

# Health Education and Public Health

2024; 7(1): 561-565. doi: 10.31488/HEPH.187

Research article

## Mental Health of Hospital Employees Over Time after the Covid-19 Pandemic

Zeinab Talebi Habibabadi<sup>1</sup>, Gholamreza Kheirabadi<sup>2</sup>, Mohammadjavad Tarrahi<sup>3</sup>

1. Department of Psychiatry, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

2. Prof. of Psychiatry, Behavioural Sciences Research Centre, Department of Psychiatry, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

3. Department of Biostatistics, School of Public Health, Isfahan University of Medical Sciences, Isfahan, Iran

**Corresponding author:** Zeinab Talebi Habibabadi, Department of Psychiatry, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

Received: May 27, 2024; Accepted: June 19, 2024; Published: June 24, 2024

### Abstract

The Covid-19 pandemic has spread incredibly and seriously affected everyone, especially health workers. The major problem facing the world health system is staff burnout. Aims: This study examined the mental health status of hospital staff over time after the outbreak of Covid-19 in Isfahan province in Iran. Setting and Design: This multi-stage stratified-sampling study was conducted hospital staff in two reference hospitals with and without admission of patients suffering from Covid-19 in Isfahan province, Iran. Materials and Methods: Symptom Checklist 25 (SCL-25) questionnaires were used for mental status evaluation and a checklist for demographic and other related variables. All variables were studied at 3, 6, and 9 months after the Covid-19 outbreak. Statistical analysis used: Data analyzed by SPSS19 using Kruskal-Wallis and Mann-Whitney Tests. Result: Among 357 staff of COVID-19 Hospital, 187 were medical, 73 non-medical, and 40 administrative staff. Of 481 staff of non-Covid-19 hospital, 235 were medical, 53 non-medical and 12 administrative staff. The hospital staff where Covid-19 patients were admitted obtained higher total SCL-25 scores than the hospital staff with no Covid-19 patients admission. Despite the upward trend in psychiatric disorders in both groups, there was a significant difference between them, especially nine months after the COVID-19 outbreak. Conclusion: The Covid-19 hospital staff were at higher risk of mental health disorders overall. Direct communication or lack of direct communication with the patients of Covid-19 over time had different psychological effects on the hospital staff.

Keywords: Healthcare Worker, Mental Health Status, Covid-19

### Introduction

In December 2019, a new viral disease was first discovered in the seafood market of Wuhan, China [1,2], and World Health Organization (WHO) named it Corona Virus Disease 2019 (Covid-19) in February 2020. About a month after the first confirmed case, it was officially introduced as the new pandemic of the century [4-5]. The virus also inflicted Iran, and the country is still fighting the virus [6].

The high spread and mortality rate, lack of any definitive treatment or prevention, and prediction of some epidemiologists regarding infection of at least 60% of the population raised public health concerns and caused tremendous psychological stress

in communities [4-7]. This disease differently endangers the mental health status of different individuals, including patients, healthcare workers, families, children, students and psychiatric patients [8,9].

Healthcare workers are the first to be exposed to the virus and at greater risk of infection and mental health problem than the general population [10-16]. Prioritizing of physical health to mental health in viral outbreaks may increase the risk of developing various mental illnesses especially in those are vulnerable [17,18]. In a study on health staff in SARS outbreak showed that the social functioning and mental health of them were at their lowest level even three years after the end of the SARS epidemic [19]. It is possible that symptoms such as anger, fear,

and anxiety are at the highest level in the community at the peak of the disease and more seriously hurt the community than the infection itself [20,21]. Damage to public health and consequent burnout of medical staff lead to a waste of capital and reduced productivity, performance and goal achievement [22,23]. Therefore, any plan and even investment in these resources that lead to maintaining and improving the employees' health can ultimately promote the efficiency and investment return [24].

This study aimed to compare the mental health status of Khorshid Hospital staff (where Covid-19 patients were admitted) with Imam Hossein Hospital staff (where Covid-19 patients were not admitted) at 3, 6, and 9 months after the outbreak of COVID-19 in Isfahan city in 2020, using the Symptom Checklist [25], (SCL-25) questionnaire and demographic characteristics checklist.

## Subjects and Methods

In this multi-stage stratified study, all medical staff except physicians of Khorshid (where Covid-19 patients were admitted) and Imam Hossein Hospitals (where Covid-19 patients were not admitted) were studied. The hospital staff was divided into medical, non-medical, and administrative groups. Medical staff included nurses, assistant nurses, and anesthesia staff in ICU, CCU, NICU, emergency wards, and other hospital wards. Non-medical staff included hospital guards and service and laboratory staff. The administrative staff included staff from different hospital wards, ward secretaries, and experts from the health, education, and finance sectors.

