Depression, Anxiety, Stress, and Insomnia amongst COVID Warriors across Several Hospitals after Second Wave: Have We Acclimatized? A Cross-sectional Survey

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ABSTRACT

Background: Coronavirus disease-2019 (COVID-19) pandemic has been a cause of significant mental health disturbances in medical health personnel. However, 18 months into the pandemic, healthcare workers (HCWs) have become accustomed to the heightened stress and anxiety that comes with caring for COVID patients. Through this study, we aim to measure depression, anxiety, stress, and insomnia in doctors with the help of validated scales.

Materials and methods: This was a cross-sectional study with an online survey design conducted among doctors from major hospitals in New Delhi. The questionnaire included participant demographics, including designation, specialty, marital status, and living arrangements. This was followed by questions from the validated depression, anxiety, stress scale (DASS-21), and insomnia severity index (ISI). Depression, anxiety, stress, and insomnia scores were calculated for each participant, and the data were analyzed statistically.

Results: The mean scores of the whole study population showed no depression, moderate anxiety, mild stress, and subthreshold insomnia. Female doctors exhibited more psychological issues (mild depression and stress, moderate anxiety, but only subthreshold insomnia) as compared to males (mild anxiety, but no depression, stress, and insomnia). Junior doctors also had higher depression, anxiety, and stress scores than senior doctors. Similarly, single doctors, those living alone, and those not having kids had higher DASS and insomnia scores.

Discussion: HCWs have been under tremendous mental stress during this pandemic which is influenced by multiple factors. Female sex, junior doctors, working on the frontline, not being in a relationship, and living alone may be some of the factors recognized in our study and corroborated by many authors, which may increase the chances of depression, anxiety, and stress in them. HCWs need regular counseling, time off for rejuvenation, and social support to overcome this hurdle.

Keywords: Anxiety, COVID-19, DASS, Depression, Insomnia, Insomnia severity index, Mental Health, Pandemic, Stress.

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INTRODUCTION

"A good half of every treatment that probes at all deeply consists in the doctor's examining himself… It is his own hurt that gives a measure of his power to heal." Much before Carl Jung made this modest statement, the idea of "the wounded healer" was known to society via excerpts from Greek mythology. The untoward bearing of an infirmity and its therapy on the physician him or herself is a tangible element of the healing process, and it would be prudent to accept that no one would want to be treated by a doctor who is not in an optimal state of mental and physical health.[1]

Unfortunately, the reported prevalence of mental illness among doctors is extremely discouraging and remarkably higher than the general population.[2,3] Physician depression and suicide have been a public health crisis worldwide,[4,5] and the inception of the global COVID-19 pandemic in March 2020 has unequivocally fueled this raging fire.[6–8] Eighteen months into the pandemic, many of these apprehensions have been allayed by the extensive research and analyses conducted on the novel coronavirus and the distinct guidelines introduced by the government, hospitals, and clinics. HCWs have now adapted to the new work environment, devised appropriate and convenient work shifts and protocols, are accustomed to caring for COVID-19 patients, and become more familiar with the disease course to be better prepared for any adverse events.[9]

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Apropos this, it was found most intriguing to assess the physician's mental health late into the pandemic, after the psychological coping mechanisms have been set in place. The present study, therefore, aims to evaluate the depression, anxiety, stress, and insomnia levels in doctors across various

hospitals at the current stage in the timeline, after the second COVID wave.

MATERIALS AND METHODS

A cross-sectional observational study with a survey design was conducted by the Department of Anesthesia at the senior author's institute between the period of 1st June to 31st July, 2021 as approved by the institutional ethical committee (vide letter S.No. IEC/****/***/Project/2020-08/CC-48). Included in the study were all doctors working in COVID and non-COVID wards and intensive care units (ICU) of major teaching hospitals in New Delhi, with access to the internet, a reasonable understanding of the English language, and who were willing to participate in the study. Doctors with a known prior history of any psychiatric illness were excluded from the study.

