Impact of COVID-19 Pandemic on the Emotional Well-being of Healthcare Workers: A Multinational Cross-sectional Survey

Bharat G Jagiasi1, Gunjan Chanchalani2, Prashant Nasa3, Seema Tekwani4

ABSTRACT

Background: Coronavirus disease-2019 (COVID-19) in the last few months has disrupted the healthcare system globally. The objective of this study is to assess the impact of the COVID-19 pandemic on the psychological and emotional well-being of healthcare workers (HCWs).

Materials and methods: We conducted an online, cross-sectional, multinational survey, assessing the anxiety (using Generalized Anxiety Disorder [GAD-2] and GAD-7), depression (using Center for Epidemiologic Studies Depression), and insomnia (using Insomnia Severity Index), among HCWs across India, the Middle East, and North America. We used univariate and bivariate logistic regression to identify risk factors for psychological distress.

Results: The prevalence of clinically significant anxiety, depression, and insomnia were 41.4, 48.0, and 31.3%, respectively. On bivariate logistic regression, lack of social or emotional support to HCWs was independently associated with anxiety [odds ratio (OR), 3.81 (2.84–3.90)], depression [OR, 6.29 (4.50–8.79)], and insomnia [OR, 3.79 (2.81–5.110)]. Female gender and self-COVID-19 were independent risk factors for anxiety [OR, 3.71 (1.53–9.03) and 1.71 (1.23–2.38)] and depression [OR, 1.72 (1.27–2.31) and 1.62 (1.14–2.30)], respectively. Frontliners were independently associated with insomnia [OR, 1.68 (1.23–2.29)].

Conclusion: COVID-19 pandemic has a high prevalence of anxiety, depression, and insomnia among HCWs. Female gender, frontliners, self-COVID-19, and absence of social or emotional support are the independent risk factors for psychological distress.

Keywords: Anxiety, Depression, Healthcare workers, Insomnia, Psychological distress.

INTRODUCTION

Coronavirus disease-2019 (COVID-19) pandemic has rapidly gripped the globe, crippling the healthcare system in many countries. With the rise in workload and the risk of cross-transmission of infection to themselves, healthcare workers (HCWs) are going through huge psychological stress since the onset of the pandemic. The research during the 2003 severe acute respiratory syndrome (SARS) outbreak has shown higher levels of anxiety and stress among HCWs.1 Studies so far in the COVID-19 pandemic are showing a higher risk of developing unfavorable mental health outcomes among HCWs.2,3

We thus designed a prospective multinational cross-sectional survey to assess the emotional and psychological impact of the COVID-19 pandemic, on the HCWs. The objective of the study is to find the prevalence of clinically significant anxiety, depression, and insomnia and factors contributing to psychological distress among HCWs.

MATERIALS AND METHODS

Study Design

We conducted a multinational, cross-sectional, web-based questionnaire survey over a period of 1 month from the mid of June to July 2020. The questionnaire was built to see the impact of the rapid growth of pandemic in the Indian subcontinent and other parts of the world. The questionnaire was forwarded to all levels of HCWs actively working in the hospital, via e-mail and/or social media. The participation was entirely voluntary, and consent was implied while attempting the survey questionnaire. This approval of the ethics and research committee was taken from the primary investigator’s hospital before the start of the study.

Survey Questionnaire

We segregated the questionnaire into five sections. The first section included participant’s demographic characteristics including any preexisting mental illness. The information on working place in...
Results
In 4 weeks, we received 1,088 responses, of which 72 were incomplete, and two of them were not working at the time of the survey. We included 1,004 completed questionnaires in the final analysis (Fig. 1).

Demographics (Table 1)
The median age of the participating HCWs was 39 (22–80) years and 42.6% were in the age-group of 31–40 years (Fig. 2). Of the total, 54.4% of the participants were males [median age 40 (22–80) years] and 45.6% females [median age 39 (22–74) years] (Fig. 2A).

The HCWs across the globe participated in the survey; however, the most (89.1%) were from India (Supplement Table 1). Among the participating doctors, 32.9% were working in high-risk areas [intensive care unit (ICU) and emergency room (ER)] and 10.5% in low-risk areas (ward and flu clinics). Among frontline nurses, 2.3% were working in high-risk areas (ICU and ER) and 1.4% working in low-risk areas (ward and flu clinics). About 52.9% of respondents were nonfrontline workers, including 33% of doctors (Fig. 2B) (Supplement Table 2).