The sample size in each group is obtained based on staff shares relative to the total staff of each hospital. Therefore, at the Khorshid Hospital, 187 medicals, 73 non-medical, and 40 administrative staff were selected as the study sample. Furthermore, at the Imam Hossein hospital, 235 medicals, 53 non-medical and 12 administrative staff were selected. Despite the selection of 300 staff, the numbers of staff who filled the questionnaire in Imam Hossein Hospital were 231, 193, and 203 in the first, second, and third time intervals, respectively. Moreover, the numbers of staff who filled the questionnaire in Khorshid Hospital were 186, 196, and 232 in the first, second, and third time intervals, respectively. The total number of participants in this study was 1241. It is noteworthy that due to the lack of a similar study, the sample size was selected based on the number of staff in each hospital, and no formula was used to calculate the sample size. Then, we examined participants at three time intervals of 3, 6, and 9 months after COVID-19 in January 2020, September 2021, and July 2021.

The data were collected using a three-part questionnaire, including a demographic questionnaire, supplementary questions about COVID-19, and a mental health questionnaire. Participants were divided into four groups by age: less than 30 years, 30 to 39 years, 40 to 49 years, and more than 50 years. Regarding the level of education, they were divided into three groups: undergraduate, diploma up to bachelor's, and higher than bachelor's degree. As to the number of children, the participants comprised three groups: no child, one or two children, and three or more children. The second part of the questionnaire included questions about the participants and their relatives or colleagues' infection with Covid-19. Moreover, the losses of the participants' colleagues or relatives due to Covid-19 and the existence of previous psychiatric diseases were asked in this part.

The third part included the SCL-25 questionnaire, which is the short form of the SCL-90 questionnaire. Participants' responses to SCL-25 are rated on a five-point Likert scale ranging from 1 (no symptom reported) to 5. Numbers two to five indicate few, some, many and severe symptoms, respectively. More details of this questionnaire are presented in appendix 1. Strand et al. aim to investigate the correlation between the various forms of SCL scale to assess and to compare psychometric characteristics. They have used SCL-25, SCL-10, SCL-5 and MHI-5 (SF-36). They find high correlation of 0.91 to 0.97 between the various versions of SCL. They show that the shorter form of SCL performs almost as well as the full version. According to their results the corresponding cut-off points to the conventional 1.75 for SCL-25 are 1.85 for SCL-10 and 2.0 for SCL-5.

In the study conducted by Najarian et al., a shortened form of SCL-90 was made with [25], factors called SCL-25. In this study, it has been shown that this short form has a high correlation with the long form, so that it is a valid and reliable measure of general psychological disorder. 801 students of Shahid Chamran University were used in this study [26]. Among the other studies that used the SCL-25 questionnaire is the study of Talai et al. who evaluated 126 people with the aim of evaluating psychiatric disorders among medical and non-medical students and finally concluded that there is no significant difference between these two groups of students [27]. Inclusion criteria were hospital staff included nurses, assistant nurses, and anesthesia staff, emergency wards, and other hospital wards, Non-medical staff included hospital guards and service and laboratory staff and the administrative staff included staff from different hospital wards, ward secretaries, and experts from the health, education, and finance sectors of Imam Hossein and Khorshid hospitals who had the consent to participate in the study. The exclusion criteria were being a physician and medical student and not filling in the questionnaire.

The participants of each stage of the study were randomly selected from different sub-groups of the hospital staff based on the number mentioned above, and the participants of each stage were different from the other stages. The wards were divided into four groups: 1) intensive care units (i.e., ICU, CCU, and NICU), 2) emergency wards, 3) other medical wards, and 4) administrative wards.

Data of the three-time intervals of 3, 6, and 9 months were evaluated by SPSS19 using Mann-Whitney and Kruskal-Wallis Tests. The Mann-Whitney is a nonparametric test that examines the difference between two groups of individuals or objects. This test is used when the variables are ordinal or quantitative, the two groups are independent, and the dependent variable data is not normally distributed. Kruskal-Wallis is the generalized version of the Mann-Whitney test used to examine two or more groups with equal or unequal sample sizes. To compare all SCL-25 criteria between two hospitals, questions about the presence of a history of COVID-19 disease, their death history in family and colleague, the history of COVID-19 disease and the presence of mental illness in the participants and sex, marital status were measured by Mann-Whitney criteria, but to compare the different age groups, different levels of education, number of children and job part were used from Kruskal-Wallis. For all variables

The Mann-Whitney test are used except of the educations and ages groups.

