

Evaluation of the COVID-19 pandemic effect on the development of somatic symptoms in patients with mood disorders: a case-control study

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Abstract

Somatic symptoms are one of the most common complaints among patients with psychiatric disorders and are considered as one of the most common psychiatric disorders in the new coronavirus pandemic. This study aimed to evaluate the effect of the COVID-19 pandemic on the physical symptoms in patients with mood disorders and compare it with healthy individuals.

In this case-control study, 67 patients with mood disorders were referred to the psychiatric clinic of 5 Azar Hospital in Gorgan, who met the inclusion criteria, and 68 healthy individuals as control group were entered into the study. For all participants after informed consent, a demographic information questionnaire was completed along with Screening for Somatic Symptoms-7 (SOMS7) and Patient Health Questionnaire-15 (PHQ-15), and the data were analysed by SPSS software version 25.

The mean score obtained for the SOMS-7 questionnaire for the group of patients with mood disorders and the control group was 32.37 ± 8.19 and 35.42 ± 11.3 , respectively. The mean obtained for the PHQ-15 questionnaire for the mood disorders group and the control group was 8.56 ± 5.93 and 5.86 ± 4.63 , respectively. In the mood disorder group, 26.9% of patients had no risk for physical symptoms, 31.3% of patients had a low risk, 25.4% of patients had a moderate risk, and 16.4% of patients had a high risk for physical symptoms. The statistical test showed that although the risk of physical symptoms was high in both groups, this rate was higher in the group with mood disorders, and there is a significant difference between the two groups ($P < 0.05$). The results also showed a significant and direct relationship between the two questionnaires ($P < 0.05$).

According to the results, although the prevalence of somatic symptoms increased in both groups, the prevalence of somatic symptoms is significantly higher in the mood disorder group.

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Introduction

In early 2020, a novel coronavirus (SARS-CoV-2) leading to a potentially fatal condition was discovered. Since then, the 2019

coronavirus disease (COVID-19) has spread worldwide, becoming a pandemic [1]. Apart from the risks severely associated with the infection, concerns have been expressed for the possible psychological effect of COVID-19, especially on susceptible persons with pre-existing mental health problems. The main psychological disorders during epidemics of infectious disease include anxiety, depression, panic attacks, and somatic symptoms [2].

Somatization manifestations may be a group of physical symptoms, including pain, dizziness, musculoskeletal diseases, fatigue, and miscellaneous symptoms [3–5]. In a previous study on 2,552 individuals in Germany, 81.6 % of the general

population remembered the experience of a physical symptom that lead to at least mild functional impairment within the last seven days [6]. In a study in China after the COVID-19 epidemic, a cross-sectional study showed that among the participants, 60.81% stated no physical symptoms, 15.04% had one physical symptom, 9.42% had two physical symptoms, and 5.62% had three physical symptoms, and in the female gender, physical symptoms such as dizziness, myalgia, and poor self-assessed health condition were correlated with higher levels of stress and poor mental health status [7].

In the general population, anxiety mostly overlaps with a range of somatic symptoms [8]. Several studies have found that somatic symptoms are connected with psychological and physiological problems [9]. In a study, it was mentioned that patients expressed their mental state via somatization symptoms [10]. However, some former researches indicated that physical symptoms might happen independently of anxiety symptoms [11,12]. A study in China on the general population considered insomnia and anxiety symptoms as risk factors for somatic symptoms [13].

A study, on Croatian population mood changes during the COVID-19 lockdown showed that lockdown was related to mood changes in terms of more restlessness, discouragement, fear, and sadness [14]. In another study in Italy, the lockdown was associated with post-traumatic stress symptoms (PTSS), anxiety symptoms, and adjustment disorder symptoms (ADS) [15]. It was shown that although the lockdown had an impact on all individuals, those with bipolar disorder showed greater impact from the lockdown orders with disruptions in routines, income, social support, and pandemic-associated stress [16].

COVID-19 is highly contagious with no definite cure. Furthermore, the probability of death is high. Moreover, the pandemic has caused severe economic uncertainties and uncertainties concerning how long the process will continue. All of these issues can considerably affect physical and mental health. According to studies, many individuals experienced negative emotions, such as anxiety, depression, insomnia, and physical disorders during the COVID-19 outbreak [17–19]. This is significant since extreme negative emotions can cause somatic symptoms that consecutively lead to important physical and mental problems [20]. Hence, it is essential to evaluate the concerns regarding somatic symptoms in the general population during the COVID-19 outbreak to provide data for useful and effective psychological interventions.

