLE 2 Comparing the DASS-21 and IES-R scores between three study groups

Variables	Study groups			p-Value		
	GPG (G) Mean ± SD	OCSG (O) Mean ± SD	HCSG (H) Mean ± SD	G and O	G and H	O and H
IES-R	29.39 ± 16.45	30.30 ± 15.47	26.27 ± 16.73	.349	.005*	.002*
DASS-21						
Anxiety	4.25 ± 4.40	6.95 ± 4.62	6.11 ± 4.61	.0001**	.0001**	.022*
Depression	10.93 ± 10.52	14.33 ± 9.92	12.14 ± 9.65	.0001**	.081	.005*
Stress	13.72 ± 11.20	16.72 ± 10.65	14.33 ± 10.42	.0001**	.405	.005*

Abbreviations: G, general population, GPG, general population group; H, hospitalized; HCSG, hospitalized COVID-19 survivor group; O, outpatient; OCSG, outpatient COVID-19 survivor group.

* p -Value < .01; ** p -Value < .001.

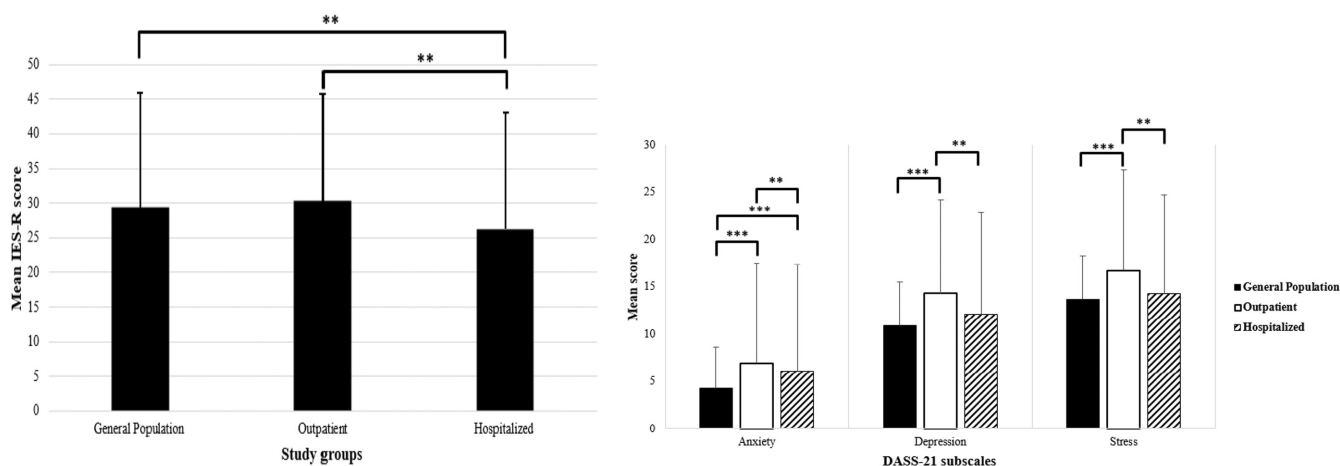


FIGURE 1 Groups' differences of mean scores for IES-R and DASS-21. ** p -value < .01 and *** p -value < .001.

278 respondents were in the HCSG. The demographic-clinical characteristics information of the patients, such as gender, age group, marital status, level of education, having a child, and the history of underlying long-term diseases along with the study groups are illustrated in Table 1.

The most frequent age group involved in the three groups was for those being 31–40 years old. According to Table 2, the highest mean scores of the IES-R (namely, the PTSD severity) were observed in the OCSG (30.30 ± 15.47), GPG (29.39 ± 16.45), and HCSG (26.27 ± 16.73), respectively. As well, no statistically significant difference was observed in the mean values of the IES-R between the GPG and OCSG ($p = .349$). The IES-R mean scores in the GPG and OCSG were, however, significantly greater than those in the HCSG ($p = .005$ and $p = .002$, respectively). The levels of anxiety detected in the HCSG were also higher, compared with those in the GPG (6.11 ± 4.61 vs. 4.25 ± 4.40 , $p = .0001$), but there was no statistically significant difference in the levels of depression and stress between the GPG and HCSG ($p = .081$ and $p = .405$, respectively). The difference between the IES-R and DASS-21 mean scores in terms of the study groups is depicted in Figure 1.

The frequency of the IES-R sub-scales (i.e., PTSD severity: normal, probable, severe, and immunosuppressed) and the DASS-21

sub-scales (namely, normal, mild, moderate, severe, and very severe), separated by the groups, viz., the OCSG, GPG, and HCSG, affected with COVID-19, are presented in Table 3. Accordingly, about one-third of all study groups were in the normal range with regard to the IES-R sub-scales. The frequency of the severities of probable, severe, and immunosuppressed in the HCSG was also significantly higher than those in the OCSG and GPG ($p = .007$ and $p = .025$, respectively). Moreover, the highest frequency of the levels of severe-to-very-severe anxiety was observed in the OCSG (46.2%), HCSG (31.3%), and GPG (20.8%), respectively. The highest frequency of the very severe levels of depression was also reported in the OCSG, so 24.7% of the individuals in the OCSG were suffering from the severe-to-very-severe levels of depression. In total, 24.7% of the cases in the OCSG, 19.4% of those in the HCSG, and 18.2% of the individuals in the GPG had experienced the severe-to-very-severe levels of depression. Moreover, 21.7% of the respondents in the OCSG, 15.8% of those in the HCSG, and 17.3% of the cases in GPG had been subjected to different levels of stress. Therefore, the levels of stress were significantly higher in the OCSG compared with those in the GPG ($p = .0001$) (Figure 2).

