



Prevalence and factors related to post-traumatic stress disorder (PTSD) in patients with COVID-19 and their families admitted to 22 Bahman Hospital in Neyshabur

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Abstract

Diseases such as COVID-19 can be associated with the development of mental disorders such as PTSD in patients or their families, which can last for years. Therefore, this study investigated the prevalence and factors associated with post-traumatic stress disorder (PTSD) in patients with COVID-19 and their families admitted to 22 Bahman Hospital in Neyshabur in 2020. In this descriptive cross-sectional study, 96 patients and 96 family members in Neyshabur were included using available and voluntary sampling. PTSD in individuals was assessed by completing the DSM-5(PCL-5) checklist and interviewing. Demographic information including gender, age, level of education and marital status was also collected. Information related to COVID-19 disease including the patient's pulmonary involvement, duration of hospitalization and ward was recorded. In both groups, the majority of participants were men (56%), married people (90%), and people with a diploma (49%). The mean score of PTSD in the patient group and the patient family group was 35.5 and 33.5, respectively. All subjects in the patient group and the patient group had PTST disorder (PTSD score>18). In the group of patients with COVID-19, the severity of post-traumatic stress disorder was severe in 14.6%, moderate in 21.9%, and mild in the rest. Also, the incidence of PTSD among patients' families was 16.7% severe, 31.2% moderate and the rest mild. Regression analysis showed that the variables of hospitalization and duration of hospitalization could predict stress disorder in patients at 53.9% and 24.2%. Given the widespread coronavirus in communities as well as the prevalence of PTSD in patients and their families, control measures should be considered to improve the mental health of these individuals.

Keywords: Coronavirus, COVID-19, PTSD, Trauma

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Introduction

Post-traumatic stress disorder (PTSD) is the most common and important mental disorder that occurs in a situation where a person experiences a lot of stress with fear of death of themselves or others (1). Certain types of events such as natural disasters such as floods and earthquakes, the spread of infectious diseases as well as physical or sexual abuse are significantly associated with the spread of PTSD (2-5). The prevalence of PTSD is affected by the severity, duration and proximity of the accident (3). Previous studies have shown that PTSD is the most common psychological problem after an epidemic due to traumatic conditions (4). Outbreaks appear to be exacerbated during pregnancy and in patients with dementia (6). Even family members of patients with COVID-19 are experiencing increased stress. Poor knowledge of the structure, behavior, and mechanisms of virus transmission, uncertainty overtime to control the disease, quarantine of patients and families, and death of family members have led to widespread fear and anxiety and loss of confidence in individuals. On the other hand, patients with coronation and their families experience difficult and stressful conditions due to hearing bad news from those around them and the media, the heavy burden of treatment costs and other related factors. The World Health Organization (WHO) estimates that 30 to 50 percent of the population in areas affected by the SARS-CoV-2 coronavirus epidemic suffer from various psychological problems, especially PTSD. At the same time, it has been reported that people with PTSD are more at risk of suicidal ideation, suicide attempt and suicide-related death (5). This is so important that even physicians are advised to include PTSD as part of a common history when taking histories of patients with coronavirus (7, 8). Patients with COVID-19, especially in the severe form of the disease, are usually admitted to infectious wards in isolation. These patients may experience loneliness, anger, anxiety, depression, insomnia, and post-stress symptoms due to perceived social isolation, dangerous conditions, uncertainty about the future, physical discomfort, drug side effects, and fear of transmitting the virus to others. Experience the accident. These effects can negatively affect the social, occupational and quality of life of these people in the short and long term (9). Patients connected to