Assessment of Psychological Distress
The clinically significant anxiety as assessed by the GAD-2 (using cutoff score 3), and GAD-7 (using cutoff score 8) was present in 358 (35.7%) and 416 (41.4%) of the respondents, respectively (Fig. 2). The depression (using CES-D score cutoff 16) and insomnia (using ISI score cutoff 10) were present in 482 (48%) and 690 (68.7%) respondents, respectively (Fig. 3).

Scales Used for Psychological Assessment
We used three scales to assess psychological distress among HCWs.

- **GAD Scale**: We used the GAD-2 and GAD-7 scale to assess the level of anxiety. GAD-7 is a self-administered, seven-item scale, with a cutoff score of 8 (sensitivity 92% and specificity 76%) developed for the screening of anxiety.\(^4\)\(^5\) The scale is validated for use in the heterogeneous population.\(^6\)\(^7\) GAD-7 performs moderately well at detecting three common anxiety disorders, panic disorder (sensitivity 74% and specificity 81%), social anxiety disorder (sensitivity 72% and specificity 80%), and post-traumatic stress disorder (sensitivity 66% and specificity 81%).\(^3\) GAD-2 is a simpler version of GAD-7, consisting of the first two items of GAD-7 scale, with reported good sensitivity of 76% and specificity of 81% at a cutoff score of 3.\(^3\)\(^7\)\(^9\) We used both the scores as the scoring is done with the same questionnaire.

- **CES-D Scale**: CES-D is one of the most widely used instruments in clinical medicine and psychiatric epidemiology for diagnosing depression, using a 20-item scale, phrased as self-statements, with ratings on a 4-point Likert scale (ranging from 0–3). Participants can rate how often each item relates to them over the course of the week. Four items that assess the positive response (e.g., “during the past week I enjoyed life”) are reverse coded.\(^10\) The cutoff score of 16 is validated for clinically meaningful depressive symptoms among caregivers.\(^11\)

- **ISI Scale**: The ISI is one of the most widely used screening tools for insomnia, in both community and primary care settings.\(^12\) It is designed to assess the nature, severity, and impact of insomnia. A cutoff score of 10 is validated (86.1% sensitivity and 87.7% specificity) for the screening of insomnia in the general population.\(^12\)\(^13\)

Statistical Methods
The continuous variables were expressed as means (standard deviation) and medians (ranges). The categorical variables were expressed in counts and percentages. Clinical comparison of factors was done using Fisher’s exact or chi-square test for categorical variables. The odds ratio (OR) [95% confidence intervals (CI)], univariate and bivariate logistic regression was used for assessing factors related to the presence of anxiety, depression, and insomnia in HCWs. The p-value less than 0.05 was taken as significant. The statistical software IBM SPSS (version 26.0 Armonk, New York: IBM Corp.) was used for analysis.
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Table 1: Demographic characteristics of responders

| Demographic variable                  | Number (%)        |
|--------------------------------------|-------------------|
| Gender                               |                   |
| Male                                 | 546 (54.4)        |
| Female                               | 458 (45.6)        |
| Age-group (years)                    |                   |
| 21–30                                | 154 (15.3)        |
| 31–40                                | 428 (42.6)        |
| 41–50                                | 265 (26.4)        |
| 51–60                                | 101 (10.1)        |
| 61–70                                | 46 (4.6)          |
| 71–80                                | 10 (1.0)          |
| Regional distribution                |                   |
| India                                | 895 (89.1)        |
| Middle East                          | 37 (3.7)          |
| North America                        | 49 (4.9)          |
| Others                               | 23 (2.3)          |
| Level of work                        |                   |
| Frontline workers                    | 473 (47.1)        |
| Nonfrontline workers                 | 531 (52.9)        |
| Any preexisting mental illness?      |                   |
| Yes                                  | 34 (3.4)          |
| No                                   | 953 (94.9)        |
| Prefer not to say                    | 17 (1.7)          |
| Whether sufficient social or emotional support available? | |
| Yes                                  | 705 (70.2)        |
| No                                   | 130 (12.9)        |
| Not sure                             | 169 (16.8)        |