Questionnaire Design

A customized questionnaire was designed comprising the following clusters of questions:

- *Demographic details* including age, sex, marital status, having a child, living conditions, etc.
- *Medical history* – History of diabetes, hypertension, asthma, migraine, psychiatric illnesses, and other comorbidities.
- *Work details and COVID exposure risk*, including professional designation, specialty, whether tested positive for COVID at any point of time.
- *Status of mental health* – Questions were designed based on validated scales for evaluating depression, anxiety, stress (DASS-21), and insomnia ISI.

Depression, anxiety, and stress were assessed using DASS-21,[10] which is a validated tool for psychological screening among patients. It is a self-reported 21-item questionnaire developed by the University of New South Wales, Australia, which provides independent measures of depression, stress, and anxiety. The scores for each of the three components are calculated by summing up the scores for the relevant items and multiplying by two to calculate the final score. A cut-off score >9 represents the presence of depression in the subject, which is further graded as "mild" (score = 10–13), "moderate" (score = 14–20), "severe" (score = 21–47), and "extremely severe" (score = 28–42). Similarly, a cut-off score of >7 and >14 denote positive screen anxiety and stress, respectively. The anxiety subscale score is assessed as "mild" (8–9), "moderate" (10–14), "severe" (15–19), and extremely severe" (20–42), whereas the stress subscale score is divided into "mild" (15–18), "moderate" (19–25), "severe" (26–33), and "extremely severe" stress (34–42).

Insomnia Severity Index (ISI)[11] is a 7-item self-report questionnaire assessing the nature, severity, and impact of insomnia.[6] The dimensions evaluated are problems with sleep onset, sleep maintenance, and early morning awakening, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by the sleep difficulties. A 5-point Likert scale is used to rate each item (e.g., 0 = no problem; 4 = very severe problem), yielding a total score ranging from 0 to 28. The total score is then interpreted as follows: absence of insomnia (0–7), subthreshold insomnia (8–14), moderate insomnia (15–21), and severe insomnia (22–28).

Online Survey

Recruitment of subjects was done using the snowball sampling technique. All subjects were contacted via e-mail or online messaging services, wherein detailed information was provided regarding the objectives and nature of the study, along with the consent form and a link to access the survey questionnaire. The questionnaire took approximately 10 minutes to complete.

The survey was anonymous and conducted through an online survey platform (Survey Monkey). Complete confidentiality of all collected data was maintained throughout the course of the study. The period of data collection was from 1st June to 31st July 2021. All data were collected and compiled by a single investigator.

Analysis of Data

Statistical analysis was performed with the help of SPSS for Windows, version 17.0 (SPSS, Chicago, Illinois). Continuous variables were presented as mean ± SD, and categorical variables were presented as absolute numbers and percentages. Data were checked for normality before statistical analysis.

Categorical variables were analyzed using either the Chi-square test or Fisher's exact test for the comparison of the prevalence of depression, anxiety, stress, and insomnia amongst physicians posted in COVID and non-COVID wards and ICUs. The comparison of normally distributed continuous variables between the groups (as per anxiety or depression) was performed using ANOVA, and further multiple comparison tests were used to assess the differences between the individual groups.

RESULTS

A total of 1683 responses were collected on the online survey platform during the study period. Out of these, only 1458 (86.6%) were complete and were included in the final analysis (Table 1). Of the responses obtained, 630 (43.2%) were from males, and the rest (56.8%) were from female doctors. The age of respondents ranged from 21 to 61 years, with a median of 31 years.

Amongst the doctors, nearly 35% were post-graduate students and non-academic junior residents (PGs and JRs), while the remaining were senior residents (SRs) (33.74%) and faculty (31.27%). More than half of the responses (54.73%) were obtained from doctors of anesthesia sub-specialty, while surgical branches (general surgery, orthopedics, neurosurgery, urology, pediatric surgery, and cardiac surgery) comprised of 23.86% and medical branches (internal medicine, pediatrics, cardiology, neurology, and nephrology) comprised of 12.34% of the total responses. Para-clinical specialties (supportive branches like microbiology, laboratory medicine, pathology, and radiology) accounted for 9.05% of all responses.