ventilators are restless and confused about what is happening. Therefore, it is predictable that many people who are discharged from intensive care unit survivors after treatment will experience depression, anxiety, post-traumatic stress disorder, and other mental health problems. A UK study reported that more than 50 percent of patients admitted to the intensive care unit showed severe signs of anxiety, depression and post-traumatic stress disorder after discharge (10). In this regard, the prevalence of symptoms and diagnostic criteria for PTSD during the coronavirus epidemic in Italy has been reported up to 49.7% (11). The prevalence of PTSD at the time of the previous epidemic of coronavirus strains was reported to be about 32% (12). Naturally, in such a situation, the mental condition of the family and those around the patients is also unfavorable. In a study in Japan of more than 16,000 participants, including family and friends of patients with COVID 19, the results showed that most of them were fearful and anxious. In this study, PTSD scores in women under 60 were more than was reported from other individuals and age groups (13). The families of patients with COVID-19 have also been identified as a trauma group so that the monitoring of their mental state and, if necessary, counseling measures should be considered for them (14). Otherwise, in the near future we are likely to see an increase in the incidence of PTSD in the whole community (15). PTSD can be very common even long after the initial exposure to trauma. If proper and timely action is not taken for counseling and psychotherapy, this disorder will challenge people for many years to come. Therefore, in the current situation where patients with COVID-19 and their families are under a lot of stress, it seems necessary to study the prevalence of this disorder among patients and their family members to plan counseling and treatment measures. So far, several studies have been conducted on the prevalence of PTSD among COVID-19 survivors worldwide, but studies to examine the psychological consequences of COVID-19 disease among patients and their companions in developing areas such as Iran are limited (16). Given that socio-cultural differences, as well as demographic characteristics, affect the prevalence and severity of PTSD in individuals, conducting such a study is a priority. This study aimed to investigate the prevalence and factors associated with post-traumatic stress disorder (PTSD) in patients

with COVID 19 and their families admitted to 22 Bahman Hospital in Neyshabur in 2020.

Materials and Methods

Study design and selection of participants

The present study was a descriptive cross-sectional study conducted in 2020. The study consisted of 19 patients with COVID 19 admitted to 22 Bahman Hospital in Neyshabur and their family members. Sampling was non-random and available and voluntary. In this way, the purpose of the study and the method of work (completing the questionnaire and checklist) was explained to patients and their families. If these individuals met the inclusion criteria and also expressed their consent to participate, a written consent form would be obtained from them. Finally, 96 patients and 96 family members were included in the study. This study aimed to determine the prevalence of PTSD in patients with COVID-19 and their families in Neyshabur and to determine the factors associated with this disorder. Inclusion criteria for patients included: hospitalization based on COVID-19 diagnosis, and ability to answer questions (stability of disease condition). Exclusion criteria for patients included: outpatients with a maximum hospital stay of one day and a history of psychiatric medication use at least one month before admission to hospitalization. Criteria for inclusion of patients' family members in the study were; Be a first-degree relative of the patient who wants to participate in the research and is willing to cooperate at the time of the patient's discharge. Exclusion criteria for a family member should also include relatives of the patient whose patient does not meet the inclusion criteria. Ethical criteria in the research, including ensuring the confidentiality of information, sufficient and necessary explanation of the working method and guidance in referring to counseling centers depending on the severity of the disorder were observed. This research is based on a research design with ethics code IR.NUMS.REC.1399.035.

Data collection

Based on the coordination with the hospital, an arrangement was made to inform the research team one day before the possible discharge of COVID 19 patient, so that one of the research colleagues would be present at the patient's discharge and complete the checklist to

diagnose the disorder along with the interview. Data were collected by completing a demographic information questionnaire as well as a DSM-5 (PCL-5) checklist and interview. When completing the checklist and interviewing, the research colleague met with them and their families in full compliance with hygiene principles and at the time of discharge. Demographic information included gender, age, level of education, and marital status. Also, information related to COVID-19 disease including the patient's pulmonary involvement, duration of hospitalization and ward were recorded.

