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**Original Research Article**

# Psychological impact of COVID-19 pandemic and mental health problems of Indian medical health workers: a cross sectional study

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## ABSTRACT

**Background:** The COVID-19 pandemic had burdened tremendously health, economic and social status of all. Populations across globe and MHW are also affected physically, economically and mentally too. The primary aim of this study was to assess the psychiatric and mental health issues.
**Methods:** A face-to-face interview and cross-sectional study were carried out in hospitals associated to Dr. SNMC Jodhpur from April 2020 to July 2021. Evaluation and assessment of insomnia, anxiety and depression was done using insomnia severity scale (ISI); generalized anxiety disorder (GAD-7) and depression on patient health questionnaire (PHQ-9) scale. A total number of 218 persons participated.
**Results:** Compared with non-medical health workers (n=82); medical health workers (n=136) had higher score for insomnia (8.26±7.28 verses 6.35±5.29; p=0.039); generalized anxiety (8.26±6.25 verses 6.32±4.76; p=0.016) and depression (8.45±5.96 verses 6.18±4.72; p=0.035). Similarly higher prevalence rate in medical health workers was found for insomnia (23.3% versus 14.6%); generalized anxiety 31% versus 19%) and depression (14.7% versus 3.66%). These psychiatric symptoms were found in higher intensity (moderate to severe type) in all groups.
**Conclusions:** During COVID-19 pandemic medical health workers are exposed to severe type of insomnia, generalized anxiety and depression. It requires more attention and recovery programs to combat the symptoms.

**Keywords:** Corona virus, COVID-19, Medical health workers, Mental health, Psychiatric symptoms

## INTRODUCTION

Corona virus is named after the crown like spikes on the outer surface of virus structure.[1] These viruses are pleomorphic, single stranded RNA virus that measures 100 to 166 nm in diameter. The crown like spikes on the outer surface of corona virus is produced by the club shaped projections that studs the viral envelope. This virus belongs to corona viridae family of Nidovirales group. Severe Acute respiratory syndrome corona virus (SARS Co-V) and Middle East respiratory syndrome (MERS-CoV) are beta corona virus.[2] At the end of 2019, a novel corona virus was identified as a cause of pneumonia cases in Wuhan, a city in China and named as SARS Co-V-2 or COVID-19.[3] Highly pathogenic viruses (SARS CoV-1) was cause of smaller epidemic in 2002-2003 and MERSCoV caused epidemics in 2012, 2015 and 2018, were also member of COVID-19 virus family. These viruses are enveloped, positive sense RNA and has four structural protein known as S (spikes); E (Envelope); M (Membrane); N (Nucleocapsid) protein and a receptor binding site to human angiotensin converting enzyme 2 (hACE-2).[4,5]

In the Chinese sea food market city Wuhan, the first case was identified as viral pneumonia and then it has been

spread increasingly a fast with human-to-human contact via respiratory droplets while sneezing and coughing since November 2019.[4-8]

In China from Jan 2020 to 6 Jan 2023 there have been 10,565,576 confirmed cased, and 32,792 deaths reported to WHO due to COVID-19. China's abrupt lifting of stringent COVID-19 restriction could result in an explosion of cased and deaths (WHO data and the hindu.com).

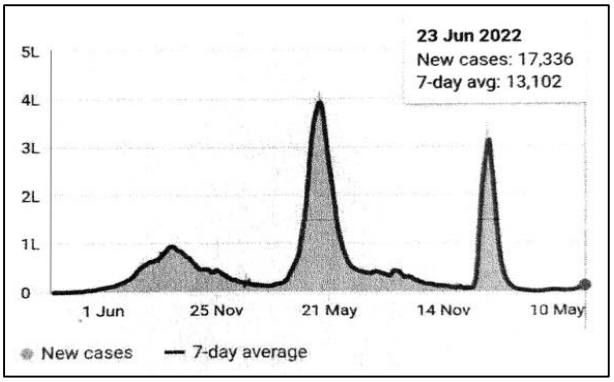


**Figure 1: The graph showing no of new cases in India during COVID-19 epidemic.**

By the end of June 2022, the India has faced three peaks of COVID-19 pandemic and total no of cases found were 4.34 crores and out of them 5.25 lakhs deaths occurred. Globally 54.2 crores cases and 63.3 lakhs deaths detected till the end of June 2022 (JHU CSSE COVID-19 data).

