



NURSES' MENTAL HEALTH AND WORK PLACE SAFETY DURING COVID 19 PANDEMIC IN TERTIARY CARE HOSPITALS OF NORTH INDIA

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ABSTRACT **BACKGROUND:** In India, there has been an exponential increase in number of COVID cases over a period of few months, creating the risk of overwhelmed health care system. The unforeseen challenges posed by the COVID 19 pandemic has taken a significant toll on health professionals. Despite the risk, frontline workers such as nurses are working tirelessly in limited resources, which can cause physical/ mental exhaustion and compassion fatigue. **METHODS:** An online cross-sectional survey with 580 nurses was conducted in two tertiary care hospitals to assess the prevalence of anxiety, depression, poor sleep quality and injury among participants. Assessment of generalized anxiety disorder (GAD) was done using GAD-7 scale; sleep quality was estimated by using Pittsburgh sleep quality index (PSQI); depression was assessed by using Patient health Questionnaire (PHQ-9). Quantitative variables were expressed as mean \pm standard deviation (SD), whereas qualitative variables were expressed as proportions (%). Chi-square test (χ^2) and Multivariate logistic regression analysis were done to explore potential influence factors for GAD, sleep quality, and depressive symptoms. **RESULTS:** The prevalence of GAD, poor sleep quality, depression and injury was 17%, 10%, 10.3% and 7.8% respectively. The significant predictors of GAD were: age > 35 years (a OR: 3.5), females (a OR:1.9), COVID duty (a OR:2.1) and injury episode (a OR: 5.1). Poor sleep quality was significantly associated with female gender (a OR:4.3), higher rank (a OR: 4.7) and injury episode (a OR:5.2). Being a higher rank professional (a OR:2.7), working with COVID patients (a OR: 2.01) and with history of an injury (a OR: 3.5) in past month were identified as significant predictors of depression. **CONCLUSION:** In this unprecedented global crisis, nurses are facing adverse mental health outcomes; hence there is a need to draft occupational health strategies to mitigate the risk of psychological injury to frontline workers.

KEYWORDS : Covid 19, Mental Health, Nurses, India

INTRODUCTION:

In December 2019, the World Health Organization (WHO) was notified about the cluster of pneumonia cases in Wuhan, China due to a previously unreported virus SARS-CoV 2. The disease was later identified and notified as corona virus disease 2019 (COVID-19). After its emergence, COVID-19 gradually spread across the globe leading to its declaration as a pandemic on March 11, 2020.^[1]

Healthworkers on the front lines of the fight against the pandemic have a higher risk of becoming infected. Although consistent use of personal protective equipment (PPE) reduces infection risk, there is a marked supply deficit and ergonomic challenges associated with use. Such problems continue to manifold in developing countries like India, where the number of cases has crossed 5 million mark as of September 2020. Largely affected are nurses encountering the bulk of healthcare interactions and can hinder their work capacities thereby impeding India's COVID 19 containment plans.^[2]

Increasing work demands and burnout owing to oversaturated health capacities and violence has been an exceptional challenge to health personnel.^[3] The risk of nosocomial transmission and ethically difficult rationing of care decisions have dramatic effects on nurse's physical and mental well-being. Their resilience is further hampered in isolation and lack of social support and public stigma as a potential source of infection is often unsettling. Nurses are, therefore, especially vulnerable to mental health disorders, including fear, anxiety, depression and insomnia.^[4]

Huyang Y et al reported that during this pandemic, front-line medical staff in China have worked for more than 16 hours a day on average, causing them to not getting enough sleep.^[5] A 37-year-old Japanese government worker taking care of the isolated returnees from Wuhan, apparently committed suicide.^[6] Several studies done during Severe Acute Respiratory Syndrome (SARS), COVID-19 epidemic showed that mental health problems could occur in healthcare workers especially nurses.^[7-10]

The theme of World Health Day 2020 is to support nurses and midwives. According to the Global Health Workforce Alliance and WHO, India is categorized among the 57 most severe crisis-facing countries in terms of availability of health workers.^[11-13] Nurses are at the forefront of COVID-19 response. Quite simply, without nurses, there would be no response. Therefore, the present study was aimed to assess the mental health status and workplace safety of nurses during COVID 19 pandemic and to determine the potential influence factors.

