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Original Article

Depression, Anxiety, Perceived Stress and Family Support in COVID-19 Patients

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Abstract

Objective: Coronavirus disease 2019 (COVID-19) was first reported in Iran in February 2020 and then quickly spread to many cities. Different factors contribute to the numerous psychological problems of this pandemic in patients, healthcare workers and the community. This study investigated the prevalence of perceived stress, anxiety and depression in COVID-19 patients hospitalized between March and April 2020 and revealed associations of these factors with social support received from family.
Method: In this cross-sectional study, patients with COVID-19 admitted between 21st of March and 22nd of April 2020 were evaluated by three questionnaires: Anxiety and depression were evaluated using the hospital anxiety and depression scale (HADS), stress levels were evaluated using the four-item perceived stress scale (PSS-4) and family support was evaluated using the perceived social support scale-family (PSS-Fa). In addition to obtaining prevalence of the noted psychological disorders and their relationship with demographic details, relationship of stress, anxiety and depression with family support was also investigated using the Pearson's correlation coefficient.
Results: Participants comprised 100 COVID-19 patients (38 females and 62 males). Findings suggested high levels of perceived stress in 26% of the participants, anxiety symptoms existed in 29% and borderline conditions existed in 17%. Moreover, depressive and its borderline symptoms were respectively observed in 17% and 23%. Family support was found to negatively and significantly correlated with anxiety (Pearson correlation = -0.249, $P < 0.05$) and depression. (Pearson correlation = -0.221, $P < 0.05$).
Conclusion: Given the high prevalence of anxiety and depression in hospitalized COVID-19 patients, it is recommended to further focus on non-clinical interventions, such as providing psychological first aids, boosting psychological resilience, and enabling greater family support, in efforts to prevent transformation of these psychological symptoms into long-term psychological disorders.

Key words: *Anxiety; COVID-19; Depression; Stress; Social Support*

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Despite advances in medical sciences, infectious diseases still constitute the leading cause of death (1). In December 2019, the new coronavirus disease broke out in Wuhan, China and rapidly spread throughout China and other countries (2). On 19th of February 2020, the first case of the infection was reported in Qom, Iran, and a large number of cities in the country were involved within a week (3). The virus affects different organs, especially the lungs, and the symptoms include fever, dry cough, headache, malaise, sore throat, muscle pain and shortness of breath if pneumonia develops (4).

In addition to physical effects, the virus can cause a great deal of psychological damage in the community, especially in the patients. Several factors in this outbreak can cause fear and anxiety in the community. During this pandemic, rapid transmission, high mortality and economic burden of the disease coupled with lack of appropriate treatments and loss of loved ones increased anxiety levels. Being isolated from family and friends and being deprived of their psychological support during hospitalization, worrying about other family members and the social stigma attached to the disease significantly increase anxiety in patients (5, 6). Prevalence of psychological symptoms such as stress, depression and anxiety is expected to be high in this crisis.

On a more negative note, anxiety, stress and psychosocial factors weaken the immune system and increase vulnerability to infectious diseases (7). A weak immune system interferes with recovery from diseases (8). In recent years, many studies have found anxiety and depression as risk factors for infectious, respiratory, neurological, cardiovascular, gastrointestinal and rheumatic diseases, and anxiety and depression can also interfere with the treatment of many diseases (9). Given the self-limiting nature of most viral infections, including the coronaviruses and lack of definitive treatments for these diseases, maintaining a good mood and avoiding anxiety are crucial for strengthening the immune system and accelerating recovery.

To date, many studies have been conducted on the psychological problems of the COVID-19 crisis among the public and healthcare workers (10, 11). Meanwhile, studies reporting on the statistics of these symptoms in afflicted patients have been rare –both for former crises such as SARS (severe acute respiratory syndrome) and especially the present COVID-19 crisis. A review article published in March 2020 indicated only 4 out of a total of 47 articles were on COVID-19 and mental health which were related to individuals affected by the COVID-19 outbreak; the remaining articles addressed the general population or healthcare workers. For instance, a study recruiting 1,210 participants from the general population reported moderate-to-severe depressive and anxiety symptoms respectively in 16.5% and 28.8% of the subjects, and moderate-to-severe stress levels in 8.1% (11). This study was conducted to obtain correct statistics for the prevalence of perceived stress, anxiety and depressive symptoms in COVID-19 patients. These subsyndromal symptoms may develop into psychological disorders if left untreated and require non-clinical interventions such as psychological first aid and psychological resilience improvement. The effects of social support provided by the family on these psychological disorders were also evaluated in this survey. Moreover, utilizing statistics, laying proper plans for psychological support of patients in this crisis and similar future scenarios and creating better psychological conditions for patients can help accelerate their treatment process.