The comparison between the IES-R and DASS-21 in the OCSG and HCSG relative to the GPG is shown in Table 4. The PTSD

TABLE 3 IES-R and DASS-21 subscales in three study groups

Variables	Study groups			p-Value [*]		
	GPG (G) N (%)	OCSG (O) N (%)	HCSG (H) N (%)	G and O	G and H	O and H
IES-R subscales						
Normal	422 (37.7%)	127 (34.5%)	127 (34.5%)	.426	.025 [*]	.007 [*]
Partial	216 (19.3%)	69 (18.8%)	69 (18.8%)			
Probable	102 (9.1%)	20 (7.2%)	43 (11.7%)			
Severe; Immunosuppressed	380 (33.9%)	84 (30.2%)	129 (35.1%)			
DASS-21 anxiety subscale						
Normal	616 (55%)	97 (26.4%)	106 (38.1%)	.0001 [*]	.0001 [*]	.0001 [*]
Mild	77 (6.9%)	26 (7.1%)	14 (5%)			
Moderate	194 (17.3%)	75 (20.4%)	71 (25.5%)			
Severe	85 (7.6%)	63 (17.1%)	21 (7.6%)			
Very severe	148 (13.2%)	107 (29.1%)	66 (23.7%)			
DASS-21 depression subscale						
Normal	590 (52.7%)	113 (30.7%)	119 (42.8%)	.0001 [*]	.0001 [*]	.006 [*]
Mild	132 (11.8%)	59 (16%)	25 (9%)			
Moderate	195 (17.4%)	105 (28.5%)	80 (28.8%)			
Severe	88 (7.9%)	57 (15.5%)	34 (12.2%)			
Very severe	115 (10.3%)	34 (9.2%)	20 (7.2%)			
DASS-21 stress subscale						
Normal	662 (59.1%)	168 (45.7%)	153 (55%)	.0001 [*]	.181	.175
Mild	111 (9.9%)	43 (11.7%)	29 (10.4%)			
Moderate	153 (13.7%)	77 (20.9%)	52 (18.7%)			
Severe	113 (10.1%)	53 (14.4%)	30 (10.8%)			
Very severe	81 (7.2%)	27 (7.3%)	14 (5%)			

Abbreviations: G, general population; GPG, general population group; H, hospitalized; HCSG, hospitalized COVID-19 survivor group; O, outpatient; OCSG, outpatient COVID-19 survivor group.

*p-Value < .05.

severity (based on the IES-R) in both OCSG and HCSG was significantly higher than that in the GPG ($p = .004$ and $B = 0.091$, 95% CI; $p = .002$, $B = 0.100$, 95% CI, respectively). In addition, the OCSG had undergone more severe PTSD than the other two groups. The levels of anxiety, depression, and stress in the HCSG were also significantly greater, compared with those in the GPG ($p = .018$, $B = 0.074$, 95% CI; $p = .007$, $B = 0.086$, 95% CI, respectively; $p = .006$, $B = 0.088$, 95% CI). Besides, anxiety in the OCSG was significantly at lower levels than that in the GPG ($p = .000$, $B = -0.193$, 95% CI), but there was no statistically significant difference in terms of the levels of stress and depression (according to the DASS-21) between the OCSG and GPG ($p = .402$ and $p = .078$, respectively).

The relationship between the PTSD severity (based on the IES-R) and the demographic variables as per study group is presented in Tables 5 and 6. In the HCSG, the PTSD severity was significantly higher in males ($p = .046$, $B = 0.140$, 95% CI), the individuals with beliefs about the prevalence rate of COVID-19 ($p = .042$, $B = 0.118$, 95% CI), those having recent insomnia ($p = .045$, $B = 0.133$, 95% CI),

and the cases with the history of insomnia ($p = .000$, $B = 0.395$, 95% CI). In the GPG, the PTSD severity was also significantly higher in males ($p = .022$, $B = 0.140$, 95% CI), those experiencing recent insomnia ($p = .034$, $B = 0.143$, 95% CI), and the cases with the history of insomnia ($p = .000$, $B = 0.132$, 95% CI). Considering the OCSG, the PTSD severity was significantly higher in males ($p = 0.000$, $B = -0.120$, 95% CI), the individuals with beliefs about COVID-19 mortality ($p = .001$, $B = 0.104$, 95% CI), and the cases with pre-existing psychiatric disorders ($p = .070$, $B = 0.030$, 95% CI).