The vast majority of doctors (80.65%) reported no comorbidities. Over half of the study population (50.61%) were married, and the remaining were either single (40.32%) or engaged/committed (6.58%). Regarding living arrangements, 18.93% reported living alone, 19.75% live with a flatmate, and a sizeable portion lives with a family (37.44% in a nuclear family and 21.39% in a joint family). Close to 2.5% of responders did not want to reveal their relationship status or living arrangements. Nearly two-thirds of the doctors (64.97%) did not have kids. Approximately, 66% of the doctors reported having tested COVID-19 positive at least once since the onset of the pandemic.

Responding to the statement "I am worried about being infected by COVID during my duty", 84.36% agreed/strongly agreed with it. Most of the responders (92.17%) agreed/strongly agreed with the statement "I am worried about carrying the infection back to my family". However, the response to the statement

Table 1: Demographic data

Sample size (n)	1458
Age	
Mean	31.60 ± 6.03 years
Range	21–61 years
Median	31 years
Sex	
Males	630 (43.2%)
Females	828 (56.79%)
Designation	
Faculty	456 (31.27%)
Senior residents	492 (33.74%)
PG students/JRs	510 (34.97%)
Specialty	
Anesthesia	798 (54.73%)
Surgical	348 (23.86%)
Medical	180 (12.34%)
Non-clinical	132 (9.05%)
Comorbidities	
No	1176 (80.65%)
Yes	282 (19.34%)
Tested COVID positive	
Yes	963 (66.05%)
No	495 (33.95%)
Marital status	
Married	738 (50.61%)
Engaged/committed	96 (6.58%)
Single	588 (40.32%)
Do not wish to reveal	36 (2.46%)
Living arrangement	
Live alone	276 (18.93%)
Live with flatmate	288 (19.75%)
Live with a nuclear family	546 (37.44%)
Live with joint family	312 (21.39%)
Do not wish to reveal	36 (2.46%)
Whether have kids	
Yes	504 (34.54%)
No	948 (64.97%)
Do not wish to reveal	6 (0.41%)
"I am worried about being infected by COVID during my duty" Response	
Strongly agree	552 (37.86%)
Agree	678 (46.5%)
Neither agree nor disagree	144 (9.87%)
Disagree	78 (5.34%)
Strongly disagree	6 (0.41%)
"I am worried about carrying the infection back to my family" Response	
Strongly agree	810 (55.55%)
Agree	534 (36.62%)
Neither agree nor disagree	30 (2.05%)
Disagree	72 (4.93%)
Strongly disagree	12 (0.82%)

(Contd...)

Table 1: *(Contd...)*

Sample size (n)	1458
"I feel pressured from family to abstain from COVID duties"	
Response	
Strongly agree	204 (13.99%)
Agree	276 (18.93%)
Neither agree nor disagree	306 (20.98%)
Disagree	450 (30.86%)
Strongly disagree	222 (15.22%)
"I am satisfied with basic facilities and accommodation provided to me during working hours"	
Response	
Strongly agree	204 (13.99%)
Agree	744 (51.02%)
Neither agree nor disagree	180 (12.34%)
Disagree	282 (19.34%)
Strongly disagree	48 (3.29%)

"I feel pressured from family to abstain from COVID duties" was less unanimous. Although 32.92% agreed with the statement, 46.08% did not feel any pressure from the family, highlighting the family support. Around 65% of the participants reported that they were "satisfied with basic facilities and accommodation provided during working hours", which may go a long way in allaying stress and anxiety at the workplace.

Depression Parameters

When analyzing questions that measure depression in the responders, it was found that the mean depression score in the whole population was 9.96 ± 2.74 (no depression), with no correlation with age ($r = -0.14$). On further evaluation, females showed a high mean depression score of 11.2 (mild depression) as compared to males (8.34, no depression). This difference was statistically significant ($p = 0.03$). Similarly, JRs and PGs showed higher depression scores (11.15) as compared to faculty (8.55, $p = 0.048$) and SRs (10.04, $p = 0.1$). The difference in scores was not significant when analyzed specialty-wise (Table 2). Likewise, depression score was comparable amongst participants with or without comorbidities, whether married, single or committed, and whether living alone or with someone. However, doctors having kids had significantly lower depression scores (8.19) than those without (10.88, $p = 0.038$), although the scores were comparable amongst doctors of both genders with kids.