## Results

Among all hospital staff, 1241 staff had the consent to participate in this study and completed the questionnaire. None of the participants were excluded from the study. Supplementary Table 1 shows the distribution of demographic variables and the distribution of participants in medical, non-medical, and administrative wards in both hospitals. It is noteworthy that the medical staff were the largest group of participants in this study. The mean scores of the SCL-25 questionnaire are shown in Supplementary table 2. According to studied demographic variables. The results are presented without considering the time interval. Supplementary table 3 shows the mean score of different sub-scales of the SCL-25 questionnaire in three-time intervals of 3, 6, and 9 months after the Covid-19 outbreak.

Supplementary table 4 shows the comparison of the mean scores of different sub-scales of the SCL-25 questionnaire of the two groups in the three-time intervals according to direct and indirect confronting with Covid-19 patients at the three-time intervals of 3, 6, and 9 months after the Covid-19 outbreak. During the first three months, there was a significant difference between the two groups in terms of obsession-compulsion, anxiety, paranoia, psychosis, and additional items sub-scales. In this regard, the health care workers who were in direct contact with patients obtained higher scores.

No significant difference was found between health care workers who were in contact with Covid-19 patients and those who had little contact or no contact with patients in terms of sub-scales of the questionnaire six months after the Covid-19 outbreak. However, there was a significant difference between the two staff groups in the SCL-25 sub-scales, except for obsession-compulsion and paranoid nine months after the Covid-19 outbreak. In this regard, the healthcare workers who had indirect contact with the patients obtained higher means in all sub-scales.

## Discussion

The results revealed that the high level of education, being single, history of psychiatric disorders, the history of Covid-19 infection in the staff or their colleagues, and the loss of relatives or colleagues of the participants were among the risk factors of mental disorders. The hospital staff where the Covid-19 patients were admitted obtained higher scores in SCL-25 sub-scales six and nine months after the Covid-19 outbreak. In general, the presence of the Covid-19 patients in the hospital was a risk factor in increasing the incidence of psychiatric disorders in the hospital staff. The staff who had direct contact with these patients obtained higher scores in SCL-25 in the first three months, but there was no significant difference among the staff after six months. Nine months after the Covid-19 outbreak, the staff who had indirect contact with these patients obtained higher scores on SCL-25 sub-scales. In a study by Rehman et al. (2021) using Depression Anxiety Stress Scale (DASS), no significant difference was found between men and women in terms of anxiety, depression, and stress but significant differences were found among different groups of participants in terms of stress, anxiety, and depression, in such a way that students, researchers,

teachers, physicians, and nurses reported mild levels of stress. Still, mental health professionals and company employees experienced normal levels of stress. Furthermore, teachers and company employees reported mild anxiety levels; researchers, physicians, and nurses reported moderate anxiety levels, and mental health professionals reported normal levels of anxiety. Regarding depression, students reported moderate depression while physicians and researchers experienced mild depression. Teachers, mental health professionals, and company employees had normal levels of depression [28].

Rehman et al.'s study was conducted during the second week of quarantine in India [28], while the present study was conducted at three time intervals of 3, 6, and 9 months after the Covid-19 outbreak. Also, more diverse participants were assessed in Rehman et al.'s study, and only three mental health criteria were evaluated. Consistent with Rehman et al.'s study, there was no significant difference between male and female participants of the present study in terms of psychiatric disorders, but Banitalebi et al. findings regarding gender and education were inconsistent with our study [29].

Kisley et al. using the meta-analysis method, investigated [38], studies about the mental health of healthcare workers who were in direct contact with patients with viral diseases, including severe acute respiratory syndrome (SARS), the coronavirus 2019 (COVID-19), and the Middle East respiratory syndrome (MERS). Twenty-five of these studies divided healthcare workers into two groups: direct exposure and indirect exposure to viral disease. In these studies, staff who had direct contact with the patients experienced higher levels of acute stress disorder, posttraumatic stress disorder, and psychological distress<sup>30</sup>. Our study demonstrated that the staff who had direct contact with patients obtained higher means in the sub-scales of anxiety, obsessive-compulsive, psychosis, and other mental disorders in the first three months. However, there was no significant difference between the two groups after six months. It is noteworthy that the staff who had indirect contact with the patients obtained higher mean scores in most sub-scales after nine months.

Hines et al. finding regarding the reduction of psychiatric disorders in medical staff over time were consistent with those of our study; however, their finding regarding the overall rate of psychiatric disorders overtime was inconsistent with the current study finding [31].