The relationship between the DASS-21 sub-scales (namely, depression, anxiety, and stress) and the demographic variables by the study groups are shown in Tables 7 and 8. The levels of stress in the HCSG were thus significantly higher in males ($p = .005$, $B = 0.219$, 95% CI) and the healthcare workers ($p = .024$, $B = 0.141$, 95% CI), but lower in those having high school diploma ($p = .040$, $B = 0.221$, 95% CI).

As well, the levels of stress in the GPG were significantly higher in the individuals with previous psychiatric disorders ($p = .000$,

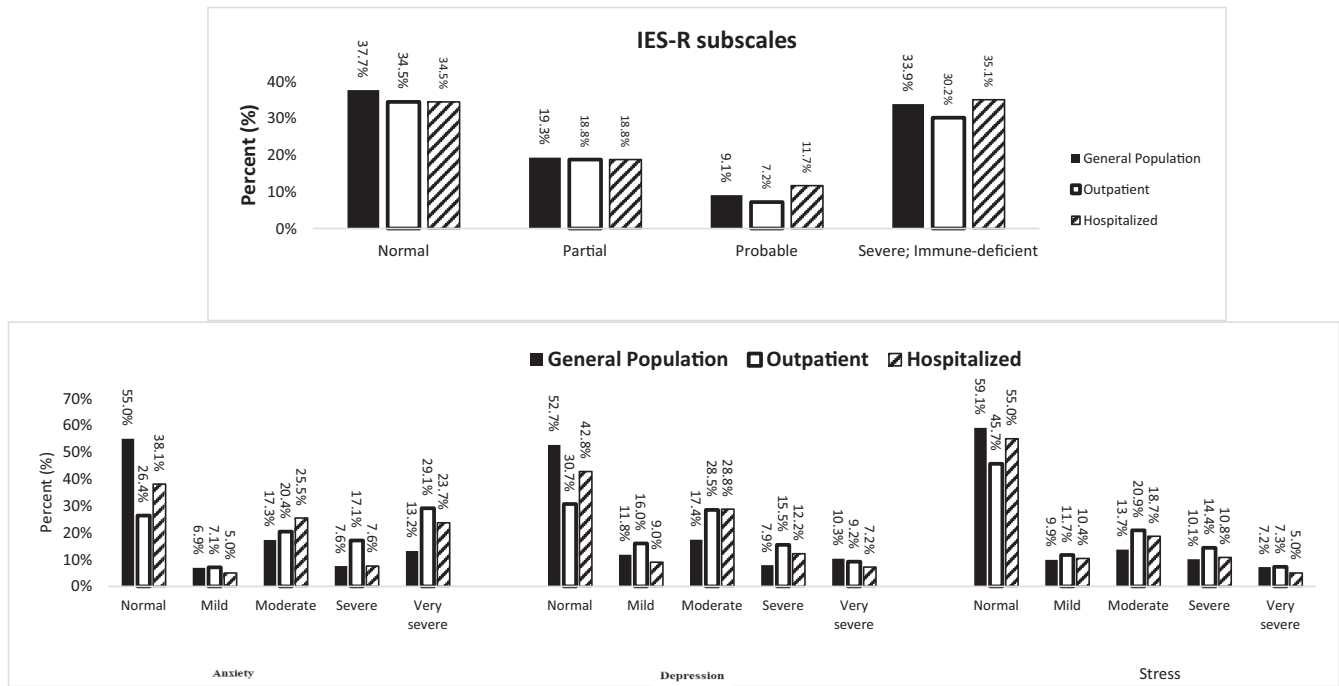


FIGURE 2 Frequency of IES-R and DASS-21 subscales between study groups.

B = 0.106, 95% CI), recent insomnia ($p = .000$, B = 0.177, 95% CI), and the history of insomnia ($p = .000$, B = 0.164, 95% CI), but lower in males ($p = .035$, B = -0.064, 95% CI).

4 | DISCUSSION

This web-based cross-sectional survey aimed to compare the demographic findings, the PTSD severity according to the IES-R sub-scales, and the levels of depression, anxiety, and stress with reference to the DASS-21 sub-scales in three groups of individuals with the history of COVID-19 and inpatient/outpatient care and treatment and the general population during the pandemic, from June 7 to July 27, 2020, in Mazandaran Province, Northern Iran. The outcomes of this web-based study showed that the levels of depression, anxiety, and stress and the event impact were high in the Iranian population in times of the COVID-19 pandemic.

The event impact in 46.8% of those in the HCSG, 37.4% of the cases in the OCSG, and 43% of the individuals in the GPG also ranged from the probable PTSD to immunosuppression. As well, 35.1% of the cases in the HCSG had obtained an IES-R score of 37 or above, indicating that the COVID-19 event impact was at the level of immunosuppression.

The study results also revealed that the PTSD severity (based on the IES-R sub-scales) was higher in the HCSG and OCSG than in the GPG.

Of note, different types of stress can have negative effects on the immune system. In other words, stress weakens the human immune system (Sadeghi Yarandi et al., 2018). In the present study, the IES-R mean score and the PTSD severity (viz. probable and

immunosuppressed) were higher in the OCSG, because there were a lack of healthcare workers, inadequate equipment, and shortages in medical spaces and convents, etc., during the second wave of the COVID-19 pandemic (Ministry of Health and Medical Education office of health and the workplace, 2020).