Medical health workers are first line fighters for the COVID-19 sufferers. They face a high risk of being infected and are exposed to long and distressing work shifts to meet health requirements exposed to protracted source of distress which may exceeds their individual coping skills, which is likely to result in overload with a protracted time.[9,10] The prevalence of moderate to severe psychiatric symptoms were anxiety 12 to 20%; depression- 15 to 25%; insomnia- 8% and traumatic distress 35 to 49% in medical health workers.[11-13]

Since the Indian medical health workers have been exposed to a persistent source of distress, the aim of present research was to outline its psychological manifestation; for this purpose, the prevalence and factors for insomnia, anxiety, depression and psychological stressors and sociodemographic issues are assessed.

## METHODS

### *Participants, design of study and procedure*

The study has been approved by the Institutional ethics committee at Dr. SN Medical College, Jodhpur; Rajasthan (letter number SNMC/1EC/2021/1194, 1197 DATED 30.01.2021). Study duration April 2020 to July 2021. This was a cross sectional study performed by face-to-face interview basis with the individuals attending out patients door. The interview was conducted on predesigned proforma and study was conducted at the reducing stage after maximum point of the COVID-19 epidemic outbreak and it corresponds at highest vulnerability period after having the great distress for a span of 6 months.

Group A: non-medical individuals of age of 20 years to 60 years. Group B: medical health workers, working in COVID-19 dedicated hospital of 20 years to 60 years age.

### *Measurements and scaling*

All demographic data i.e. age, sex, occupation, medical health workers of institutions; marital status, (i.e. married, unmarried, divorced and widows, cohabitating), living area, (urban/rural); type of family (nuclear, joint); education status, (middle/high school/below; high school/secondary school, graduate, post graduate). Monthly income (10,000 to 50,000); (50,000 to 1,00,000); (100,000 to 200,000); more than 200,000); occupation (student, health care professionals, educational persons, enterprises/advocates; others) were recorded and information was collected on predesigned proforma and questionnaires were filled for all. Clinical symptoms of COVID-19 (cough, fever, etc.) were recorded. Participants were also asked about comorbidities. Participants were also asked whether they have had insomnia or psychiatric disease prior to COVID-19 and those patients who replied positively were automatically excluded. In addition, insomnia, anxiety, depression and phobic anxiety were assessed.

Insomnia was assessed and scaled through insomnia severity index (ISI), a 7-item self-assessed index assessing the severity of initial, middle and late insomnia.[14] An ISI total score >8 indicates that insomnia is present.[15] This item was rated 0, 1, 2, 3, 4 (i.e. less than 7; 8-14; 15-21; 22-28 or more) respectively and clinically score categories were (1) no clinically significant insomnia (2) sub threshold insomnia mild type (3) moderate insomnia (4) severe insomnia.[14]

Anxiety symptom were assessed via generalized anxiety disorder 7 items scale (GAD-7) which is a brief self-report questionnaire with a 7-item anxiety scale. A scoring of 5, 10, 15 are taken as the cut off points for mild, moderate and severe anxiety respectively.