Materials and Methods

Aims

This study investigated the prevalence of perceived stress, anxiety and depression in a group of COVID-19 patients and revealed the associations of these factors with the social support received from their families.

Design

The present cross-sectional study was conducted in Imam Khomeini Complex Hospital of Tehran University of Medical Sciences (IKCH-TUMS). COVID-19 patients who were admitted to this hospital between 21st of March 2020 and 22nd of April 2020 and did not meet the exclusion criteria entered the study. Three questionnaires were completed by the patients. Patients were selected and guided to complete the questionnaires by internal medicine specialists.

Inclusion and exclusion criteria

The patients were diagnosed with COVID-19 based on their clinical symptoms and by performing PCR tests and chest CT-scans. The exclusion criteria were comprised of the patient's unwillingness to participate in the study, decreased levels of consciousness, severe dyspnea leading to lack of cooperation and inability to complete the questionnaire owing to poor mental status.

Instruments

The demographic information of patient's collected included age, gender and level of education. Patients were also assessed through three questionnaires: anxiety and depression were evaluated using the hospital anxiety and depression scale (HADS), stress levels were examined using the four-item perceived stress scale (PSS-4) and family support was examined using the perceived social support scale-family (PSS-Fa).

Scales

Perceived Stress Scale- 4 items (PSS-4): The PSS-4 is a popular tool for measuring psychological stress and the extent to which individuals estimate their lives as unpredictable and uncontrollable over the previous month. The questionnaire was first designed by Cohen *et al.* in 1983 (12). Its internal validity and consistency have been shown in various studies (13). PSS has three versions including the PSS-14 as the original 14-item version designed in English, the PSS-10 and the PSS-4. In a study in Iran, Persian version of this questionnaire

(pss-4) was evaluated and demonstrated satisfactory psychometric properties. Its Cronbach's alpha coefficient was 0.77 (14). A score of 0-4 obtained from the four-item PSS with minimum and maximum scores of 0 and 16, respectively, showed low levels of perceived stress, 4-8 demonstrated moderate levels and above 8 demonstrated high levels.

Hospital Anxiety and Depression Scale (HADS): The 14-item HADS was developed by Zigmond and Snaith to identify cases with symptoms of anxiety and depression among patients in non-psychiatric hospitals (15). This validated tool has 14 items. Seven out of the 14 items measure anxiety and the other seven measure depression. The respondents rated every item as 0-3. A score of 0-7 for each of the subscales is considered normal, 8-10 is borderline and 11-21 is abnormal (16). In 2003, Ali Montazeri *et al.* translated the questionnaire to Persian and evaluated its reliability and validity (17) and showed that its Persian version has satisfactory psychometric properties and can be used properly by the Iranian population.

Perceived social support scale-family (PSS-Fa): The 20-item PSS-Fa with a total score of 0-20 reflects an individual's need for family support based on the feedback on how well this need is met. Procidano *et al.* first reported the questionnaire in 1983 (18). Three studies described, developed, and validated measures for perceived social support from friends (PSS-Fr) and from family (PSS-Fa) (18). The higher the score obtained, the greater the family support. It was translated to Persian and its validity and reliability and satisfactory psychometric properties were confirmed in previous studies (19).

Statistical analysis: The data collected were analyzed in SPSS-25. Continuous and categorical variables were shown as mean (standard deviation (SD)) and frequency (percentage), respectively. The mean and prevalence of low, moderate and high perceived stress, anxiety, depression as well as family support amid the COVID-19 outbreak was clearly identified. Pearson correlation test was used to analyse correlation between scales of HADS and PSS-4 questionnaires. A P-value less than 0.05 was statistically significant. ANOVA was used for evaluation of correlation of demographic data with stress, anxiety, depression and family support.

Ethical issues

All the included patients willingly participated in this study. The privacy rights of all the patients were observed. The study was approved by the Ethics Committee of Tehran University of Medical Sciences (Code: IR.TUMS.VCR.REC.1399.080).