DSM-5 (PCL-5) checklist

The post-traumatic stress disorder checklist was designed based on the DSM-5 (PCL-5). This checklist was prepared by Withers, Leitz, Kane, Palmeier, Marx, and Ashnor (1993), based on the criteria of the Fifth Edition Diagnostic and Statistical Manual of Mental Disorders, for the US National Center for Post-Traumatic Stress Disorder as a diagnostic aid. This checklist contains 17 five-choice items. Of these 17 items, 5 were related to the signs and symptoms of re-experiencing a traumatic event, 7 were related to the signs and symptoms of emotional numbness and avoidance, and 5 were related to the symptoms and symptoms. The scoring method is in the form of Likert from one to five and the total score of the articles (85-17) is considered as the individual score (17). A score of 35 is considered as the cut-off point in most studies (18-20). The validity and reliability of this tool have been reviewed and confirmed in previous studies (17-22). In the present study, Cronbach's alpha coefficient for the whole scale was 0.90. Depending on the scores obtained from the stress checklist after injury and according to the range of scores, individuals were divided into three groups. Thus, individuals with scores ranging from 18-28, 29-56 and 57-85 were divided into mild, moderate and severe PTSD groups, respectively. A score of 17 meant that there was no evidence of this disorder.

Statistical analysis

The number and relative frequency of participants were calculated and reported based on various parameters. Spearman correlation analysis was also used to determine the correlation between individuals' PTSD

scores and demographic variables and COVID-19 disease. Linear regression analysis was used to evaluate the effect of demographic variables and COVID-19 disease on the severity of PTSD. Data were analyzed by SPSS v.16 software at a significance level of 0.05.

Results

Data analysis was performed on 192 patients (96 patients and 96 families of these patients).

Demographic characteristics, length of hospital stay, ward, and percentage of lung involvement in patients and families of patients with COVID 19 are listed in Table 1. In both groups, the majority of participants were men (56%), married people (90%), and people with a diploma (49%). The percentage of lung involvement in most of the subjects (78%) was less than 50% who were hospitalized for less than 10 days (58%) in non-specialized wards (80%).

Table 1. Demographic characteristics and COVID-19 disease in study participants.

| Variable | | Patient group (n=96) | | Patient family's group (n=96) | |
|---------------------------------------|----------------------------|----------------------|--------------------|-------------------------------|--------------------|
| | | Average | Standard deviation | Average | Standard deviation |
| Age | | 57.44 | 15.05 | 46.14 | 16.25 |
| | | Number | Percentage | Number | Percentage |
| Gender | Female | 40 | 41.7 | 31 | 32.3 |
| | Male | 56 | 58.3 | 65 | 67.7 |
| Marital status | Single | 6 | 6.2 | 6 | 6.2 |
| | Marriage | 90 | 93.8 | 90 | 93.8 |
| | Total | 96 | 100 | 96 | 100 |
| Level of Education | Illiterate | 3 | 3.1 | 3 | 3.1 |
| | High school | 27 | 28.1 | 28 | 29.2 |
| | Diploma | 47 | 49 | 43 | 44.8 |
| | Associate degree | 3 | 3.1 | 5 | 5.2 |
| | Bachelor | 10 | 10.4 | 10 | 10.4 |
| | Master's degree and higher | 6 | 6.2 | 7 | 7.3 |
| | Total | 96 | 100 | 96 | 100 |
| Percentage of lung involvement | Under 50% | 78 | 81.2 | 78 | 81.2 |
| | Above 50% | 18 | 18.8 | 18 | 18.8 |
| | Total | 96 | 100 | 96 | 100 |
| Duration of hospitalization | Less than 10 days | 58 | 60.4 | 58 | 60.4 |
| | More than 10 days | 38 | 39.6 | 38 | 39.6 |
| | Total | 96 | 100 | 96 | 100 |
| Inpatient department | Non-special | 80 | 83.3 | 80 | 83.3 |
| | Special | 16 | 16.7 | 16 | 16.7 |
| | Total | 96 | 100 | 96 | 100 |

The amount and severity of post-traumatic stress disorder (PTSD) in patients and families of patients with COVID 19 were assessed using a questionnaire and the results are listed in Table 2. The mean score of PTSD in the patient group and the patient family group was 35.5 and 33.5, respectively. This indicates that, on average, the severity of PTSD in patients was slightly higher than in patients' families. All subjects in the patient group and the patient group had PTSD, meaning that in this study, there was no individual without this disorder among the participants. In the group of patients with COVID-19, the severity of post-traumatic stress disorder was severe in 14.6%, moderate in 21.9% and mild in the rest. The percentage was severe, 31.2% was moderate and the rest was mild.