Using threshold score of 10; the GAD-7 has a sensitivity of 89% and specificity of 82% for GAD. It is moderately good at screening three other common anxiety disorders-panic disorders and is more relevant tool to assess the GAD; PTSD in COVID-19 pandemic situation.[15,16]

To assess the depressive symptoms Patient Health Questionnaire (PHQ-9) was used. It is 9 item self-assessed questionnaire and is used to differentiate between major depressive disorder and other depressive

disorder. For every not at all =0; Several days =1; More than half the days =2 and nearly every day =3; score were given. Total score and depression severity was assessed by (A) minimal depression=1-4 (B) mild depression =5-9 (C) moderate depression =10-14 (D) moderately severe depression =15-19 (E) severe depression =20-27 scores.[16,17]

***Statistical analysis***

$\chi^2$ tests were used to compare group difference of both group variables. $\chi^2$ test, p value calculation, student test and scatter diagrams were plotted by using regression equation, 95% CI, t-value and p value upto significance of 0.05 were performed using step vise variable selection, and all variables were entered into the model to explore independent influence for different risks like insomnia, anxiety, depression. Sub group analysis were performed for medical and non-medical health workers. Data analysis were done on IBM-SPSS version 25 software.

## RESULTS

At our hospital settings in out patients door, face interview was conducted for a total 218 patients by taking all the precaution of COVID-19 protocol.

**Table 1: Demographic profile of study population of medical health professional and other type of worker and general population.**

| Parameters | Subgroup | (General population) (%) | Medical health professionals | P value |
|---|---|---|---|---|
| **Age (in years)** | <50 | 42 | 78 | 0.458 |
| | >50 | 40 | 58 | |
| **Mean age** | | 48.26±14.30 | 44.38±11.90 | 0.031 |
| **Gender** | Male | 53 (64.63) | 80 (58.82) | 0.478 |
| | Female | 29 (35.37) | 56 (41.18) | |
| **Residence** | Urban | 45 (54.88) | 95 (69.85) | 0.036 |
| | Rural | 37 (45.12) | 41 (30.15) | |
| **Type of family** | Joint | 64 (78.05) | 73 (53.68) | 0.0005 |
| | Nuclear | 18 (21.95) | 63 (46.32) | |
| **Education** | Middle | 32 (39.02) | 11 (8.09) | <0.0001 |
| | Secondary | 16 (19.51) | 19 (13.97) | |
| | Graduation | 19 (23.17) | 58 (42.65) | |
| | Professional | 15 (18.29) | 48 (35.29) | |
| **Occupation** | Student | 02 (2.44) | 03 (2.21) | <0.0001 |
| | Health care professional | 08 (9.76) | 133 (97.79) | |
| | Education prof. | 05 (6.10) | 00 | |
| | Enterprises/adv. | 12 (14.63) | 00 | |
| | Other | 55 (67.07) | 00 | |
| **Income** | Below 10,000 | 00 | 00 | 0.001 |
| | 10,000 to 50,000 | 38 (46.34) | 34 (25.00) | |
| | 50,000 to 1,00,000 | 31 (37.80) | 60 (44.12) | |
| | 1,00,000 to 2,00,000 | 13 (15.85) | 31 (22.79) | |
| | More 2 lakh | 00 | 11 (8.09) | |

**Table 2: Insomnia severity ISI.**

| Insomnia severity ISI | General population | Medical health professionals (%) | Total n (%) | P value |
|---|---|---|---|---|
| **Non (0-7)** | 40 (48.78) | 51 (37.50) | 91 (41.74) | 0.039 |
| **Mild (8-10)** | 30 (36.59) | 47 (34.56) | 77 (35.32) | |
| **Moderate (15-21)** | 12 (14.63) | 32 (23.53) | 44 (20.18) | |
| **Severe (22-28)** | 00 | 06 (4.41) | 06 (2.75) | |
| **Very severe** | 00 | 00 | 00 | |
| **Total** | 82 (100) | 136 (100) | 218 (100) | |
| **Mean score** | 6.35±5.29 | 8.26±7.28 | | |

Table 1 shows the sociodemographic features of whole sample. It shows the medical health care workers living in rural areas, having nuclear family, higher education status and health profession has significant involvement

during epidemic. Similarly medical health workers with higher income, higher age also show significant involvement during COVID-19 epidmic.