Supplementary Table 1: Countries of current residence/work of respondents

| Country                  | Number | %  |
|--------------------------|--------|----|
| India                    | 895    | 89.1 |
| United Arab Emirates     | 35     | 3.5 |
| Canada                   | 28     | 2.8 |
| United States of America | 21     | 2.1 |
| Australia                | 6      | 0.6 |
| Bangladesh               | 2      | 0.2 |
| Germany                  | 2      | 0.2 |
| Ireland                  | 1      | 0.1 |
| Malaysia                 | 1      | 0.1 |
| Maldives                 | 1      | 0.1 |
| Nigeria Africa           | 1      | 0.1 |
| Oman                     | 2      | 0.2 |
| Singapore                | 5      | 0.5 |
| United Kingdom           | 4      | 0.4 |
| Total                    | 1004   | 100.0 |

Univariate Analysis of Factors Affecting Psychological Symptoms in HCWs

- Age-groups affected (Tables 2 and 3)
  Anxiety was higher in the HCWs of younger age. When analyzed by the GAD-2 scale, the age-group 31–40 years had the highest number of respondents with anxiety (44.4%) followed by age-group 41–50 years (24.4%). Using a GAD-7 scale, 31–40 age-group HCWs had statistically significant anxiety (44%) as compared to other age-groups (p = 0.001). The clinically significant depressive symptoms (p = 0.001) and insomnia (p = 0.000) were also statistically significant (highest) in the same age-group of 31–40 years.

- Affection of symptoms as per gender (Tables 2 and 3)
  The clinically significant anxiety was significantly higher in females as compared to male HCWs (GAD-2, p = 0.027; and GAD-7, p = 0.003). The clinically significant depressive symptoms and insomnia were also higher in the female HCWs, with statistical significance (p = 0.000 and p = 0.031, respectively).

- Comparison of psychological impact between frontline and other HCWs (Tables 2 and 3)
  The anxiety (GAD-2, p = 0.011 and GAD-7, p = 0.005) and clinically significant depressive symptoms (p = 0.002) were higher in frontline workers, with statistical significance. The frontline HCWs also had a higher level of insomnia (as compared to nonfrontline HCWs) and again the difference was statistically significant (p = 0.000).

- Relation of psychological distress to preexisting mental illness (Tables 2 and 3)
  The clinically significant anxiety symptoms were statistically significantly lower in patients, with preexisting mental illness (GAD 2, p = 0.009; GAD 7, p = 0.012). The clinically significant depressive symptoms, however, were statistically significantly higher in HCWs with preexisting mental illness, (p = 0.001). Similarly, insomnia was also higher in HCWs with preexisting mental illness (but without statistical significance, p = 0.205).

- Comparison with presence or absence of emotional or social support (Tables 2 and 3)
  About 13% of the respondents had no emotional or social support at their workplace or home and about 16.8% were not sure about their support system (Table 1). The anxiety, as well as depression, was significantly higher in the group of HCWs who had no support system. The severity of anxiety and insomnia was also higher in the group of HCWs without support, with statistical significance (p = 0.00).
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Supplementary Table 3: Responders’ self-illness with COVID-19

| Statement                                | N (%) | Total  |
|------------------------------------------|-------|--------|
| Illness/exposure of responder to COVID-19|       |        |
| Yes Had required intensive care admission due to COVID-19 | 1 (0.1%) | 230 (22.9%) |
| Hospitalized due to COVID-19             | 16 (1.6%) |    |
| Quarantined due to unprotected exposure from an infected person | 119 (11.9%) |    |
| Self-isolation due to experiencing COVID-19like symptoms/diagnosis | 94 (9.4%) |    |
| No None of the above                     | 767 (76.4%) | 774 (77.1%) |
| Prefer not to say                        | 7 (0.7%) |    |

Supplementary Table 4: Responder’s family member or near ones with COVID-19

| Variable                               | Statement                                | N (%) | Total |
|----------------------------------------|------------------------------------------|-------|-------|
| Family member or near one infected     | I have lost a family member or near one due to COVID-19 | 13 (1.3%) | 132 (13.2%) |
|                                         | Yes, diagnosed and quarantined or isolated due to COVID-19 | 48 (4.8%) | |
|                                         | Yes, hospitalized due to COVID-19         | 56 (5.6%) | |
|                                         | Yes, required intensive care admission due to COVID-19 | 15 (1.5%) | |
| No                                     | None                                     | 872 (86.9%) | 872 (86.9%) |

• Self-illness (Tables 2 and 3)

HCWs who had themselves been infected or exposed to COVID-19 had significantly higher anxiety, depression, and insomnia (GAD-2, p = 0.008; GAD-7, p = 0.001; CES-D, p = 0.000; ISI, p = 0.006), respectively.