The present study aims to determine the effect of the COVID-19 pandemic on the development of somatic symptoms in patients with mood disorders and its comparison with healthy individuals.

Materials and methods

Study design

In this case-control study, all patients with mood disorders referred to 5 Azar Hospital during the COVID-19 pandemic for 5 months were included according to the inclusion criteria and after obtaining the written informed consent. Healthy individuals with matched age and sex were selected as the control group. A sociodemographic questionnaire was designed by researchers to collect participants' sociodemographic data. Then, to evaluate the somatic symptoms, screening for Somatic Symptoms-7 (SOMS-7) and Patient Health Questionnaire-15 (PHQ-15) questionnaires were filled for both groups, and the obtained data were analysed.

The study was approved by the Ethics Committee of Golestan University of Medical Sciences: IR.GOUMS.REC.1399.014.

Setting

The study was performed in the Psychiatry Clinic of 5 Azar Hospital in Gorgan city, Iran. The duration of the study was six months, during the COVID-19 pandemic and from April to August of 2020.

Participants

Sixty-seven patients with mood disorders between the ages of 18 and 55 years were selected as the patient group for inclusion in the study. Then, among the healthy individuals referred to the clinic, 68 volunteers with demographic characteristics similar to the patient group were selected as the control group. Patients were selected by a psychiatrist (researcher), who were not in the acute phase of the disease and met the inclusion criteria, and after obtaining informed consent included in the study.

Inclusion and exclusion criteria. The inclusion criteria for the case group were people with mood disorders, willingness to participate in the study, and conscious satisfaction, and the exclusion criteria were histories of physical symptoms, conscious dissatisfaction, and history of other concomitant psychiatric disorders such as psychotic disorders. The inclusion criteria for the control group were people without any psychiatric disorders, willingness to participate in the study, and conscious satisfaction. The exclusion criterion was the willingness to leave the study at any time.

Measurements

Sociodemographic questionnaire. A personal information questionnaire was created to obtain demographic information about the participants. The form included questions about age, sex,

education, physical illness, history of psychotic disorder, drug administration, and history of smoking and alcohol consumption.

For assessing the somatic symptoms in participants, Patient Health Questionnaire-15 (PHQ-15) and Screening for Somatic Symptoms-7 (SOMS7) were used in both case and control groups.

Patient Health Questionnaire-15 (PHQ-15). PHQ-15 is a brief, self-administered questionnaire that is used in screening for monitoring somatic symptom severity, which is presented by Kroenke et al. [21]. Zhang et al. evaluated the reliability of the PHQ-15 questionnaire, and they demonstrated a Cronbach's alpha of 0.833 [22]. Abdolmohammadi et al. assessed the validation of the Persian version of the PHQ-15 questionnaire, and the Cronbach alpha coefficient was 0.76 [23].

This questionnaire includes 15 questions, and the range of scores is between 0 and 30. According to this questionnaire, physical symptom disorder is mild in people with a score of 5–10, moderate in those with a score of 10–15, and severe in those with a score above 15.

Screening for Somatic Symptoms-7 (SOMS-7). The 53-item scale is used to assess physical symptoms, as well as the effect of treatment on patients. This questionnaire assesses all physical symptoms in seven days. The severity of signs and symptoms according to the grading criteria is from zero for the lowest intensity to 4 for the maximum intensity. In Hiller et al. study, in which psychometrics of the questionnaire was performed through clinical interviews with patients and reports by patients themselves, the reliability and validity of the questionnaire were 0.85 and 0.75, respectively [6].

In Ebrahimi et al. study on the Persian version of the SOMS-7, the reliability coefficient based on Cronbach's alpha was 0.92 and 0.94 [24].

Bias

For decreasing information bias, all questions in the questionnaire were clarified with all participants before the completion of the questioner, by the researcher. The participants were instructed on how to score on the questions of the questionnaire.

Study size

Acknowledging Ebrahimi et al.'s study with a significance level of 0.05 and the test power of 80% to estimate the sample size, we considered 67 patients as cases and 68 individuals as healthy controls [24].