METHODS:

To prevent the spread of COVID 19 infection through droplets or contact, the data was collected online in two tertiary hospitals in Rajasthan catering to both general and COVID-19 patients. The sample size of the study was computed taking the prevalence (p) of depression to be 5.3% among health care workers using formula, ($n = z^2 [p q] / d^2$) for estimating single proportions.^[14,15] The standard normal deviation was set at a 95% confidence level, with the allowable margin of error (d) of 2%, sample size (n) was calculated to be 482, and considering 20% non-response rate, sample size was 577.

The study proforma was anonymous, administered in English and Hindi, and hosted on Google Forms (Alphabet Inc., California, USA). The study was piloted among 60 nurses from another hospital. Post pilot, necessary amendments were made for phrasing and comprehension, for translation expert review with forward and reverse drafting of the questionnaire was done. Responses from the pilot survey were excluded from the final study. We distributed the study link to nursing supervisors of the hospitals where the study was conducted after obtaining prior approvals. The nursing supervisors then shared the survey links in their official WhatsApp groups (Facebook Inc., California, USA). WhatsApp is the primary means of formal communication among nurses, so all nurses join the official group. The reminder messages were sent every week in the official groups to ensure a reasonable participation rate.

The study proforma comprised of the following sections:

1. Demographic information:

The study participants reported their demographic information and COVID-19 related information

2. Injury:

The questionnaire had questions about the injury (Needlestick injury/fall/ other)sustained at the workplace in the last one month and their potential causes. Needle Stick Injury was defined as “any cut or prick to the study subject in the hospital by a needle which has been used previously on a patient.”

3. Generalized anxiety disorder:

We used Generalized anxiety disorder-7 (GAD- 7) scale for assessing anxiety. The GAD-7 scale measures the frequency and severity of generalized anxiety disorder symptoms, containing the items based on the DSM-IV criteria for depression and anxiety.^[16] The 7 items are measured using a 4-point Likert-scale with a response format ranging from 0 (not at all) to 3 (nearly every day). The total score of GAD-7 ranges from 0 to 21, with increasing scores indicating more severe functional impairment as a result of anxiety. Taking the reference from the study done by Huang Y, we defined a cutoff of 9 points or more as the presence of anxiety symptoms.^[5]

4. Sleep quality:

For assessing the sleep quality, we used the Pittsburgh Sleep Quality Index (PSQI) comprising seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication/pills, and daytime dysfunction. Each component is measured using a four-point Likert-type scale ranging from 0 (not in the past month) to 3 (three or more times a week), with higher scores indicating poor sleep quality. PSQI greater than 7 points indicates poor sleep quality.^[17]

5. Depressive symptoms:

To assess the depressive symptom among the study population, we used the Patient Health Questionnaire-9 (PHQ-9). It is a nine-item questionnaire, and each item is measured using a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). A score of > 10 was defined as depression.^[18,19]

Institutional ethics approval was obtained for the study. Informed consent was taken, requiring the participants to submit the form only if they understood the questionnaire completely and voluntarily wanted to participate. To avoid duplication, one form was made available to a unique email id. The responses collected were confidential and kept anonymous at all stages of the study. Responses collected were deidentified and reported as collective, combined data.

Data collection complied with the terms and conditions of Google Forms. Data were entered in MS Excel and analyzed using Statistical Package for the Social Sciences version 21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Armonk, NY). Quantitative variables were expressed as mean ± standard deviation (SD), whereas qualitative variables were expressed as absolute and relative frequencies. Univariate analysis using the Chi-square test (χ^2) and multivariate logistic regression analysis were done to explore potential influence factors for GAD, sleep quality, and depressive symptoms. Adjusted odds ratio (aOR) and 95% confidence interval (95% CI) were obtained from logistic regression models. For all analyses, *p*-value <0.05 was considered to be statistically significant.