As well, patients with more severe conditions were only admitted, which led to outpatient care and treatment for some people with less involvement, causing more fear in those who were being treated at home because they might have felt more concerned about the transmission of the virus to family members. In this sense, they might have needed inpatient services when outpatient care and treatment was not enough, but they had failed to receive adequate care and treatment. This uncertainty could thus exacerbate the COVID-19 event impact (viz., PTSD severity).

The regression results also showed that the PTSD severity based on the IES-R outcomes in the OCSG and the HCSG was significantly higher than that in the GPG. Knowing that there was no effective cure for COVID-19, having the fear of transmission to the loved ones, and the fact that there was no vaccine in Iran until then, as well as shortness of breath and the need for continuous oxygen even after discharge, could thus affect the COVID-19 survivors. PTSD could be further exacerbated, while the general population might have experienced the less impact of the pandemic (i.e., PTSD severity) due to lack of experience with the disease condition.

Fear, uncertainty, and unpredictability due to the unknown end of the pandemic, while there was no definitive cure, could thus lead to the emergence of mental health issues, such as stress, anxiety, and depression (Tsamakis et al., 2020). In addition, the frequent media images of severely ill people, dead bodies, and coffins could cause a state of social agitation (United Nations Sustainable Development Group, 2020).

TABLE 4 A comparison between IES-R and DASS-21 subscales following the COVID-19 outbreak in OCSG, GPG, and HCSG

Variables	IES-R			Anxiety			Stress			Depression		
	B (95% CI)	p	AR ²	B (95% CI)	p	AR ²	B (95% CI)	p	AR ²	B (95% CI)	p	AR ²
General population (GPG)	Reference		.006	Reference		.062	Reference		.011	Reference		.017
Outpatient (OSCG)	0.091	.004*		-0.193	.000*		0.02	.402		-0.056	.078	
Hospitalized (HCSG)	0.100	.002*		0.074	.018*		0.088	.006*		0.086	.007*	

Abbreviation: B, Beta.

*p-Value < .05.

In these situations, psychological responses in patients and healthcare workers could range from negative emotions, such as the transmission of the infection to other family members, depression, stress, and anxiety, feelings of guilt and anger, workplace stress, low-life expectancy, and negative and unpredictable future estimates and fear of death (Aliakbari Dehkordi et al., 2020; Kamali et al., 2021). Studies in Iran have further reported the higher levels of depression, anxiety, and stress in the COVID-19 survivors than the general population (Mohammadi et al., 2020).

In the present study, the levels of depression, anxiety, and stress (severe and very severe) were also higher in the OCSG, but the logistic regression analysis outcomes demonstrated that depression, anxiety, and stress in the HCSG were at higher levels than those in the general population and the OCSG. In other reports on COVID-19, the statistically significant levels of persistent major depressive disorder and anxiety had been additionally reported (Rogers et al., 2020). Using electronic health records, new studies also support the possible association between COVID-19 and the risk of psychiatric complications in the COVID-19 survivors (Taquet et al., 2021).

Physical isolation from family members or loved ones during self-quarantine or hospital stay could also cause mental instability in infected cases (Moreno et al., 2020). In addition, the high rates of PTSD have been evident in patients recovered from COVID-19 and discharged (Bo et al., 2021). Some studies in Iran have further reported more anxiety-related symptoms in people with COVID-19 suspected than the non-infected group and the COVID-19-confirmed ones (Hassannia et al., 2021).

Of note, the main generation familiar with smartphones, the Internet, and new communication technologies is the young (Mazza et al., 2020). In this respect, the most active group involved in this field is the young generation in Iran (Mousavi & Shafiqh, 2016). Accordingly, the study results showed that most of the participants in this web-based cross-sectional survey were in the age range of 31–40, i.e., they were young people in the community.

Although reports have indicated that mental health problems, particularly depression symptoms, have been more common in the elders (Mansour et al., 2020; Nikolakakis et al., 2019) and the public media have been alarmingly portraying COVID-19 as a health condition affecting this age group in the early months of the pandemic (Pan American Health Organization (PAHO), 2020), the higher levels of anxiety in the present study were seen in the GPG in the age group of 31–40, while depression was at higher levels in the age group of 41–50 in the OCSG than other age groups. Some studies had also found that the over-60 survivors had experienced less stress and anxiety and lower emotional symptoms of depression than the younger cases (Cai et al., 2020).