• The occurrence of COVID-19 in a family member or near one (Tables 2 and 3)

The affection of a close family member by COVID-19 did not have a significant impact on the emotional and psychological well-being of the HCW.

• The presence of social and emotional support (Tables 2 and 3)

The absence of any social and emotional support to HCWs was (statistical) significantly associated with anxiety, depression, and insomnia (GAD-2, p = 0.000; GAD-7, p = 0.000; CES-D, p = 0.000; ISI, p = 0.000) respectively.

Logistic Regression of Factors Affecting Psychological Symptoms (Table 4)

We used bivariate logistic regression for significant factors of GAD-2, GAD-7, CES-D, and ISI. Most of the responders (89.1%) were
from the Indian subcontinent and only 3.4% HCWs reported any preexisting mental illness. To avoid statistical bias, both of these variables were excluded from the bivariate logistic regression. Female gender [OR, 1.37 (1.034–1.83), \( p = 0.028 \)], self-illness [OR, 1.71 (1.23–2.38), \( p = 0.001 \)] with COVID-19 and nonavailability of social or emotional support [OR, 3.81 (2.84–2.90), \( p = 0.000 \)] were independently associated with higher anxiety using GAD-7. These same factors were also independently associated with anxiety on the GAD-2 scale. Female gender [OR, 1.72 (1.27–2.31), \( p = 0.000 \)], self-illness [OR, 1.62 (1.14–2.30), \( p = 0.007 \)], and absence of social or emotional support [OR, 6.29 (4.50–8.79), \( p = 0.000 \)] were also independent risk factors for clinically significant depression symptoms. The independent risk factors for insomnia among HCWs were younger age [20–30 years, OR, 1.37 (0.27–6.90); 30–40 years, OR, 1.02 (0.27–6.90), \( p = 0.006 \)], frontline workers [OR, 1.68 (1.23–2.29), \( p = 0.001 \)], and absence of social or emotional support [OR, 3.79 (2.81–5.11), \( p = 0.000 \)].

**Subjective Assessment of the Pandemic and Concerns of HCWs (Supplement Table 5)**

The final section of the survey covered the concerns and worries of the HCWs during the pandemic. About 70% of the HCWs felt treating COVID-19 patients as part of their job responsibility, whereas 9.3% felt it otherwise. In regards to “workplace challenge,” the main concern was watching their fellow HCWs contracting COVID-19, followed by self-infection from SARS-CoV-2. Also, 9.2% of HCWs had a concern about insufficient or poor quality personal protective equipment (PPE). When asked about the “risk of infection,” 65% of the HCWs were worried about the cross-transmission of the SARS-CoV-2 virus to their family members or friends. About 17% of respondents were worried about losing a near one or a family member due to SARS-CoV-2 infection. Only 12.5% of HCWs were worried about getting infected themselves. The main concern of HCWs on self-infection was complications secondary to infection, ICU admission, invasive mechanical ventilation (39.7%), and death (13.8%). Only 24.9% expressed no fret about getting infected with COVID-19.

And 1.8% expressed having thoughts of self-harm or suicidal intentions. However, only 6.9% of the HCWs felt that their intake of alcohol or nicotine had increased after the onset of the pandemic.

**Discussion**

This is the first large-scale multinational survey on the psychological impact of the COVID-19 pandemic on the HCWs of different backgrounds, with over 1000 responses. Stress is often described as an emotional burden or strain. Perception of stress usually causes anxiety and negative emotions like depression and sleep disturbances.\(^1\) Hence, we chose different scales to assess the levels of clinically significant anxiety, depressive symptoms, and insomnia among the HCWs, to assess the psychological distress during the COVID-19 pandemic.