Statistical analysis

In data analysis, first, the normality of the data was examined using a one-sample Kolmogorov-Smirnov by Lilliefors

correcting. By confirmation of the normality, the appropriate parametric methods, such as the Student's test and analysis of variance, were used, and if not normal, Mann-Whitney and Kruskal-Wallis tests were used. Chi-square test was used to analyze the data with nominal scale, and in cases where more than 20% of the expected frequencies of the tables were less than 5 (Cochran), Fisher's exact test was used. The software used in this research is SPSS v.25-IBM, and the significance level of the tests is less than 0.05.

Results

Participants

A total of 67 patients who were diagnosed with mood disorders by the psychiatrist and met the inclusion criteria participated as the case group. Mood disorders patients with histories of physical symptoms, conscious dissatisfaction, or other concomitant psychiatric disorders were excluded from the study. A total of 68 healthy individuals of similar age and sex were selected as the control group.

Kolmogorov-Smirnov test showed that all the studied variables have a non-normal distribution.

Descriptive data

Sociodemographic characteristics of participants are shown in Table 1. Except for the blood group, history of drug use, and psychotic disorder, other sociodemographic factors had no significant difference between mood disorder and control groups.

Main results

According to Table 2, the results showed a significant difference in the scores obtained in both SOMS-7 and PHQ-15 tools between Mood disorder and Control groups ($P < 0.05$).

Spearman correlation coefficient showed a significant and direct relationship between the score obtained in PHQ-15 tools with SOMS-7 ($P < 0.05$) (Table 3 and Fig. 1); but no significant relationship was observed between age and score of PHQ-15 and SOMS-7 tools ($P > 0.05$) (Table 3 and Fig. 1).

According to Table 4, the majority of participants in the mood disorders group had a mild risk for psychosomatic (31.3%), and in the control group, most participants did not have a risk for psychosomatic (47.1%). It was a significant difference between the two groups in terms of the risk of physical symptoms disorder ($P < 0.05$). Besides, the chi-square test showed a significant difference between the two groups in terms of the risk of physical symptoms disorder ($P < 0.05$).

TABLE 1. Sociodemographic characteristics of Patients with Mood Disorder and Control Group

Variables	Mood disorder (n = 67)	Control (n = 68)	P Value
Age (Year)	32.37 ± 8.19	35.42 ± 11.3	0.172
Sex			0.637
Male	23 (34.3)	26 (38.2)	
Female	44 (65.7)	42 (61.8)	
Marital Status			0.3
Single	25 (37.3)	17 (25.0)	
Married	41 (61.2)	50 (73.5)	
Other	1 (1.5)	1 (1.5)	
Education			0.837
Primary School	17 (25.4)	13 (19.1)	
School Diploma	8 (11.9)	10 (14.7)	
Bachelor of science	26 (38.3)	28 (41.2)	
Higher	16 (23.9)	17 (25.0)	
Physical illness			0.399
Yes	19 (28.4)	15 (22.1)	
No	48 (71.6)	53 (77.9)	
History of psychotic Disorder			0.000*
Yes	49 (73.1)	1 (1.5)	
No	18 (26.9)	67 (98.5)	
History of Drug Administration^a			0.000*
Yes	40 (59.7)	15 (22.1)	
No	27 (40.3)	53 (77.9)	
History of Smoking			0.076
Yes	10 (14.9)	3 (4.4)	
No	57 (85.1)	65 (95.6)	
History of Alcohol Consumption			0.41
Yes (Often)	3 (4.5)	0 (0.0)	
Yes (always)	3 (4.5)	0 (0.0)	
No	61 (91.0)	68 (100.0)	
Blood Group			0.027*
A	10 (14.9)	24 (35.3)	
B	25 (37.3)	14 (20.6)	
AB	8 (11.9)	16 (8.8)	
O	24 (35.8)	24 (35.3)	
RH			0.975
Positive	59 (88.1)	60 (88.2)	
Negative	8 (11.9)	8 (11.8)	

*Significant difference in level of 0.05.
Data are presented as mean SD and No. (%).
^aHistory of using medication that had an effect on mood disorders such as beta-blockers (propranolol), corticosteroids, cimetidine and diuretics during the last three months.