Another study by Rahman et al. on non-hospital staff using DASS-21 in India showed that their reactions to psychological stress decreased over time [32]. The present study findings are partly consistent with Rahman et al. total score decrease over time in hospital without COVID-19 admitted patient. But in COVID-19 admitted hospital the result was inverse. since both groups in COVID-19 admitted hospital experienced more mental disorders over time. However, nine months after the Covid-19 outbreak, the staff who had no contact with the patients experienced more mental disorders.

Nguyen et al. conducted a cross-sectional study to evaluate the risk factors of psychological stress in healthcare workers. They distributed an online, self-administered questionnaire through social media among medical and non-medical health workers from April 22 to May 12, 2020. They measured the prevalence

of psychological stress using the Impact of Event Scale-Revised (IES-R) instrument. The findings showed that being single, age less than 34 years, being female, presence of chronic disease before the Covid-19 outbreak, the participants or their relatives' infection with this disease, and having a lower level of education were among the important risk factors for increased stress levels during Covid-19pandemic [33].

Another cross-sectional study was conducted on 4391 students in different grades during the Covid-19 outbreak through the online Depression Anxiety Stress Scale) DASS). The results showed that participants with higher academic levels had more psychopathology than participants at lower educational levels [34]. Although few studies have been conducted in this regard, our study showed direct relationship between the level of education and the incidence of psychiatric disorders.

Banitalebi et al. showed a significant relationship between mental health and marital status, so that being female and married were reported as a protective factor against mental health problems, and there was also a significant relationship between mental health and age. But there was no significant relationship between the level of education and mental health<sup>31</sup>. The difference between Banitalebi et al.'s study and our study is that we found no significant relationship between age and gender regarding psychiatric disorders. Nevertheless, the incidence of psychiatric disorders was higher in the participants above 50. Contrary to Banitalebi et al.'s study, a significant positive relationship was found between the level of education and psychiatric disorders. It is noteworthy that both studies found a significant relationship between marital status and mental health.

Hines et al. (2021) investigated the trend of psychiatric disorders among medical staff and the factors influencing their resilience. For this purpose, 838 physicians and medical staff were evaluated using the Events Scale - Revise and Moral Injury Events Scale at the onset of Covid-19, one month, and three months later. It was shown that psychiatric distress decreased over time<sup>30</sup>. our findings were consistent with those of Hines et al. in that the scores of the SCL-25 sub-scales reduced in the group that had direct contact with these patients compared to the other group in nine months after the Covid-19pandemic. Although few studies have been conducted in this regard, several hypotheses can be made.

Sirois and Owens (2021) stated the possible reasons for these gradual changes from four perspectives: 1) Reducing the psychological burden of the disease stigma, 2) Improving methods of coping with stress and better coping by training and using psychological resources, 3) increasing information about the nature of the disease and prevention methods, and 4) empowerment of the health system in providing protective equipment against the disease [35].

The authors of the present study guess that the increased support overtime in the workplace for the medical staff with direct exposure, promising news about vaccine production in August 2020 and priority of injection to medical staff who had direct exposure to the patients might explain the difference in the mental health status of those with direct and indirect exposure to Covid-19patientsover time. Finally the diverse and sometimes

contradictory findings regarding the factors affecting the mental health of the general public and health system employees in different societies and the passage of time during the Covid-19 outbreak can be influenced by various factors such as the differences in rate and recurrence of waves of disease in different societies, the approach of different governments in the way Informing about this disease and the amount of economic support for people and health system employees, vaccination status, economic factors affected by outbreak, different cultural reactions to quarantine and restrictions on communication, and perhaps many other unknown factors that require more and more comprehensive studies is the future.

## Conclusion

Working at a hospital with Covid-19patient's admission, being single, having history of psychiatric disorders, to be infected with Covid-19in persons, their colleagues and relatives, and mourning due to Covid-19deaths were the risk factors of psychiatric disorders in hospital staff in this study. The initial reaction of staff exposed to stress of faced with Covid-19patients was more in the form of physical complaints, but their psychological reactions changed over time that did not follow a specific pattern.

## Acknowledgement

We are grateful to all of those with whom we have had the pleasure to work during this project especially nurses and other staff of Khorshid and Imam Hossein hospitals in Isfahan.

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Habibabadi ZT, Kheirabadi G, Tarrahi M. New Approaches for Hindfoot Pain Telerehabilitation. *Health Education and Public Health*. 2024; 7(1): 561-565. doi: 10.31488/HEPH.187.

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