Table 2 shows that medical health workers had higher prevalence rates of insomnia (mean score 8.26±7.28 verses 6.35±5.29; p value 0.039); generalized anxiety (mean score 8.26±6.25 verses 6.18±4.76; p value 0.016) and depression (8.45±5.96 verses 6.18±4.72; p value 0.035) than non-medical health workers.

On ISI scale moderate and severe insomnia was elevated and shows higher score in medical health workers than non-medical worker (23.5% versus 14.6%; p=0.03) and (4.4% versus 0 p=0.03) respectively. Mild insomnia was present equal in both groups (34.5% versus 36.5%) (Table 2). It showed that moderate to severe type of insomnia was found more in medical health personnels when compared to non-medical workers, significantly (p=0.03).

**Table 3: GAD-7 in both groups (generalized anxiety disorder 7 item).**

| GAD–7 | (General population) (%) | Medical health professionals (%) | Total n (%) | P value |
|---|---|---|---|---|
| **Mild (0-5)** | 34 (41.46) | 38 (27.94) | 72 (33.03) | |
| **Moderate (5-10)** | 28 (34.15) | 41 (30.15) | 69 (31.65) | |
| **Severe (10-15)** | 16 (19.51) | 43 (31.62) | 59 (27.06) | |
| **Very sever >15** | 04 (4.88) | 14 (10.29) | 18 (8.26) | 0.016 |
| **Total** | 82 (100) | 136 (100) | 218 (100) | |
| **Mean score** | 6.32±4.76 | 8.26±6.25 | | |

**Table 4: Patient depression questionnaire (PHQ–9) scale.**

| PHQ–9 Scale | (General population) (%) | Medical health professionals (%) | Total n (%) | P value |
|---|---|---|---|---|
| **Zero score** | 09 (10.98) | 27 (19.85) | 36 (16.51) | |
| **Minimal depression (1-4)** | 22 (22.83) | 18 (13.24) | 40 (18.35) | |
| **Mild (5-9)** | 24 (29.27) | 37 (27.21) | 61 (27.98) | |
| **Moderate (10-14)** | 23 (28.05) | 27 (19.85) | 50 (22.94) | 0.035 |
| **Moderately severe (15-19)** | 03 (3.66) | 20 (14.71) | 23 (10.55) | |
| **Severe depression (20-27)** | 01 (1.22) | 07 (5.15) | 08 (3.67) | |
| **Mean score** | 6.81±4.72 | 8.45±5.96 | | |

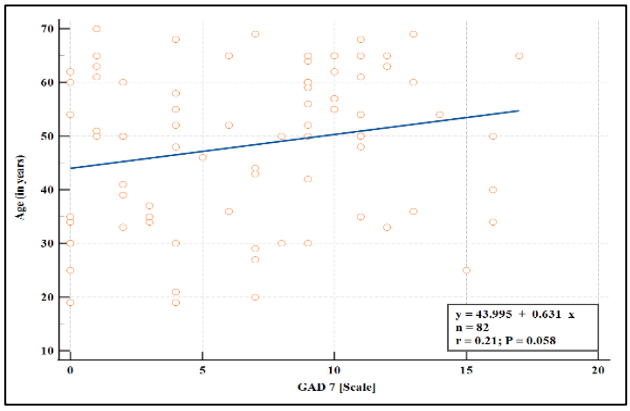


**Figure 2: Scattered diagram showing relation between age and generalized anxiety on GAD-7 scale for medical health workers under assessment.**

The scattered plot showed that the relationship between the age of participants and GAD-7 scales was positive and linear and did not reveal any bivariate outliers. The correlation between these two parameters was statistically significant r=0.15, p=0.09 the regression equation for predicting GAD-7 score was y=42.2446 to 0.2836 x. The $r^2$ for this equation was 0.02 i.e. 2.0% variance in the age was predictable from the level of GAD-7 score.

Medical health workers also had higher scores of ISI (p value more then 0.039); GAD-7 (p value =0.016) and PHQ-9 (p value =0.035) than the non-medical workers (Table 2).