Discussion

Given the worldwide spread of COVID-19, which has affected almost all important economic, political, and social aspects of the world, the discussion of the psychological effects of this viral disease on the mental health of people at different levels of society is of great importance [25]. It was shown that the number of individuals with suspected poor mental health is

TABLE 2. Patient Health Questionnaire-15 Score and Screening for Somatic symptom disorders-7 Questionnaire Score in Patients with Mood Disorder and Control Group

	Mood disorder (N = 67) Mean ± SD	Control (N = 68) Mean ± SD	P-value
PHQ-15 Score	8.56 ± 5.93	5.86 ± 4.63	0.009*
SOMS-7 Score	28.98 ± 20.93	20.80 ± 17.52	0.006*

*Significant difference in level of 0.05.
PHQ-15: Patient Health Questionnaire-15; SOMS-7: Screening for Somatic symptom disorders-7.

TABLE 3. The Relationship between Patient Health Questionnaire-15 Score and Screening for Somatic symptom disorders-7 Questionnaire Score in Patients with Mood Disorder and Control Group

	SOMS-7 score	
	r**	P-value
PHQ-15 Score	0.857	0.000*
Age	0.053	0.545

*Significant difference in level of 0.05.
**Spearman's Correlation Coefficient.
PHQ-15: Patient Health Questionnaire-15; SOMS-7: Screening for Somatic symptom disorders-7.

significantly increased during the COVID-19 pandemic in Iran [26]. One of the most common psychiatric disorders that have increased with the pandemic of new coronavirus is the somatoform disorders, which seems to be affected in mood disorder patients [25,27], so this study aims to investigate the impact of the pandemic of COVID-19 on somatic symptoms on patients with mood disorders and healthy individuals, and the findings of this study were as follows.

Examination of patients by PHQ-15 and SOMS-7 questionnaires, which examine somatic symptoms, showed that the mean score obtained by the SOMS-7 questionnaire for the group of patients with mood disorders was significantly higher than the control group ($P < 0.05$). Moreover, the mean score obtained for the PHQ-15 questionnaire in the group of patients with mood disorders was significantly higher than the control group ($P < 0.05$). Besides, 26.9% of patients in the mood disorder group showed no risk for somatic symptoms, 31.3% of patients showed mild risk, 25% of patients demonstrated moderate risk, and 16.4% showed a high risk for somatic symptoms. Most participants of the control group (47.1%) did not show a risk for somatic symptoms. There was a positive and significant correlation between the scores obtained by the SOMS-7 and PHQ-15 questionnaires in the two groups ($P < 0.05$).

Huang et al. in China evaluated the prevalence of insomnia, anxiety, and somatic symptoms through the pandemic of COVID-19. The percentages of somatization, anxiety, and insomnia were 7.59%, 33.02%, and 24.66%, respectively. In participants with anxiety, 19.38% showed somatization, and this group had a higher history of physical disease and insomnia in comparison to those who had somatization without anxiety [28]. In the present study, 73.1% of patients with mood disorders were at risk for somatic symptoms, and in the population of healthy participants, 53% had a risk of somatic symptoms, and this was higher than Huang study and indicated the prevalence of somatic symptoms in the general population of the participants in the present study. Moreover, in Huang's