This prevalence of anxiety (41.4%), depression (48%), and insomnia (68.7%) was high among HCWs in this survey, and similar findings were reported from other surveys.\(^1\) We found that being younger (<40 years), female gender, lack of emotional support,
professional role as a frontline HCW had a significantly higher prevalence of psychological symptoms. Female HCWs were significantly higher associated with clinically significant anxiety (OR, 1.57 (1.07–2.31)) and depression (OR, 1.92 (1.39–2.61)) as compared to their male counterparts. Lai et al. also reported female HCWs in Wuhan, China, had higher psychological symptoms (anxiety, depression, and insomnia) as compared to males. Self-illness with COVID-19 was an independent risk factor associated with anxiety (GAD-7: OR, 1.71 (1.23–2.38); GAD-2: 1.53 (1.11–2.12)) and depression (1.62 (1.14–2.30)). A higher rate of depression and post-traumatic stress disorder was already being reported in COVID-19 patients.

Table 3: Univariate analysis of factors affecting depression and insomnia in HCWs

| Variables                | CES-D (cutoff 16) | ISI (cutoff ≥ 10) |
|--------------------------|-------------------|-------------------|
|                          | No depression (<16) | Depression | p value | No insomnia | Insomnia | p value |
| Age-group                | N | %     | N | %     | N | %     | N | %     | N | %     | N | %     | N | %     | p value |
| 21–30                    | 48 | 9.20 | 106 | 22.00 | 0.000 | 81 | 11.70 | 73 | 23.20 | 0.000 |
| 31–40                    | 210 | 40.20 | 218 | 45.20 | 280 | 40.60 | 148 | 47.10 |
| 41–50                    | 149 | 28.50 | 116 | 24.10 | 198 | 28.70 | 67 | 21.30 |
| 51–60                    | 72 | 13.80 | 29 | 6.00 | 86 | 12.50 | 15 | 4.80 |
| 61–70                    | 34 | 6.50 | 12 | 2.50 | 37 | 5.40 | 9 | 2.90 |
| 71–80                    | 9 | 1.70 | 1 | 0.20 | 8 | 1.20 | 2 | 0.60 |
| Gender                   | Male | 319 | 61.10 | 227 | 47.10 | 0.000 | 391 | 56.70 | 155 | 49.40 | 0.031 |
|                          | Female | 203 | 38.90 | 255 | 52.90 | 299 | 43.30 | 159 | 50.60 |
| Country group            | India | 454 | 87.00 | 441 | 91.50 | 0.000 | 610 | 88.40 | 285 | 90.80 | 0.327 |
|                          | Middle East | 15 | 2.90 | 22 | 4.60 | 29 | 4.20 | 8 | 2.50 |
|                          | USA + Canada | 41 | 7.90 | 8 | 1.70 | 37 | 5.40 | 12 | 3.80 |
|                          | Others | 12 | 2.30 | 11 | 2.30 | 14 | 2.00 | 9 | 2.90 |
| Mental illness           | No | 514 | 98.50 | 456 | 94.60 | 0.001 | 670 | 97.10 | 300 | 95.50 | 0.205 |
|                          | Yes | 8 | 1.50 | 26 | 5.40 | 20 | 2.90 | 14 | 4.50 |
| Frontline workers        | Yes | 222 | 42.50 | 251 | 52.10 | 0.002 | 291 | 42.20 | 182 | 58.00 | 0.000 |
|                          | NO | 300 | 57.50 | 231 | 47.90 | 399 | 57.80 | 132 | 42.00 |
| Self-illness             | Yes | 92 | 17.60 | 138 | 28.60 | 0.000 | 141 | 20.40 | 89 | 28.30 | 0.006 |
|                          | No | 430 | 82.40 | 344 | 71.40 | 549 | 79.60 | 225 | 71.70 |
| Family illness           | Yes | 69 | 13.20 | 63 | 13.10 | 0.945 | 98 | 14.20 | 34 | 10.80 | 0.142 |
|                          | No | 453 | 86.80 | 419 | 86.90 | 592 | 85.80 | 280 | 89.20 |
| Emotional support        | Yes | 455 | 87.20 | 250 | 51.90 | 0.000 | 550 | 79.70 | 155 | 49.40 | 0.000 |
|                          | No | 67 | 12.80 | 232 | 48.10 | 140 | 20.30 | 159 | 50.60 |