Results

The statistical population of this study comprised 100 patients, including 38 females and 62 males, of whom 21% were 20-40 years old, 51% were 41-60 and 28% over 60. Moreover, 11% were illiterate, 25% had primary school education, 22% junior high school education, 24% high school diploma, 3% associate degree, 13% a bachelor's degree and 2% had a master's degree (Table 1).

A score of 0-16 and a mean score of 5.79 ± 4.181 were obtained from the PSS-4. Perceived stress levels were low in 44% of the patients, moderate in 30% and high in 26%. A score of 0-20 and a mean score of 7.53 ± 5.476 were also obtained for anxiety, which was normal in 54% of the patients, borderline in 17% and abnormal in 29%. Moreover, a score of 0-18 and a mean score of 6.25 ± 4.579 were obtained for depression, which was normal in 59% of the patients, borderline in 23% and high in 17%. The score and mean score of family support were also 2-20 and 16.08 ± 3.626, respectively, and half the cases received a score of 15-18 (Table 2).

Perceived stress and anxiety were higher in women while depression was higher in men. The difference between the two genders was only significant in perceived stress ($P = 0.01$). The mean score of family support was 15.97 for women and 16.14 for men, suggesting an insignificant difference between the two genders based on the independent t-test ($P = 0.345$).

There was significant difference in prevalence of depression by age group, and the prevalence of this symptom was higher in those above age 60 years. Nonetheless, there was no relationship between anxiety and age group. ANOVA showed that education levels were not significantly correlated with stress, anxiety, depression and family support (Tables 3, 4).

The Pearson correlation coefficient showed that family support was significantly and negatively correlated with stress (Pearson correlation = -0.274, $P < 0.05$), anxiety (Pearson correlation = -0.249, $P < 0.05$) and depression (Pearson correlation = -0.221, $P < 0.05$) (Table 4). A linear regression also proved the result that family support significantly predicted depression scores, ($b = –0.172$, $t(225) = -2.111$, R square = 0.049, $P < 0.05$), anxiety score ($b = –0.164$, $t(225) = -2.416$, R square = 0.062, $P < 0.05$) and stress score ($b = –0.232$, $t(225) = -2.672$, R square = 0.075, $P < 0.05$).

Participants identified concerns about infection of their family and acquaintances (42%) and isolation from their family during hospitalization as the main causes of their anxiety (22%). The other most frequent causes reported, respectively, included complications of the disease (13%), their financial problems (11%), worrying about disease recurrence (9%) and concerns about quarantine restrictions after discharge (3%).

Table 1. Participant Characteristics of the Cross-Sectional Study Defining Depression, Anxiety and Perceived Stress in COVID-19 Patients

Variable	Results Total (n = 100)
Gender	
Male	62
Female	38
Age (year)	
< 20	0
21-40	21
41-60	51
> 60	28
Education level	
Illiterate	11
Primary school	25
Secondary school	46
Tertiary school	18

Table 2. The Prevalence of the level of Perceived Stress, Anxiety and Depression amid the COVID-19 Outbreak

Variable	Results Total (n = 100)
Perceived stress[(1)]	
Low	44%
Moderate	30%
High	26%
Anxiety[(2)]	
No	54%
Borderline	17%
Yes	29%
Depressive disorder[(3)]	
No	59.6%
Borderline	23.2%
Yes	17.2%

1. Perceived stress: low perceived stress (PSS-4 score = 0-4), moderate perceived stress (PSS-4 score = 4-8), high perceived stress (PSS-4 score = 8-16)
2. Anxiety: No: normal (HADS score = 0-7), borderline: (HADS score = 8-10), Yes: anxiety disorder (HADS score = 11-21)
3. Depressive disorder: No: normal (HADS score = 0-7), borderline: (HADS score = 8-10), Yes: depressive disorder (HADS score = 11-21)

ABBREVIATIONS

PSS-4: Perceived Stress Scale-4
HADS: Hospital Anxiety and Depression Scale
PSS-Fa: Perceived social support scale-family. The score equals 0-20. Low scores indicate the perception of less social support from the family while higher scores indicate more family support.