Table 2. Number and percentage of participants based on the extent and severity of PTSD.

| Variable | Patient group (n=96) | | Patient family's group (n=96) | |
|-----------------------------|----------------------|--------------------|-------------------------------|--------------------|
| | Average | Standard deviation | Average | Standard deviation |
| Average PTSD score (17-185) | 35.53 | 18.51 | 33.500 | 17.49 |
| | Number | Percentage | Number | Percentage |
| PTSD score (18-28) | 61 | 63.5 | 50 | 52.1 |

| | | | | |
|-----------------|----|------|----|------|
| Medium (29-56) | 21 | 21.9 | 30 | 31.2 |
| Intense (57-85) | 14 | 14.6 | 16 | 16.7 |
| Total | 96 | 100 | 96 | 100 |

The correlation between PTSD scores in patients and their families with demographic characteristics and disease parameters were examined by the Spearman correlation test and the results are presented in Table 3. According to the results of Table 3, a significant positive correlation was observed between the variables of involvement percentage, type of hospitalization and duration of hospitalization with the severity of post-traumatic stress disorder in both groups.

The longer the hospital stay and the percentage of lung involvement, the higher the stress disorder score was reported. Also, those admitted to the intensive care unit reported higher stress scores. Compared to the patient group, a higher correlation was found between the severity of PTSD and the percentage of pulmonary involvement and inpatient ward among patients' families. If the duration of hospitalization was more correlated with the severity of PTSD among patients. Also, no significant correlation was found between stress disorder and demographic variables such as gender, age, level of education and marital status.

Table 3. Correlation of PTSD scores with demographic variables and parameters of COVID-19 disease in patient groups and patients' families.

| Variable | Gender | Age | Level of Education | Marital status | Percentage of lung involvement | Inpatient department | Duration of hospitalization |
|-------------------------|-----------------------------|--------|--------------------|----------------|--------------------------------|----------------------|-----------------------------|
| PTSD patients | Spearman (p) | 0.056 | 0.703 | 0.245 | 0.113 | 0.000 | 0.000 |
| | Correlation coefficient (r) | -0.124 | 0.039 | -0.120 | 0.253 | 0.461 | 0.637 |
| PTSD patients' families | Spearman (p) | 0.384 | 0.802 | 0.754 | 0.161 | 0.000 | 0.000 |
| | Correlation coefficient (r) | -0.090 | -0.026 | -0.033 | 0.063 | 0.575 | 0.7412 |

The results of regression analysis to evaluate the effect of demographic variables and parameters of COVID-19 disease on the severity of PTSD are presented in Table 4. In both groups, none of the demographic variables, including age, gender, education, and marital status, affected the severity of PTSD. The results of the regression test showed that the variables of hospitalization, length of hospitalization and percentage of lung involvement of patients can predict stress disorder in the families of patients with 43.1%, 57.5% and 1.10%, respectively. These results mean that family members of patients who have been

hospitalized in the intensive care unit for more than 10 days, and their lung involvement rate is more than 50%; Higher levels of stress disorder have also been reported. Also, the results of data analysis by regression test in the patient group showed that only the variables of hospitalization and duration of hospitalization (and not the percentage of lung involvement) can predict stress disorder, at 53.9% and 24.2%. These results indicate that patients who have been hospitalized in the intensive care unit for more than 10 days have also reported a higher rate of stress disorder (Table 4).

Table 4. The effect of demographic variables and parameters of COVID-19 disease on the severity of PTSD in patient groups and patients' families.