The present study additionally revealed that the PTSD severity was higher in males in the HCSG and GPG than females, but less severe PTSD was reported in the OCSG. Men in the HCSG had also felt more stress compared with women, but this type of stress was at lower levels in the GPG and OCSG, receiving care and treatment. However, depression was reported at higher levels in the

TABLE 5 Relationship between demographic variables and IES-R subscales (PTSD severity) following the COVID-19 outbreak in OCSG, GPG, and HCSG

Variables	IES-R					
	HCSG		GPG		OCSG	
	B (95% CI)	p-Value	B (95% CI)	p-Value	B (95% CI)	p-Value
Gender						
Female	Reference		Reference		Reference	
Male	0.140	.046	0.140	.022	-0.120	.000
Age						
18-30	Reference		Reference		Reference	
31-40	0.128	.170	-0.046	.528	0.014	.714
41-50	0.042	.663	-0.073	.392	0.027	.496
51-60	0.010	.910	-0.070	.411	0.023	.534
Over 60	0.055	.557	-0.026	.695	-0.029	.329
Having children						
Under 16	Reference		Reference		Reference	
Over 16	-0.102	.208	-0.011	.879	0.037	.436
Both	-0.067	.270	-0.016	.771	-0.024	.471
Childless	-0.275	.003	-0.052	.553	0.005	.911
Unemployed	Reference		Reference		Reference	
Occupation						
Homekeeper	0.118	.232	-0.168	.157	0.027	.613
University student	0.043	.493	-0.145	.112	-0.054	.200
Medical center staff	-0.026	.698	-0.100	.257	-0.059	.085
Employee in other departments	-0.138	.161	-0.110	.396	-0.003	.946
Clinical treatment staff	0.095	.093	-0.052	.585	0.013	.739
Marital status						
Single	Reference		Reference		Reference	
Married	-0.023	.785	-0.874	.278	-0.010	.787
Divorced	-0.001	.979	-0.152	.805	-0.045	.132
Deceased spouse	-0.008	.896	-0.103	.101	-0.006	.823
Level of education						
Elementary school	Reference		Reference		Reference	
High school	-0.022	.819	-0.249	.048	0.242	.037
Bachelor's/Master's degree	0.157	.141	-0.293	.042	0.257	.051
PhD	0.106	.070	-0.281	.005	0.095	.297

Abbreviations: B, beta; GPG, general population group; HCSG, hospitalized COVID-19 survivor group; OCSG, outpatient COVID-19 survivor group. * $p < .05$.

males in the HCSG than females. Some studies had correspondingly reported that women had experienced the higher levels of stress, anxiety, and depression than men (Hurissi et al., 2021; Lim et al., 2018; Reskati et al., 2021; Wang, Pan et al., 2020) even if no difference had been observed between males and females in some other surveys (Thakur & Jain, 2020). Studies on the hospitalized COVID-19 survivors had also suggested that men, in general, had lived through more anxiety and depression than women (Li et al., 2021; Mohammadi et al., 2020). In one survey on a total of

265 men with COVID-19 with the mean age of 58, 1 month after being treated, it had been also indicated that 28% of the cases had been subjected to PTSD, 31% of the individuals had suffered from depression, 42% of the respondents had felt some levels of anxiety, and 20% of the patients had been affected with obsessive-compulsive disorder symptoms (Mazza et al., 2020). The discrepancy in the results of the studies in different countries could be thus related to their cultural contexts. As well, isolated male patients with COVID-19 might have suffered from a low

TABLE 6 Relationship between physical health, beliefs about COVID-19 and its treatment, history of mental disorders, current and past sleep quality, and IES-R subscales (PTSD severity) following the COVID-19 outbreak in OCSG, GPG, and HCSG

Variables		IES-R					
		HCSG		GPG		OCSG	
		B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value
Chronic diseases	No	Reference		Reference		Reference	
	Yes	-0.077	0.210	-0.001	0.985	0.026	0.367
Beliefs about COVID-19 spread	No	Reference		Reference		Reference	
	Yes	0.118	0.042*	-0.043	0.489	-0.005	0.867
Beliefs about COVID-19 mortality	No	Reference		Reference		Reference	
	Yes	0.047	0.426	0.120	0.049*	0.104	0.001**
Beliefs about COVID-19 treatment	No	Reference		Reference		Reference	
	Yes	-0.052	0.315	-0.080	0.120	-0.038	0.153
Psychological examination	No	Reference		Reference		Reference	
	Yes	-0.020	0.726	0.020	0.740	0.026	0.416
Mental disorders	No	Reference		Reference		Reference	
	Yes	0.028	0.684	0.049	0.427	0.070	0.030
Psychiatric medication use	No	Reference		Reference		Reference	
	Yes	0.022	0.702	0.070	0.257	-0.022	0.480
Use of sleeping pills	No	Reference		Reference		Reference	
	Yes	0.090	0.169	0.052	0.402	0.063	0.045*
Recent insomnia	No	Reference		Reference		Reference	
	Yes	0.133	0.045*	0.143	0.034*	0.127	0.000***
Prior insomnia	No	Reference		Reference		Reference	
	Yes	0.395	0.000***	0.232	0.000***	0.223	0.000***

*Significant at 0.05 level, **Significant at 0.01 level, ***Significant at 0.001 level.

B, Beta; GPG, General population group; OCSG, Outpatient COVID-19 survivor group; HCSG, Hospitalized COVID-19 survivor group.

monthly income, and consequently more depression symptoms because of the financial stress.