Table 3. Associations of Perceived Stress, Anxiety, Depression and Family Support by Gender, Age and Education Level in COVID-19 Patients

Variable	P (gender)	P (age)	P (education level)
Perceived stress	0.01*	0.578	0.468
Anxiety	0.661	0.758	0.811
Depressive disorder	0.236	0.033*	0.414
Family support	0.345	0.209	0.516

*: P < 0.05

Table 4. Detailed Data about the Associations of Perceived Stress, Anxiety and Depression with Family Support by Gender and Age in COVID-19 Patients

	Perceived stress score (mean ± SD)	P	Anxiety score (mean ± SD)	P	Depression score (mean ± SD)	P	Family support score (mean ± SD)	P
Gender		0.01*		0.661		0.236		0.345
Male	5.29 ± 3.57		7.08 ± 5.61		6.34 ± 4.88		16.14 ± 3.29	
Female	6.6 ± 4.96		8.26 ± 5.22		6.11 ± 4.09		15.97 ± 4.18	
Age (year)		0.578		0.758		0.033*		0.209
20-40	5.11 ± 2.92		8.32 ± 5.34		5.32 ± 3.25		14.63 ± 4.43	
40-60	6.30 ± 4.56		7.22 ± 5.57		5.85 ± 4.69		16.49 ± 3.44	
> 60	5.84 ± 4.27		7.72 ± 5.45		8.44 ± 4.72		16 ± 3.52	

*: P < 0.05

4. Perceived stress: low perceived stress (PSS-4 score = 0-4), moderate perceived stress (PSS-4 score = 4-8), high perceived stress (PSS-4 score = 8-16)
5. Anxiety: No: normal (HADS score = 0-7), borderline: (HADS score = 8-10), Yes: anxiety disorder (HADS score = 11-21)
6. Depressive disorder: No: normal (HADS score = 0-7), borderline: (HADS score = 8-10), Yes: depressive disorder (HADS score = 11-21)

ABBREVIATIONS

PSS-4: Perceived Stress Scale-4

HADS: Hospital Anxiety and Depression Scale

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Discussion

Prevalence of anxiety and depression was found to be higher in the admitted COVID-19 patients compared to the general population in Iran (20). The present findings revealed moderate-to-high levels of perceived stress in over 55% of the patients and abnormal (definite or borderline) anxiety levels in 46%. Research in Iran has reported generalized anxiety disorder in 5.2% of the general population and has shown that 15.6% of the population has at least one type of anxiety disorder (including generalized anxiety disorder, panic disorders, phobia and post-traumatic stress disorder) (20). Moreover, borderline or definite symptoms of depression were observed in approximately 40% of the patients. Previous studies in Iran reported major depressive disorder in 12.7% of the subjects. A study in Iran among Iranian Medical Students showed that the prevalence of depression and anxiety was higher among those who had experienced COVID-19 symptoms than those who did not (21). An epidemiological study in the U.S. also reported the 12-month prevalence of Subsyndromal Symptomatic Depression (SSD) in the general population as 8.4% (22). A study in Australia also reported a 12.9% prevalence of SSD in the general population (23).

Psychological problems of the COVID19 pandemic in general population or health workers has been addressed in many studies. In a study among nurses of Guilan University of Medical Sciences hospitals during the COVID crisis, prevalence of anxiety and depression was 38.8% and 37.4%, respectively (24). Prevalence of depressive symptoms, generalized anxiety disorder and sleep disorders in the Chinese community were respectively reported as 35.1%, 20.1% and 18.2% (25). A review article published in March 2020 excluded 19 out of a total of 47 articles on COVID-19 and mental health owing to their language or irrelevance. Of the remaining 28 articles, only 4 were related to individuals affected by the COVID-19 outbreak and the others addressed the general population or healthcare workers.

Majority of the studies (18 out of the 28) were conducted in Chinese health centers (10); for instance, a study that recruited 1,210 participants from the general population reported moderate-to-severe depressive and anxiety symptoms, respectively, in 16.5% and 28.8% of the subjects, which was consistent with the present study, and moderate-to-severe stress levels in 8.1% (11).