| | | B | Standard deviation | Beta | t | P-value |
|--|--------------------------------|--------|--------------------|--------|--------|---------|
| PTSD patients | Constant | -1.012 | 0.448 | | -2.258 | 0.026 |
| | Gender | 0.130 | 0.098 | 0.083 | 1.320 | 0.190 |
| | Age | -0.003 | 0.003 | -0.062 | -0.902 | 0.370 |
| | Level of Education | -0.010 | 0.038 | -0.017 | -0.269 | 0.789 |
| | Marital status | 0.171 | 0.204 | 0.056 | 0.839 | 0.404 |
| | Percentage of lung involvement | 0.327 | 0.162 | 0.174 | 2.014 | 0.047 |
| | Inpatient department | 1.063 | 0.195 | 0.539 | 5.437 | 0.000 |
| | Duration of hospitalization | 0.365 | 0.115 | 0.242 | 3.187 | 0.002 |
| F=27.480 P=0.000 ADJ.R²= 0.664 | | | | | | |
| PTSD Patient Families | Constant | -.808 | 0.333 | | -2.424 | 0.017 |
| | Gender | -0.031 | 0.067 | -0.020 | -0.464 | 0.644 |
| | Age | -0.002 | 0.003 | -0.035 | -0.628 | 0.531 |
| | Level of Education | -0.016 | 0.031 | -0.025 | -0.517 | 0.607 |
| | Marital status | 0.199 | 0.160 | 0.064 | 1.247 | 0.216 |
| | Percentage of lung involvement | 0.022 | 0.118 | 0.011 | 0.186 | 0.853 |
| | Inpatient department | 0.867 | 0.138 | 0.431 | 6.299 | 0.000 |
| | Duration of hospitalization | 0.882 | 0.081 | 0.575 | 10.929 | 0.000 |
| F=66.371 P=0.000 ADJ.R²= 0.828 | | | | | | |

Discussion

In this study, the severity of PTSD in patients with COVID-19 and their families in 2020 was evaluated. The effect of some demographic variables as well as parameters related to COVID-19 on the severity of

PTSD was also analyzed. According to the results, post-traumatic stress disorder had a significant correlation with the percentage of lung involvement, type of ward and length of hospital stay. In patients, the variables of hospitalization and duration of

hospitalization had a significant effect on the severity of PTSD. Also, three variables of lung involvement percentage, type of hospitalization ward and length of hospitalization in the families of patients with COVID were able to significantly predict stress disorder. The present study showed that 14.6% of patients and 16.7% of their families had a severe type of this disorder and the rest of the participants suffered from moderate and mild types. A previous meta-analysis study found that during previous coronavirus epidemics, the prevalence of PTSD was about 32% (12). In the case of SARS-CoV-2, a study in Italy found that the prevalence of PTSD symptoms among COVID-19 survivors was about 30% (23). However, the results of another study in Italy showed that PTSD was diagnosed in 10.4% of the subjects. The results of this study are more consistent with the present study. In a case-control study, PTSD scores in the case group were significantly higher than in the control group (16, 23). In general, the difference in the prevalence of PTSD among COVID-19 patients can be due to various reasons, including cultural-religious differences, as well as the distance between the test and the completion of COVID-19 disease. Because it has been shown that with increasing duration after discharge, patients' PTSD scores increase by 20% (23). In the present study, contrary to the studies mentioned, the DSM-5 (PCL-5) checklist was completed on the day of discharge. In general, previous studies show that approximately 5 to 10 percent of men and 10 to 12 percent of women will experience the disorder in their lifetime. The lifetime prevalence of this disorder in the general population has been reported to be about 8%. About 5-15% of other people may also have subclinical forms of the disorder (3). The present study showed that PTSD is higher in patients admitted to the intensive care unit and their families who feel the risk of death closer. Previous studies have also shown that post-traumatic stress disorder is more common, especially in people who feel that death is imminent or imminent for any reason. For example, in a study of 16,000 participants in Japan, people who had COVID-19 in one of their family members showed more psychological distress than others (13). Following the outbreak of SARS in 2003, both health care workers and quarantined individuals showed signs of post-traumatic stress disorder. PTSD was also reported to be the most common long-term psychiatric disorder among them. The incidence of this disorder in