Table 4: Bivariate logistic regression of factors affecting anxiety, depression, and insomnia in HCWs

| Variables                | GAD-7 (OR (95% CI)) | p value | GAD-2 (OR (95% CI)) | p value | CES-D (OR (95% CI)) | p value | ISI (OR (95% CI)) | p value |
|--------------------------|---------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|
| Age                      | 71–80               | 1       | 0.373               |         | 1                   | 1       | 0.006               |         |
|                          | 21–30               | 1.57 (1.03–2.39) | 1.073               | 0.000   | 1                   | 0.000   | 1                   | 0.000   |
|                          | 31–40               | 1.43 (1.02–1.99) | 1.073               | 0.000   | 1                   | 0.000   | 1                   | 0.000   |
|                          | 41–50               | 1.46 (1.03–2.07) | 1.073               | 0.000   | 1                   | 0.000   | 1                   | 0.000   |
|                          | 51–60               | 0.91 (1.08–1.46) | 1.073               | 0.000   | 1                   | 0.000   | 1                   | 0.000   |
|                          | 61–70               | 0.89 (0.63–1.29) | 1.073               | 0.000   | 1                   | 0.000   | 1                   | 0.000   |
| Gender                   | Male                | 1       | 0.028               |         | 1                   | 0.059   | 1                   | 0.000   |
|                          | Female              | 1.37 (1.04–1.83) | 1.073               | 0.000   | 1                   | 0.054   | 1                   | 0.001   |
| Frontline others         | Others              | 1       | 0.165               |         | 1                   | 0.054   | 1                   | 0.000   |
|                          | Frontline workers   | 1.23 (0.92–1.64) | 1.073               | 0.000   | 1                   | 0.054   | 1                   | 0.000   |
| Self-illness             | No                  | 1       | 0.001               |         | 1                   | 0.009   | 1                   | 0.007   |
|                          | Yes                 | 1.71 (1.23–2.38) | 1.073               | 0.000   | 1                   | 1.62 (1.14–2.30) | 1.29 (0.92–1.81) | 1.044  |
| Emotional support        | No                  | 3.81 (2.84–3.90) | 1.073               | 0.000   | 1                   | 2.90 (2.18–3.86) | 6.29 (4.50–8.79) | 3.79 (2.81–5.11) | 0.000  |
|                          | Yes                 | 0.000   | 1                   |         | 0.000               | 1       | 0.000               | 1       |

p value less than 0.05 is significant is highlighted in bold.
Frontline HCWs are usually vulnerable to the stress of work and the risk of nosocomial transmission of SARS-CoV-2. Studies have reported a higher risk of anxiety, insomnia, and overall psychological problems among frontline HCWs and ICU staff of the hospital. In our study, frontline HCWs had significantly higher anxiety (GAD-7: *p* = 0.005), depression (*p* = 0.002), and insomnia (*p* = 0.000) as compared to nonfrontline HCWs. Further, working in the frontline was an independent risk factor for insomnia [OR, 1.68 (1.23–2.29)]. The absence of social and emotional support for HCWs was independently associated with higher anxiety [GAD-7: OR, 3.81 (2.84–3.90); GAD-2: OR, 2.90 (2.18–3.86)], depressive symptoms [OR, 6.29 (4.50–8.79)], and insomnia [OR, 3.79 (2.81–5.11)]. This was also recently reported in other studies, and the poor social support during the COVID-19 pandemic is associated with psychological distress among HCWs.

In our survey, 20.5, 76.4, and 41.2% of HCWs with preexisting mental illness reported anxiety (GAD-7 scale), depression, and insomnia despite treatment, respectively. Vindegaard et al. in a meta-analysis of published studies in COVID-19 reported worsening of symptoms in psychiatric patients. However, to our surprise, anxiety was less in patients with previous mental illness. This may be because of statistical bias as preexisting mental illness was only reported by 3.4% of the participants. Also, the ongoing treatment for preexisting mental illness could be a reason for no increased anxiety in these patients. Despite the low numbers, clinically significant depressive symptoms were significantly higher in patients with preexisting mental illness (*p* = 0.002).

We conducted a subjective assessment of the pandemic by HCWs using open-end statements. The interesting finding was that only 10% of HCWs were concerned about PPE. This indirectly reflects the adequate preparation during initial lockdown despite resource-limited settings of the Indian subcontinent. We also tried to assess the trepidation among HCWs about COVID-19. HCWs were concerned more about the transmission of SARS-CoV-2 to their family members as compared to their health and may be explained by general social and cultural values.

The absence of social and emotional support for HCWs on the frontline was an independent risk factor for insomnia [OR, 1.68 (2.84–3.90)]. GAD-2: OR, 2.90 (2.18–3.86); depressive symptoms [OR, 6.29 (4.50–8.79)], and insomnia [OR, 3.79 (2.81–5.11)]. This was also recently reported in other studies, and the poor social support during the COVID-19 pandemic is associated with psychological distress among HCWs.