The levels of stress and anxiety along with PTSD severity were also higher in people with elementary school education compared with those holding higher degrees, which could be attributed to their more limited knowledge of the disease and its care and treatment process. Understanding the unknown can accordingly reduce the perceptions of safety in humans, and then trigger excessive anxiety, so the lack of scientific information exacerbates this situation (Bajema et al., 2020). At this time, people seek more information to relieve their anxiety, which can further make them unable to distinguish between the right and the wrong information, and be exposed to false news (To et al., 2020). Several studies have thus far shown that an individual's previous psychiatric problems are a major risk to their mental health (Acarturk et al., 2018; Van Rheenen et al., 2020). Self-quarantine and physical isolation also put a person in a closed space, and the stress arising from this sudden change and uncertainty about prognosis or treatment can aggravate mental disorders, or lead to recurrences in patients undergoing self-quarantine (Kang et al., 2021).

Patients with previous mental health disorders accordingly seem to be very vulnerable to recurrences during the COVID-19 pandemic

since it can cause major psychiatric symptoms, such as anxiety, depression, panic, delirium, and psychosis; and even aggravate suicide attempts. In addition, patients with serious psychiatric disorders, e.g., schizophrenia, who are often socioeconomically vulnerable, are more at risk following isolation and self-quarantine orders, and consequently reduced access to job opportunities worsens their economic status (Gautam et al., 2020). In some similar surveys, PTSD related to COVID-19 had significantly diminished sleep quality (Zhang et al., 2020), while Pinkham et al. had not shown statistically significant changes in mood experiences among those with severe mental disorders, such as schizoaffective or types I or II bipolar disorders, but the participants had surprisingly reported a statistically significant growth in their improvement (Pinkham et al., 2020).

In the present study, the PTSD severity was higher in all the three groups with the history of previous or recent sleep problems than in those not facing such conditions. Moreover, the PTSD severity was higher in the COVID-19 survivors in the OCSG with pre-existing psychiatric disorders. The GPG with insomnia had also experienced the higher levels of stress, anxiety, and depression. Besides, the respondents in all three groups, who had lived with recent insomnia, had suffered from the higher levels of stress compared with people not having such a problem. The hospitalized individuals with clinical

TABLE 7 Relationship between demographic variables and DASS-21 subscales following the COVID-19 outbreak in OCSG, GPG, and HCSG

Variables	Stress						Anxiety						Depression						
	HCSG		GPG		OCSG		HCSG		GPG		OCSG		HCSG		GPG		OCSG		
	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	
Gender	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Female	0.219	0.005*	-0.064	0.035*	-0.172	0.006**	0.129	0.111	-0.019	0.524	-0.107	0.082	0.227	0.006**	-0.014	0.636	-0.156	0.012*	
Male	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Age	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
18-30	0.093	0.361	0.030	0.424	-0.042	0.573	-0.005	0.96	0.043	0.260	0.010	0.885	0.081	0.461	0.006	0.874	-0.010	0.889	
31-40	0.006	0.950	-0.004	0.910	0.012	0.883	-0.045	0.68	0.022	0.579	0.070	0.415	0.040	0.724	-0.010	0.791	0.072	0.403	
41-50	-0.089	0.394	-0.015	0.682	0.008	0.927	-0.13	0.21	-0.028	0.461	0.040	0.642	-0.092	0.418	-0.039	0.319	0.027	0.751	
51-60	-0.163	0.113	-0.009	0.757	0.056	0.412	-0.150	0.16	-0.020	0.498	0.046	0.498	-0.122	0.269	-0.008	0.782	0.060	0.374	
Over 60	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Having children	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Under 16	-0.096	0.275	0.033	0.486	0.007	0.924	-0.090	0.336	0.030	0.526	-0.000	0.991	-0.094	0.323	0.025	0.602	-0.027	0.708	
Over 16	-0.083	0.271	-0.015	0.640	-0.009	0.867	-0.078	0.270	0.030	0.369	-0.022	0.692	-0.128	0.078	-0.032	0.355	-0.053	0.347	
Both	-0.227	0.026*	0.045	0.360	0.013	0.882	-0.220	0.042*	0.073	0.138	-0.033	0.711	-0.178	0.106	0.045	0.369	-0.043	0.623	
Childless	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Marital status	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Single	-0.107	0.235	0.174	0.127	-0.028	0.732	0.008	0.935	0.021	0.588	0.011	0.893	0.045	0.652	-0.095	0.018*	-0.032	0.689	
Married	-0.036	0.898	0.173	0.182	0.741	0.241	0.653	0.378	-0.012	0.687	0.125	0.045*	0.100	0.187	-0.054	0.074	0.134	0.032*	
Divorced	-0.039	0.592	0.083	0.358	0.079	0.217	0.054	0.481	-0.002	0.900	-0.068	0.279	0.047	0.549	-0.012	0.646	-0.104	0.102	
Deceased spouse	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Unemployed	0.187	0.085	0.084	0.120	-0.266	0.029*	0.096	0.400	0.040	0.457	0.101	0.400	0.114	0.330	0.051	0.358	-0.406	0.001**	
Homekeeper	0.040	0.558	0.020	0.625	-0.111	0.231	0.011	0.873	0.014	0.728	0.007	0.938	0.076	0.306	-0.004	0.918	-0.175	0.058	
University student	0.053	0.479	-0.045	0.178	-0.201	0.027*	0.047	0.550	-0.041	0.230	0.027	0.761	0.047	0.562	-0.036	0.297	-0.262	0.004*	
Medical center employee	-0.041	0.704	0.024	0.651	-0.214	0.105	0.017	0.879	0.005	0.926	-0.155	0.235	-0.076	0.512	0.019	0.723	-0.409	0.002**	
Employee in other departments	0.141	0.024*	-0.008	0.822	-0.051	0.603	0.126	0.055	-0.033	0.400	-0.060	0.537	0.152	0.024*	-0.047	0.242	-0.224	0.022*	
Clinical treatment staff	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Primary school	-0.221	0.040*	0.174	0.127	-0.154	0.229	-0.247	0.030*	0.102	0.375	-0.192	0.131	-0.247	0.034*	0.158	0.181	-0.138	0.278	
High school	-0.148	0.206	0.173	0.182	-0.219	0.137	-0.209	0.092	0.065	0.617	-0.208	0.154	-0.188	0.136	0.114	0.397	-0.155	0.289	
Bachelor's/Master's degree	-0.115	0.071	0.083	0.358	-0.232	0.024*	-0.089	0.187	-0.022	0.809	-0.248	0.015*	-0.130	0.060	0.036	0.701	-0.198	0.052	
PhD	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference

*Significant at 0.05 level, **Significant at 0.01 level.

B, Beta; GPG, General population group; OCSG, Outpatient COVID-19 survivor group; HCSG, Hospitalized COVID-19 survivor group

TABLE 8 Relationship between physical health, beliefs about COVID-19 and its treatment, history of mental disorders, current and past sleep quality, and the DASS-21 subscales following the COVID-19 outbreak in OCSG, GPG, HCSCG

Variable	Stress						Anxiety						Depression						
	HCSCG		GPG		OCSG		HCSCG		GPG		OCSG		HCSCG		GPG		OCSG		
	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	B (95% CI)	p-value	
Chronic diseases	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	-0.009	0.889	0.025	0.371	-0.31	0.559	0.141	0.047*	0.081	0.005**	-0.001	0.971	0.063	0.383	0.060	0.040*	-0.049	0.354
Beliefs about COVID-19 spread	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	0.015	0.808	-0.005	0.872	-0.084	0.187	0.057	0.390	-0.026	0.405	-0.153	0.015*	0.024	0.721	0.006	0.830	-0.123	0.052
Beliefs about COVID-19 mortality	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	0.104	0.114	0.112	0.000***	0.084	0.175	0.050*	0.472	0.086	0.006**	0.179	0.004**	0.083	0.241	0.095	0.003**	0.157	0.011*
Beliefs about COVID-19 treatment	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	-0.049	0.385	-0.059	0.027	-0.056	0.287	-0.062	0.297	-0.046	0.084	-0.073	0.161	-0.112	0.068	-0.101	0.000***	-0.085	0.103
Psychological examination	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	0.057	0.379	0.106	0.001**	0.023	0.711	0.059	0.388	0.090	0.005**	-0.000	0.994	0.054	0.439	0.113	0.001**	-0.009	0.880
Mental disorders	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	0.048	0.525	0.076	0.017*	0.049	0.436	-0.037	0.641	0.092	0.005**	0.046	0.458	-0.052	0.531	0.113	0.001**	0.064	0.306
Psychiatric medication use	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	0.034	0.594	0.011	0.718	0.134	0.034*	0.140	0.041*	0.017	0.581	0.100	0.107	0.076	0.276	-0.058	0.076	0.140	0.025*
Use of sleeping pills	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	0.056	0.432	0.051	0.099	0.093	0.146	0.013	0.857	0.062	0.048*	0.146	0.022*	0.059	0.441	0.051	0.110	0.097	0.127
Recent insomnia	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	0.051	0.474	0.177	0.000***	0.026	0.706	-0.00	0.965	0.132	0.000***	-0.090	0.184	-0.075	0.334	0.120	0.000***	-0.006	0.926
Prior insomnia	No	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
	Yes	0.380	0.164	0.164	0.000***	0.230	0.000***	0.368	0.000***	0.175	0.000***	0.264	0.000***	0.345	0.000***	0.124	0.000***	0.199	0.001**

*Significant at 0.05 level, **Significant at 0.01 level, ***Significant at 0.001 level.

B, Beta; GPG, General population group; OCSG, Outpatient COVID-19 survivor group; HCSCG, Hospitalized COVID-19 survivor group.

professions had similarly reported the higher levels of stress and depression. Unfortunately, many health advocates have become infected and even lost their lives, which can increase mental distress among the medical staff. That is, they are in a state of physical and mental stress. Research has also shown that they suffer from loneliness, anxiety, and fear, and are concerned about the impact of the disease on their family members (Azizi et al., 2021; Brooks et al., 2020).

Anxiety was also at higher levels in the HCSG with underlying conditions than in those without such illnesses. Similar studies had further shown that the history of co-morbidities could predispose people to more stress, depression, and anxiety during pandemics (Holmes et al., 2020; Zhu et al., 2020)

As well, the PTSD severity was higher in the HCSG, who believed in the spread of COVID-19, than those who did not think so. The PTSD severity was also greater in the GPG and OCSG, who believed in death following COVID-19, than the cases who did not feel so.