Anxiety Parameters

Upon evaluation of anxiety questions, the mean score in the study population was 10.33 ± 2.05 (moderate anxiety), without any correlation with age ($r = -0.19$). Sex-wise analysis revealed mild anxiety in males and moderate in females, with a statistically significant difference in scores (11.21 vs 9.18, $p = 0.04$). Similar findings were observed amongst PGs and JRs (score 12.58, moderate anxiety), SRs (10.92, moderate anxiety), and faculty (8.26, mild anxiety). The difference in scores was significant between JRs and faculty ($p = 0.03$), but not between JRs and SRs ($p = 0.055$), or SRs and faculty ($p = 0.065$). Although doctors of all specialties had mild–moderate anxiety, their scores were compared statistically. Similarly, doctors with or without comorbidities had similar anxiety scores. However, anxiety was significantly lower in participants who were either married (9.42) or had kids (8.16) than in those who were single (11.95) or did not have kids (11.46).

There was no significant gender-based difference in doctors who were married or had kids. Scores were comparable in doctors with different living arrangements, or whether they tested positive or not (Table 2).

Stress Parameters

When looking at the questions reflecting stress in the participating doctors, the mean stress score of the whole study population was 16.06 ± 3.16, reflecting mild stress. No correlation was found between the age of doctors and the stress scores ($r = -0.12$). Females had higher stress scores as compared to males (16.46 vs 12.22), and this was statistically significant ($p = 0.027$). The stress score was higher in PGs and JRs (16.22) than in SRs (14.02) and faculty (12.81), but these differences were not statistically significant. Likewise, the stress score of doctors divided specialty-wise is given in Table 2, and the difference between them was not significant ($p > 0.05$). Doctors with comorbid conditions also had slightly higher scores (16.14 vs 14.20, $p = 0.12$). There was also an insignificant difference in scores amongst responders who were married vs unmarried or who lived alone vs living with family/flatmate. On the other hand, participants who had kids had significantly lower scores (12.76) vs those who did not (15.78, $p = 0.035$), although scores were comparable amongst male or female doctors with kids. Doctors who tested positive at any point during the pandemic also had significantly higher stress (16.92 vs 14.16, $p = 0.038$) than those who were never positive.

Insomnia Parameters

Regarding insomnia questions, the mean score for all participants was 8.79 ± 2.42, which suggests some amount of subthreshold insomnia. Upon further analysis, the scoring in males (8.43) and in females (9.05) also showed subthreshold insomnia, but the difference was not statistically significant. Some scores were low enough to suggest no insomnia (e.g., Faculty, committed participants, surgical branches, having kids, and never testing positive), but the difference in each category was never statistically significant ($p > 0.05$).

DISCUSSION

Several studies have suggested that doctors and other medical personnel routinely experience work-related psychological stress and burn-out,[2,3] often resulting in substance and alcohol abuse,

Table 2: Depression, anxiety, stress, and insomnia parameters

Parameters	Mean depression scores	Mean anxiety scores	Mean stress scores	Mean insomnia scores
Whole population (± SD)	9.96 ± 2.74	10.33 ± 2.05	16.06 ± 3.16	8.79 ± 2.42
Sex				
Males	8.34	9.18	12.22	8.43
Females	11.2	11.21	15.46	9.05
Designation				
JRs/PGs	11.15	12.58	16.22	9.41
SRs	10.04	10.92	14.02	9.28
Faculty	8.55	8.26	12.81	7.56
Specialty				
Anesthesia	9.95	11.17	16.21	9.22
Surgical	10.68	10.63	15.44	7.62
Medical	8.4	8.93	13.73	9.40
Paraclinical	10.27	9.27	15.00	8.40
Comorbidities				
Yes	10.0	10.80	16.14	9.78
No	9.95	10.22	14.20	8.55
Marital status				
Married	9.12	9.42	14.69	8.23
Committed	9.58	10.20	14.94	7.86
Single	10.87	11.95	15.39	9.89
Living arrangement				
Living alone	10.25	11.04	14.17	9.88
Living with someone	9.76	9.88	14.08	8.03
Having kids				
Yes	8.19	8.16	12.76	7.25
No	10.88	11.46	15.78	9.25
Tested positive				
Yes	11.17	10.36	16.92	9.02
No	9.03	10.00	14.16	7.57