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In this survey, we also obtained the respondents’ perception of their mental stress. The primary concern was unable to stay with their family either to avoid nosocomial transmission of the virus or because of the social stigma of COVID-19. The absence of regular work hours, and the risk of nosocomial transmission with SARS-CoV-2, was the reason for emotional stress among HCWs. Many also expressed concern regarding financial uncertainty, and changing information on COVID-19 pandemic, as a cause of mental unrest and conflicts.

The strength of our survey includes the high number of responders of frontline HCWs, multinational reach, especially the two highest affected countries, India and the USA and the timing of the survey. The survey period coincided with the increasing cases of COVID-19 in India and may have mirrored the apprehension of the growing pandemic.

Our study has a few limitations. Firstly, we could not assess the disproportionate impact of the ethnicity, cultural, sociopolitical differences, and effect of age or designation of HCWs on psychological distress. Secondly, there was an over-representation of the participants from one country and a smaller number of nursing staff, which may affect the generalizability of the results. Thirdly, the level of stress was not evaluated among HCWs. Finally, this being a point prevalence study and needs follow-up to understand the complete impact of the pandemic.

**Supplementary Table 5: Concerns and worries about the COVID-19 pandemic.**

| Main concern as one works in this COVID-19 pandemic | Statements | Number (%) |
|---------------------------------------------------|------------|------------|
| About my finances | 102 (10.2%) |
| About my own health | 355 (35.4%) |
| Insufficient/poor quality PPE | 92 (9.2%) |
| Social stigma from the society | 76 (7.6%) |
| Watching colleagues/other HCWs contracting COVID-19 | 379 (37.7%) |

| Main worry about COVID-19 | Statements | Number (%) |
|---------------------------|------------|------------|
| Getting COVID-19 yourself | 125 (12.5%) |
| Losing a family member or near one to COVID-19 | 171 (17.0%) |
| Transmitting SARS-CoV-2 to a vulnerable person in your family | 231 (23.0%) |
| Transmitting the SARS-CoV-2 to your family or friends | 413 (41.1%) |
| I do not worry about any of the above | 63 (6.3%) |

| Biggest worry if one contracts COVID-19 infection | Statements | Number (%) |
|-------------------------------------------------|------------|------------|
| Complications of the disease—requiring ICU or ventilator | 399 (39.7%) |
| Death | 139 (13.8%) |
| Isolation or quarantine | 178 (17.7%) |
| Loss of income | 38 (3.8%) |
| None | 250 (24.9%) |
| I am not sure | 205 (20.4%) |
| No, I have a responsibility at home, and I would prefer to stay home. | 93 (9.3%) |
| Yes, it is my responsibility to treat such patients | 706 (70.3%) |

| Change in intake of alcohol or nicotine since the onset of this pandemic | Statements | Number (%) |
|-------------------------------------------------|------------|------------|
| Increased | 640 (63.7%) |
| Decreased | 115 (11.5%) |
| I do not drink alcohol or nicotine | 69 (6.9%) |
| No change | 156 (15.5%) |
| Prefer not to say | 24 (2.4%) |

| Any suicidal self-harm or thoughts since the onset of this pandemic | Statements | Number (%) |
|-------------------------------------------------|------------|------------|
| No | 942 (93.8%) |
| Not sure | 27 (2.7%) |
| Prefer not to say | 17 (1.7%) |
| Yes | 18 (1.8%) |
Impact of COVID-19 Pandemic on Emotional Well-being of Healthcare Workers

CONCLUSION
Our study concludes that the COVID-19 pandemic is causing a significant psychological upheaval among HCWs. Female gender, frontline workers, self-illness with COVID-19, and absence of social or emotional support are the independent risk factors associated with psychological distress among HCWs. We recommend robust screening programs and professional psychological support with appropriate interventions to address the emotional well-being of the HCWs during these challenging times.

ORCID
Bharat G Jagiasi https://orcid.org/0000-0002-3068-1201
Gunjan Chanchalani https://orcid.org/0000-0001-8429-8526
Prashant Nasa https://orcid.org/0000-0003-1948-4060
Seema Tekwani https://orcid.org/0000-0002-7395-1160

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