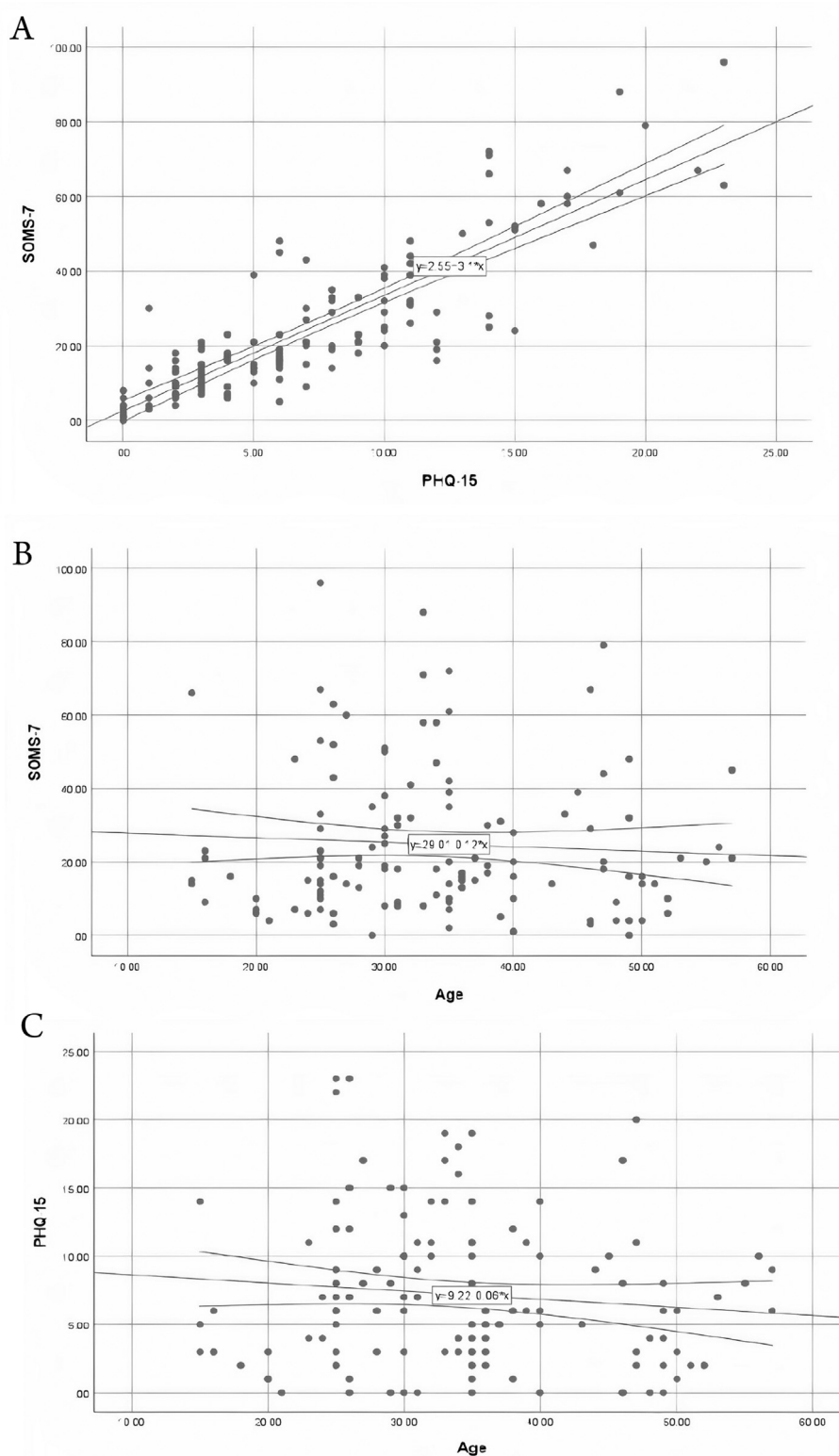


FIG. 1. The Relationship between **A)** Patient Health Questionnaire-15 Score and Screening for Somatic symptom disorders-7 Questionnaire Score Groups (Spearman's Correlation Coefficient $r = 0.857$ $p = 0.000$), **B)** Screening for Somatic symptom disorders-7 Questionnaire Score and Age (Spearman's Correlation Coefficient $r = 0.053$ $p = 0.545$), **C)** Patient Health Questionnaire-15 Score and Age (Spearman's Correlation Coefficient $r = 0.110$ $p = 0.202$), in Mood Disorder and Control Groups.

TABLE 4. Patient health Questionnaire-15 score subscale in patients with mood disorder and control group

PHQ-15	Mood disorder (n = 67)	Control (n = 68)
No Risk for Psychosomatic	18 (26.9)	32 (47.1)
Mild Risk for Psychosomatic	21 (31.3)	22 (32.4)
Moderate Risk for Psychosomatic	17 (25.4)	10 (14.7)
Severe Risk for Psychosomatic	11 (16.4)	4 (5.9)
Statistics	$\chi_2 = 9.01$	
df	3	
P-value	0.29*	

*Significant Difference in level of 0.05.
PHQ-15: Patient Health Questionnaire-15.

study, the score obtained in somatic symptoms was significantly related to age, anxiety score, insomnia, and history of physical illness, which did not agree with the results of the present study, which may be due to differences in the study population in the two studies.

In a study by Shelvin et al. in the United Kingdom, the prediction of somatoform symptoms by COVID-19 associated anxiety is evaluated. PHQ-15 questionnaire was used to assess patients' somatic symptoms. The results showed that anxiety has a unique role in causing somatic symptoms in patients [25] and despite the fact that the level of anxiety in the present study was not studied, but because the level of anxiety in mood disorders patients is higher than the average of the community [29] the result can be consistent with the result of the present study.