antidepressants, and smoking. In general, medical professionals are taught early in their training to mask their pain and to maintain a stoic stance about illness, and this perpetuates the denial of their own health vulnerabilities.[12] Suicide rates globally are reported to be much higher among doctors than among other professional groups or the general population.[4]

Across the globe, the COVID-19 pandemic has been an extremely testing situation for everyone. Despite being at the forefront, HCWs are not immune to the physical, mental, and emotional consequences of this disease. Several studies have shown high rates of depression, stress, and anxiety in HCWs caring for COVID-19 patients.[6–8] This has been attributed not only to the drastically escalated workload and change in the work conditions, but also due to fear of health of self and loved ones, apprehensions about the proper use of personal protective equipment (PPE), the ever-changing course, sequelae, and treatment protocols of this novel disease, and the attached social stigma.[13]

There are demographic, socio-economical, and occupational factors that play a part in influencing psychological stress in HCWs.[7,8,14–20] Female gender is more likely to be anxious, stressed, and depressed as compared to their male counterparts,[14–20] and this could be explained because of personality and hormonal differences. Similar results were observed in our study with a high rate of mild depression, moderate anxiety, and stress in females as compared to males. The incidence of insomnia, however, was comparable between both genders. Hierarchy in the healthcare system showed that significant anxiety and stress were seen in junior doctors (JRs and PGs) as compared to senior doctors (SRs and faculty).[14–16] This could be explained due to more exposure of junior doctors to COVID-19 patients, lack of experience, and less support from family (as they tend to be single more often and have no kids). Single doctors and those living alone were more prone to psychological issues than married counterparts and those living with family. This could be easily explained by the support and the opportunity to communicate feelings with spouse/loved ones.[7,18,19] Similarly, in our study, doctors living alone or single showed a higher level of anxiety and stress which was statistically significant. Likewise, having kids seems to be a stress buster, as was observed in our study.

HCWs with previous COVID-19 infection and preexisting comorbidities were more prone to anxiety, depression, stress, and insomnia than their healthy counterparts.[14,15] However, no such results were seen in our study except a high incidence of stress which was statistically significant and was seen in patients with previous COVID-19 infections. Previous studies showed that frontline workers (those working in casualty and ICU) experienced and displayed more mental health issues than non-frontline workers.[16–20] The reasons suggested were fear of infection by family and colleagues, lack of social support, and lack of protective measures. No such difference had been seen between frontline workers (anesthesia

Table 3: Previous studies on the psychological impact of the COVID-19 pandemic on HCWs