two years after the outbreak of SARS was 47.8% (4). Risk factors for increasing the severity of PTSD symptoms include female gender, living in a city with the disease, poor sleep quality, and experience with a dangerous physical illness, but there is a significant relationship between PTSD and age and education. In another study, in groups under 60 years of age, respondents who had a patient with COVID-19 had a higher score of psychological stress, regardless of gender, and this difference was statistically significant (13). Another study reported that female gender, poor economic status, and fear could predict the severity of PTSD in patients with coronary heart disease (24). In the present study, patients admitted to intensive care units and their companions showed a higher severity of PTSD, which could be due to fear of death. In general, some differences in the findings between the current study and some previous studies may be due to cultural-religious differences. Another reason may depend on the timing of the study. While the present study was performed approximately 2 years after coronary heart disease, some other studies were performed only a few months after the onset of the disease (11). This suggests that stress levels and mental health problems can probably be reduced over time and familiarity with the risks and how to deal with the disease. Previous studies have also reported that the symptoms of PTSD are moderately high in nurses and physicians and all people working in hospital wards and are higher in women working in these wards (9). Although the disorder is more common in women under normal circumstances (other than coronary heart disease), its prevalence in women can be attributed to the more stressful roles they have to play at home during quarantine, as well as the quarantine effect at home. Staying attributed (25). The prevalence of PTSD, depression and sleep disorders increases during quarantine. Fear of getting sick is the most important factor of psychological distress and living in a completely limited environment is very effective on the duration of sleep and mental health (26). In another study, PTSD and depression and anxiety were more common in medical staff who were directly associated with patients (25). Although exposure rates, work experience, occupational support and social support, quarantine, age, gender and marital status have been reported to be associated with PTSD (27). In the present study age, gender and status Marriage had

nothing to do with PTSD. The reason for this difference could be the difference in the statistical population, because, in the study, participants included the treatment staff of the statistical community and in the present study, the participants were patients admitted to their families.

The results of the present study proved that PTSD is a common disorder among patients and families involved with COVID-19. This disorder can severely affect the quality of life of the person and those around them so that the person is involved with its complications for years after the end of COVID-19. At present, it seems that in addition to efforts at various levels to prevent the spread of coronary heart disease and other worrying conditions, special attention should be paid to mental health issues. Programs offered for screening for psychiatric disorders, including anxiety and depression, especially PTSD among patients and their families, and case management by employing psychiatrists, psychologists, and other related medical groups, especially in quarantine cases due to the severity of vulnerabilities and it seems necessary to create peace and trust in the people (8). This study has strengths and limitations that should be noted. This study is one of the few studies that has been performed on the effect of COVID-19 on the incidence of PTSD in patients and their relatives in the world. Also in this study, the modification effect of several parameters such as gender, education, marital status, length of hospital stay, percentage of pulmonary involvement and hospitalization on PTSD severity were measured. However, the present study has some limitations as well. First, due to the physical and psychological effects of COVID-19, patients' energy and motivation to respond were low. Second, patients' families sometimes had time constraints to respond due to the patient's haste to discharge. Also, the physical distance was observed when communicating with patients and their families, which can affect effective communication with them.

Conclusions

In this study, the rate of PTSD in patients with COVID-19 and their families was assessed by a valid questionnaire. The effect of individual factors and parameters related to COVID-19 on the severity of PTSD was also investigated. The results showed that

all subjects in the patient group and the patient family group showed mild to severe degrees of PTSD. On average, the severity of PTSD in patients was slightly higher than in the patients' families. The effect of none of the parameters of gender, age, education and marital status on the incidence of PTSD was significant. However, in the group of patients, the variables of hospitalization and duration of hospitalization had a significant effect on the severity of PTSD. The results of this study indicate that COVID-19 disease and exposure to the resulting fear and anxiety cause PTSD in both patients and their families. Given the widespread of coronavirus in communities and the prevalence of PTSD in patients and their families, control measures should be considered to improve mental health for these individuals. These measures may include screening for psychiatric disorders such as anxiety and depression, especially PTSD among patients and their families, and managing PTSD cases by employing psychiatrists, psychologists, and other medical groups.

Author contribution

MGh managed the manuscript, study design, controlling the project and fulfilled the data processing and compiled some sections of the article. **MB**, **ZJ**, **FKh** and **HO** were involved in some sections of the manuscript like collected data, data processing and performed statistical analyses. **MGh** wrote the whole manuscript. All authors revised the article comprehensively and confirmed the final edited version of the paper.

Conflict of interest

The authors reported no potential conflict of interest.

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