Moreover, stress, anxiety, and depression were higher in the OCSG, who believed that COVID-19 could cause death, than those who did not have faith in it. The severity of anxiety and depression in the OCSG with their belief in death after COVID-19 was also higher. These findings could be a warning sign that the individuals who did not believe in the spread of COVID-19 and subsequent deaths did not also take the issue seriously, and failed to comply with personal protection protocols; because people who see themselves as low risks are unlikely to change their social behaviours (Taylor, 2019). The probable cause of mental disorders in people with the abovementioned beliefs might be illness anxiety (namely, fear of infection) (Furer et al., 1997) and the fear that all pandemics are difficult to control. Accordingly, governments and public health officials are recommended to give accurate information about the pandemic, disprove the rumours in a timely manner, and reduce the impact of misinformation on the general emotional state of the public. These high-level activities can thus lead to a sense of public safety and potential psychological benefits (Salari et al., 2020).

Of note, there were limitations in this study. Firstly, causal inferences were difficult to make due to the cross-sectional nature of this web-based survey. In addition, the self-reported levels of depression, anxiety, and stress, and the IES-R sub-scales might not be consistent with the assessments by mental health professionals. Therefore, future longitudinal studies along with follow-ups and interventions were suggested. Moreover, a larger sample size was required to find stronger relationships and make independent predictions based on the mental symptoms in the COVID-19 survivors and healthy individuals in the community.

As well, the data here were collected from self-reports, so the co-morbidities and the history of psychiatric disorders in the patients before the pandemic could not be accurately assessed, and there might be a bias. In addition, it was not possible to generalize the results to the cases with COVID-19 in other countries. In this study, only literate participants having access to the Internet were evaluated. Accordingly, the individuals with lower levels of education and

economic restrictions, etc., were not included. Finally, some clinical and laboratory data might be associated with the symptoms of depression, which were not measured in this study. Despite these limitations, this study gave valuable information about the initial mental responses in COVID-19 survivors and the general population after the onset of COVID-19 in Mazandaran Province, as one of the first region in the Northern Iran overwhelmed with this pandemic.

A summary of recent United Nations (UN) policies on COVID-19 and the need for actions on mental health status also recommends that a community-wide approach should be used to strengthen, protect, and give care for this purpose (United Nations Sustainable Development Group, 2020). Iran's government and public health officials can further consider training programs and psychological interventions, developed based on smartphones or on the web or news media, such as television, to minimize the risk of transmitting the virus in face-to-face training and relieve depression, anxiety, and stress by increasing the levels of health awareness and mental care services.

5 | CONCLUSION

The study results revealed that about one-third of the respondents in the GPG had experienced the moderate-to-very-severe levels of depression, anxiety, and stress. In the HCSG, a half of the cases had also undergone the moderate-to-very-severe levels of anxiety and depression, and one-third of these individuals had even lived with stress at the moderate-to-very-severe levels. However, more than half of the cases in the OCSG had suffered from the moderate-to-very-severe levels of anxiety and depression, and approximately half of this population had moderate-to-very-severe stress. In about half of the cases in the HCSG and GPG, and more than one-third of the respondents in the OCSG, the COVID-19 event impact had been from probable PTSD to suppressed immune system functioning. These data gave important clinical implications, particularly for healthcare policies, aimed at reducing the waves of mental problems following the current pandemic. Furthermore, the prevention and the early diagnosis and treatment of neurological and psychiatric symptoms should be a priority in the COVID-19 survivors.

AUTHOR CONTRIBUTIONS

Maryam Hasannezhad Reskati designed the study and did the literature search, data gathering, interpreted the findings, drafting the manuscript, and editing the manuscript. Touraj Assadi & Akbar Hedayatizadeh-Omran contributed in data gathering. Motahareh Kheradmand & Mahmood Moosazadeh analysed the data and interpreted the findings. Seyed Hamzeh Hosseini contributed in editing the manuscript. Forouzan Elyasi participated in the study design, collecting the data, interpreting the findings and editing the manuscript. All the authors read and approved the final manuscript.

FUNDING INFORMATION

This study was financially supported by the Mazandaran University of Medical Sciences, Sari, Iran.

CONFLICT OF INTEREST

The authors declared no competing interests in this study.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICAL APPROVAL

This research project was approved by the Ethics Committee of Mazandaran University of Medical Sciences (IR.MAZUMS.REC.1399.158), Sari, Iran. At the end of the questionnaire.

ORCID

Forouzan Elyasi  <https://orcid.org/0000-0002-6872-481X>

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How to cite this article: Hasannezhad Reskati, M., Kheradmand, M., Moosazadeh, M., Assadi, T., Shafizad, M., Hedayatizadeh-Omran, A., Hosseini, S. H., & Elyasi, F. (2022). Comparing mental health status and COVID-19 event impact between survivors and the general population during the second wave of the pandemic in Iran. *Nursing Open*, 00, 1–16. <https://doi.org/10.1002/nop2.1341>