Prevalence of anxiety or its borderline symptoms were obtained as 46% in the present study of COVID-19 patients and was lower than that reported in the only similar study in Iran by Zandifar *et al.* (100%). In this study, they found 97.2% of patients with a degree of depression. Also, all patients (100%) had severe anxiety (0.9%) and very severe anxiety (99.1%). In terms of stress, 97.1% of patients had different levels of stress. In terms of stress intensity, 84.9% of patients had severe and very severe stress. In terms of perceived stress, 73.6% of patients had high levels and 22.6% had moderate levels. In the Zandifar *et al.* study, a positive correlation was found between depression and perceived stress (correlation coefficient = 0.33, P = 0.001). The correlation between anxiety and perceived stress was statistically significant (correlation coefficient = 0.2, P = 0.04). A significant association was also detected between level of education and severity of depression, but in our study, there was no correlation between them. In both, there was no statistical association between age and gender with anxiety (26).

Prevalence obtained for anxiety or its borderline symptoms was 46% in the present study of COVID-19 patients which was lower than that reported in a similar study by Xiangyu Kong *et al.* (34.72%), as was the case for prevalence of depressive disorder obtained as 17% versus 28.47%. The present study found only depressive symptoms higher in older ages, whereas Xiangyu Kong *et al.* found both anxiety and depression scores to be significantly higher in ages over 50 (27). This discrepancy in the results can be attributed to differences in social conditions, demographical characteristics and presence of comorbidities.

The present study found perceived stress, anxiety symptoms and depressive symptoms to be significantly and negatively correlated with social support from family. In other words, the higher the level of family support, the lower the incidence of stress, anxiety and depression amid the crisis. Similarly, Xiangyu Kong *et al.* reported the positive effects of social support on psychological consequences (27). Furthermore, social support negatively correlated with anxiety levels in Chinese college students (2).

As discussed earlier, several factors in this outbreak that cause fear and anxiety in the community and patients include limited information, transmission, prevention, treatment and prognosis of the disease. The high transmission rate and mortality of the disease, loss of family members, and rising unemployment also increase anxiety during this pandemic. To cope with the difficulties of this predicament, the patients undoubtedly need more social support from family members, friends and healthcare workers (28). The greater the social support, the better the mental health of patients. In situations where physical presence and face-to-face communication are impossible or restricted, the patients' mental status can be improved by virtually communicating with their families.

Limitation

The present study limitations and disruptive factors included selecting participants from patients with a relatively acceptable psychophysical status who willingly and voluntarily completed the questionnaire. Some patients with symptoms of anxiety and depression, therefore, refused cooperation in the study and were excluded. Lack of cooperation by patients with serious psychological diseases decreased the statistics, though insignificantly. Psychological symptoms highly depend on the individual's mental health status and are affected by their psychiatric history and physical conditions as well as social factors and are not merely influenced by COVID-19. The ideal would have been to compare each patient's symptoms at time of the study with their symptoms before affliction with the disease, but such measure could not be taken in this study. Last but not least, the positive spiritual impact of the philanthropic and sympathetic atmosphere of hospital cannot be ignored. Not only healthcare workers treated the patients in an ideal altruistic way, but reliable community volunteers helping out in COVID-19 wards also played a key role in supporting the patients who had no companions during their hospitalization (29). Boosting the spirit of the patients as a result of the commendable philanthropic and empathetic behaviors of the health personnel and volunteers might have, however, affected the statistics.

Although this study did not aim at evaluating the effect of psychological counseling on general well-being in the patients, the participants reported improvements in their general health after a brief psychological conversation with them, which was confirmed by the interviewer. This feeling of satisfaction was also reflected by the patients in the questionnaires. It is recommended that further studies be conducted using larger samples to investigate this effect as well as the prevalence of psychological symptoms using standard scales.

Conclusion

Although this study did not aim at evaluating depressive or anxiety disorders, it investigated statistics for psychological symptoms using standard scales. These subsyndromal symptoms may, however, develop into psychological disorders if left untreated. These conditions require non-clinical interventions such as psychological first aid and psychological resilience improvement. Given the high prevalence of depressive symptoms and symptoms of anxiety and perceived stress during the current pandemic, plans are required to be

laid down to address psychological support for hospitalized COVID-19 patients in the following days of this and future pandemics. Providing the patients with greater family support, even in virtual form or through telecommunications, can improve their well-being in this crisis. Moreover, given that anxiety and depression can prolong hospitalization and cause non-adherence to treatment, mental health is of vital importance for improving the clinical outcomes of patients and accelerating their healing process amid crises.

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Conflict of Interest

None.

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