Table 3 is for the assessment of generalized anxiety on GAD-7 scale there is a, significant increase in score and number in medical health workers (severe and very severe anxiety) (31% versus 19% and 10.2% versus 4.880) (p value =0.016). While mild anxiety was detected higher in non-medical workers than medical health workers but the moderate anxiety become all most equal to both group (Table 3).

Table 4 is for depression assessment. On the PHQ-9 depression scale moderately severe and severe depression was found significantly increased in medical health workers (14.7% versus 3.66% and 5.15% versus 1.22%; p vale 0.035) than in non-medical workers.

Similarly moderate depression, mild minimal depression were found equal or slightly more in both group which was not significant although both groups has increase in percentage (22% and 29%) versus (13% and 27%)

respectively (p value =0.035). Overall mean score of depression was higher in medical health workers than in non-medical workers (8.45±5.96 versus 6.81±4.72) and p value (0.035). It shows significant difference in the prevalence of overall depression in medical health worker groups. It shows that in both groups depression was present (Table 4).

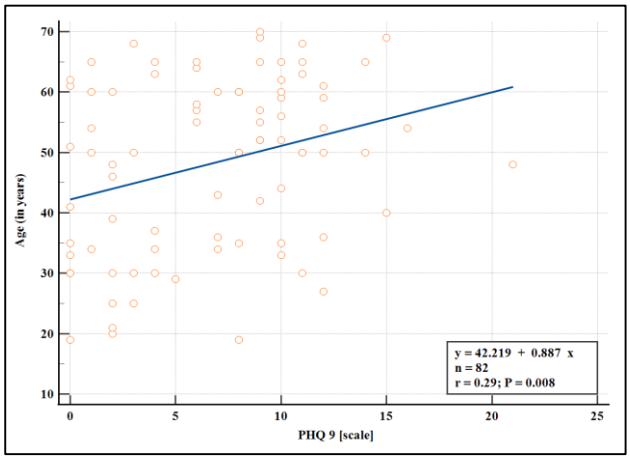


**Figure 3: Scattered diagram treadling between age and PHQ-9 score for medical health workers.**

This plot also showed positive and linear and did not reveal any bivariate outliers; there were significant correlation between two parameters (r=0.19; p=0.03) and the regression equation for predicting PHQ-9 score was y=41.9058 + 0.3701 x. The $r^2$ for this equation was 0.034 i.e. 3.4% of the variance in age was predict able from the level of PHQ-9 score.

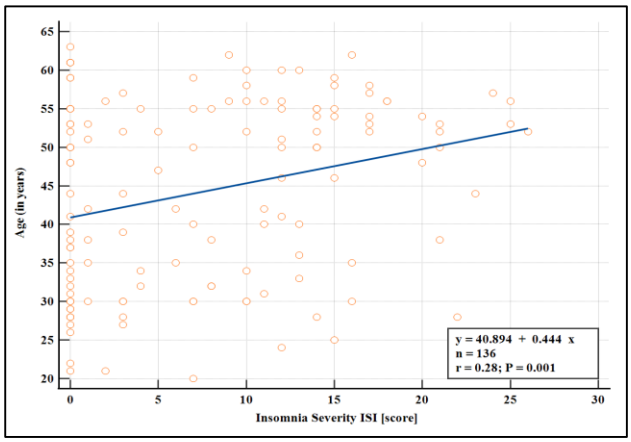


**Figure 4: Scattered diagram showing treadling between age and insomnia severity ISI.**

There is significant correlation between age and ISI score was positive and linear and did not reveal bivariate outlines. The correlation between these two parameters was statistically significant r=0.28; p=0.001 and regression equation for this is γ=40.8943 + 0.4438x. The $r^2$ for this equation was 0.07 i.e. 7% of variance in the age was predictable from the level of ISI-score.

The mean score for depression at PHQ-9 scale in medical health workers were found higher (8.45 versus 6.81; p value 0.03) significantly (Table 4).