Author, Year	Country/Region	Scales/Scores used	Results
Varshney et al.[14] 2020	653 HCWs in 64 cities in India	IES-R	• Approximately one-third of the participants had a significant psychological impact (IES-R score >24). • Risk factors identified were young age, female gender, and existing comorbid conditions.
Chew et al.[15] 2020	906 HCWs in 5 major hospitals in Singapore and India	DASS-21 and IES-R	• 5.3% of the HCWs screened positive for moderate to very severe depression, 8.7% for moderate to severe anxiety, 2.2% for moderate to severe stress, and 3.8% for moderate to severe psychological distress. • Significant association was found between the prevalence of physical symptoms and psychological outcomes (including depression, anxiety, and stress).
Rossi et al.[16] 2020	1379 HCWs in Italy	Global Psychotrauma Screen (GPS) PHQ-9 GAD-7 ISI 10-item Perceived Stress Scale (PSS-10)	• Out of the total, 40.38% HCWs screened positive for post-traumatic stress symptoms, 24.73% for depression, 19.80% for anxiety, 8.27% for insomnia, and 21.90% for stress. • Young age, female sex, frontline worker, having a colleague who is infected/deceased due to COVID, and being exposed to the infection were identified as risk factors for psychological disturbances.
Lai et al.[18] 2020	1257 HCWs in 34 hospitals in China	9-item Patient Health Questionnaire (PHQ-9) 7-item Generalized Anxiety Disorder Scale (GAD-7) ISI Impact of Event Scale-Revised (IES-R)	• A significant proportion of HCWs reported symptoms of distress (71.5%), depression (50.4%), anxiety (44.6%), and insomnia (34.0%). • Significant risk factors were female gender, nurses, and those involved in the direct care of COVID-19 patients.
Que et al.[20] 2020	2285 HCWs in 28 regions of China	GAD-7, PHQ-9, and ISI	• The prevalence of anxiety, depression, insomnia, and the overall psychological problems in HCWs was reported as 46.04%, 44.37%, 28.75%, and 56.59%, respectively. • Receiving negative information and working in direct contact with COVID patients were recognized as important risk factors for psychological issues.

sub-specialty) and non-frontline workers (surgical, medical, and para-clinical branches) in our study. Depression, anxiety, stress, and insomnia scores were comparable between the two groups. This can possibly be explained by the observation that repeated COVID duties during 18 months of the pandemic have resulted in the acclimatization of all HCWs to the scenario. They are now more used to the COVID restrictions, working in PPE, long duty hours, and staying away from family or taking extra precautions around them. The intensity of psychological illness has also become mild–moderate as compared to severe psychological stress and fear of death at the beginning of the pandemic. Table 3 shows various previous studies conducted on the psychological impact

of the COVID pandemic on HCWs, and the risk factors identified for mental health issues.

LIMITATIONS

Our study has several limitations. First, only doctors were included in our study, and not all HCWs. Secondly, doctors included belonged only to major hospitals of New Delhi and the National Capital Region (NCR). We were unable to extend the study to regions outside NCR, which may be less or more affected by COVID, thus causing a different psychological impact than reported. Third, because of the snowballing technique used, we were unable to ensure that the participating doctors were posted in COVID wards

Table 4: Recommendations for psychological support of HCWs during pandemic[11]

Proper food, drink, rest, and transport facilities at work
Provide reasonable shift hours with adequate breaks
Designing rotates so that the same teams can work together
Focused workload management and defined role expectations
Proactively addressing suggestions, grievances, and issue resolution via a two-way dialogue
Regular praise and acknowledgment of duties under trying circumstances
Clear guidelines with rationale regarding patient care, with regular updates
Encourage morale-building team exercises and recreational activities
Making clear that staff safety is the foremost priority
Providing adequate and good quality equipment and safety gear like PPE, masks, and goggles
Ensuring that formal and informal psychological support is provided to staff
Providing adequate quarantine period and making sure support is provided during the quarantine
Ensuring adequate support in case staff or their family is exposed/infected
Planning for adequate replacement teams if HCWs get infected
Adequate support system in place for all HCWs, including doctors, nursing staff, technical staff, cleaning staff, and porters

HCWs, healthcare workers; PPE, personal protective equipment

while answering the questionnaire, although the questionnaire did confirm that they have cared for COVID patients at some point. Lastly and most importantly, we did not compare the mental health disturbances in the early days of the pandemic with the current scenario. This would present a better comparison and a clearer picture of the psychological impact of COVID after the second wave in India.

CONCLUSION

To conclude, COVID-19 has caused a significant psychological impact amongst HCWs due to longer working hours, trying working conditions, fear of health and safety of self and loved ones, and ever-changing guidelines and social stigma surrounding the novel disease. However like all warriors, HCWs have acclimatized to the situation 18 months into the pandemic and their mental health has stabilized. Females, younger doctors, front-line workers, and lack of family support remain the risk factors for psychological issues. Appropriate preventive measures (Table 4) should be taken in the form of counseling sessions, communication, and psychotherapy for all the HCWs, as the wounded healers must emerge victorious and mentally healthy from this pandemic.

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