In Li et al. study, the association between somatic symptoms and symptoms of anxiety during the COVID- 2019 pandemic was assessed in health professionals. The percentage of somatic symptoms, anxiety, and insomnia was 12.0%, 45.4%, and 32%, respectively. The incidence of somatic symptoms in those with anxiety was 22.9%. They suggest that anxiety independently correlated with somatic symptoms of those with symptoms of anxiety [30]. Colizini et al., in a study, reported a case of a 16-year-old adolescent who was suspected of having the COVID-19 infection and associated psychological distress. Although his test was negative for SARS-CoV-2, he had a fear of being infected, and he received a diagnosis of Somatic symptom disorder [31]. Salehian et al., reported a case of COVID-19 infection, who was already admitted to the psychosomatic ward due to diagnosis of somatic symptom disorder. The patient had a history of many unexplained physical complaints, and when informed about the time of his discharge, he started to complain of some new physical symptoms. After the diagnosis of COVID-19, unlike usual, he did not complain of any new physical complaints and was tried to be discharged. Somatic symptom disorder, can interfere with the care of individuals infected with COVID-19 [32].

In a study by Gica et al. the effect of the COVID-19 pandemic on psychosomatic complaints and the factors associated with these complaints in Turkey was evaluated (17). PHQ-15 questionnaire was used in this study and the results showed that the participants' psychosomatic symptoms were higher than before the pandemic. They believe that intolerance to uncertainty and biological rhythm changes are effective factors in increasing psychosomatic complaints [33].

In a study by Shangguan et al., the somatization and anxiety were evaluated after the COVID-19 pandemic, and it was found that among all individuals, 8% showed moderate to severe anxiety, and 7.4% showed somatization. After the outbreak, the occurrence of anxiety with or without somatization did not alter significantly ($p > 0.05$), whereas the incidence of somatization increased significantly ($p < 0.01$) [34]. Liu et al. evaluated the prevalence of somatic symptoms as a result of COVID-19 among college and primary school students in China and demonstrated that the occurrence of somatic symptoms in college students was 34.8% and in primary school students was 2.39%. Throughout the whole study, concern regarding COVID-19 was positively associated with the incidence of somatic symptoms [20].

Many factors are associated with mood disorders during the COVID-19 pandemic. In a study on the effect of the lockdown during COVID-19, overall mental well-being was reduced, and depressive symptoms increased triggered by obligatory home quarantine [35]. Furthermore, decreased exercise duration through the pandemic has been related to higher rates of depression, anxiety, and stress [36]. In a study in Canada, feeling lonely, feeling overwhelmed by one's health needs, younger age, and having financial concerns are reported as the risk factors of mood disorders [37]. In a Zhong et al. study, former smokers or drinkers, individuals who were front-line medical personnel, those who had a chronic disease, self-employed, suspicion of SARS-CoV-2 infection, present symptoms of SARS-CoV-2 infection, and regular physical activity were defined as risk factors associated with mood disorders [38]. Hubard et al. showed that anxiety and depression are associated with social (social support, loneliness), sociodemographic (age, gender, deprivation), and psychological factors (perceived threat and illness representations) [39].

Although a proper level of stress can advance the body's resistance and helps as a defence mechanism when stress is high in conditions such as the COVID-19 pandemic, the autonomic nervous system, as well as cortex are deleteriously affected, and this can result in psychosomatic and somatic symptoms and, consecutively cause psychological and mental problems [40].

One of the limitations of the study is the low sample size, and it is recommended to repeat with a larger sample size. The other limitation of the study is that we have not considered other

mental disorders, and it is recommended that the study performs by considering disorders such as anxiety and depression and compare the result with studies from other countries.

Conclusion

Finally, it can be concluded that the prevalence of somatic symptoms according to the score obtained in the PHQ-15 tool includes a high percentage of participants, which is significantly higher in patients with mood disorders, and the score obtained in the SOMS-7 tool also had a significant relationship with the score obtained in PHQ-15 tool, and these two tools can be used to diagnose somatic disorders in patients with somatoform complaints in COVID-19 pandemic.

Ethics approval and consent to participate

The study is approved by the ethics committee of Golestan University of Medical Sciences (IR.GOUMS.REC.1399.014). All participants signed informed written consent.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Authors' contribution

All authors fulfil the criteria for authorship, performed the statistical analysis, drafted the manuscript, and made critical revisions of the manuscript for key intellectual content. All authors have agreed to authorship and order of authorship for this manuscript. All authors read and approved the final version of the manuscript.

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Transparency declaration

The authors declare that they have no competing interests.

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