Scattered diagram was plotted using regression equation for medical health workers showing significant increase in anxiety, depression and ISI (Figures 2 to 4).

## DISCUSSION

The high prevalence rate for the psychiatric symptoms of moderate to severe degree in health care persons (anxiety 12 to 20%; depression 15 to 25% insomnia 8% and traumatic distress 35 to 49%) was found during COVID-19 pandemic.[11-13] Traumatic severe insomnia, anxiety and depression and post traumatic disorder are more common in medical personnels having high risk factors. Studies on medical health worker using similar scale across the different part of world, suggest the prevalence of anxiety vary between 10.5% to 44.7%; depression vary between 8.9% to 50.7%.[9,14-16,18-31] Similarly an Indian study conducted by gynecologist team on medical health workers at COVID-19 positive labour room show that the prevalence of insomnia (57%) and depression (92%) were very high.[32] They have high affinity to develop these symptoms when their life status of daily fighting against COVID-19 and have increased work load suggest that they must cope up with psychological distress and work overload.[9] Consistent with these, it was found on online survey of Canadian health workers, 47 percent of health workers needed psychological support.[9,10] The cumulative burden of chronic stress can be found in the presence of current identifiable source of distress in the form of recent life events e.g. disease/death. The stress factors are judged to tax or exceed the individual to cope with their circumstances. The stress is associated with restless sleep, early morning awakening, lack of energy, generalized anxiety, sadness, irritability; significant impairment in occupational, technical and social functioning.[9,10]

Many factors are related to the psychological stress in medical health workers, they are not feeling safe at work place, initial poor understanding of the virus biology, long work shifts, lack of rest, the high risk of exposure to COVID-19 patients, shortage of logistics like personnel protective suits and exposure to extreme life events such as death.[19-22] Many doctors and nurses became COVID-19 positive and developed viral pneumonia and admitted in the hospital, but, with the better understanding of viral pathology and clinical medicine the hospital stay of these health workers were less and un eventful. Later, with continuously updated guideline on how to tackle the patients with COVID-19; with rest in shifts for medical staff, availability of personnel protective kits, masks, glasses, gloves etc. and updated training and treatment on Noval corona virus diagnosis and management plan for medical staff; the psychological stress became less. Relatively few clinicians screened positive for anxiety, depression and post-traumatic stress disorder (PTSD approximately 5 to 10 percent) attributed to better preparedness of clinicians based upon their previous experience with SARS epidemic.[9-11,15,23,24] Our study found the intensity of the psychiatric symptoms in

medical health workers e.g. insomnia, generalized anxiety and depression and further categorized in mild, moderate and severe forms. Scattered diagram plotted for prediction of manifestation of insomnia, generalized anxiety and depression with age were also done. It will help for predictions of the disorder with particular age with certainty.

NIMHANS suggested a "psychological intervention medical team" formed as especially designed team or a part of general medical team attending to people affected by the pandemic. The staff should consist of psychiatrists, clinical psychologist and psychiatric nurses and the team should formulate interventions plans separately for health care personnels according to their need.[16,17,25,26]

Programmes favouring positive activities and recovery programs to ensure the best physical, mental, social conditions so that medical health workers may progress to an optimal health state are necessary.[27,30] This is to support medical staff for quick adaptation to working conditions and it should provide a good mental and physical health balance. Lowering work load, job demands and providing rewards might potentiate positive mental health in medical health workers.[10,27]

The present study has limitations; it was a cross sectional study done whereas a longitudinal approach might verify whether the allostatic overload, exhaustions develop after sometime and other psychiatrist disorder like PTSD may develop with COVID-19 progression. Second, face to face interview to the persons was made and it may include lesser number of respondents. More and more numbers could be included by using "online survey", Third, the personality part of the psychiatric disorder sleep disorders, substance dependence were not included.

## CONCLUSION

A higher rate of psychiatric symptoms was found among medical health workers during COVID-19. Medical health workers need a health protection and adequate working facilities, adequate rest, as well as psychological recovery programs for better psychiatric health.

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