RESULTS:

A total of 580 participant's responses were collected and taken for data analysis. The mean age of the participants was 28.89 ± 5.3 years with the majority (85.3%) below the age of 35 years. Most of the

participants were staff nurses (86.7%) and were married (92.1%). Out of total respondents, 185 (31.9%) were actively involved in the care of COVID-19 patients. [Table 1]

Table 1. Demographic characteristics of study participants (n= 580)

Variable	N (%)
Age (in years), Mean ± SD	28.89 ± 5.3
≤ 35 years	495 (85.3)
>35 years	85 (14.7)
Gender	
Male	396 (68.3)
Female	184 (31.7)
Occupational rank	
Staff nurse	503 (86.7)
Nursing supervisor	77 (13.3)
Marital status	
Married	534 (92.1)
Single	46 (7.9)
Working with COVID patients	
Yes	185 (31.9)
No	395 (68.1)

Injury assessment revealed that 45 (7.8%) participants had injury incidents in past one month. The majority (46%) participants had needle stick injury, most injuries were linked to rushed work (50%). Only 23% of the participants were wearing PPEs at the time of the injury incident. [Table 2]

Table 2: Injury, type of injury and possible causes among study participants (n= 580)

Variable	N (%)
Proportion who had an injury within the last 1 month	45 (7.8)
Injury	
Needlestick Injury	21 (46)
Scalpel/other sharp	4 (9)
Fall	8 (18)
Other	12 (27)
Wearing PPE* at the time of injury	
Yes	10 (23)
No	35 (77)
Cause of recent injury	
- Lack of assistance	6 (14)
- Fatigue	6 (14)
- Rushed	23 (50)
- Could not have been prevented	10 (22)

*PPE personal protective equipment

On psychometric assessments, it was found that 17% and 10.3% of participants were suffering from generalized anxiety disorders and depression respectively. On sleep assessment, it was observed that 10% of study participants had poor sleep quality. On risk stratification and comparison, it was found that participants with age more than 35 yrs, being female, on COVID duty, Nursing supervisor rank and those who had injury episodes in the past had significant association with anxiety. Similarly, poor sleep quality was observed to be significantly higher among females, nursing supervisors and those with injury incidents in the past 1 month. On depression assessment, it was observed that participants who were working as supervisors, were on COVID duty and had a previous injury episode had a significantly higher risk of depression. [Table 3]

Table 3: Prevalence of GAD, sleep quality and depressive symptoms during COVID-19 Outbreak stratified by variables among study participants

Variable	GAD n (%)		χ^2 p-value	Poor Sleep Quality n (%)		χ^2 p-value	Depression n (%)		χ^2 p-value
	Yes	No		Yes	No		Yes	No	
N= 580	98 (17)	482 (83)		59 (10)	521(90)		60(10.3)	520(89.7)	
Age			<0.01*			0.8			0.64
<35	72(14.5)	423(85.5)		51(10)	444(90)		50(10)	445(90)	
>35	26(30.6)	59(69.5)		8(9.4)	77(90.6)		10(11.8)	75(88.2)	
Gender			0.03*			<0.01*			0.77
Male	58(14.6)	338(85.4)		24(6)	372(94)		40(10)	356(90)	
Female	40(21.7)	144(78.3)		35(19)	149 (81)		20(10.9)	164(89.1)	

COVID duty									
Yes	42(22.7)	143(77.3)	0.01*	21(11.4)	164(88.6)	0.52	28(15)	157(85)	0.01*
No	56(14.2)	339(85.8)		38(9.6)	357(90.4)		32(8)	363(92)	
Rank									
Staff nurse			0.02*			<0.01*			<0.01*
Nursing supervisor	78(15.5)	425(84.5)		40(8)	463(92)		44(8.7)	459(91.3)	
	20(26)	57(74)		19(24.7)	58(75.3)		16(20.8)	61(79.2)	
Injury									
Yes	20(44.4)	25(55.6)	<0.01*	14(31)	31 (69)	<0.01*	12(27)	33(73)	<0.01*
No	78(14.6)	457(85.4)		45(8.4)	490(91.6)		48(9)	487(91)	

* P value less than 0.05, Abbreviations: n, number, GAD, generalized anxiety disorder.

- a) GAD was defined as individuals who scored ≥9 points.
- b) Poor sleep quality was defined as individuals who scored > 7 points.
- c) Depression was defined as individuals who scored >10 points.

On multivariate regression analysis, it was observed that participants aged more than 35 years (a OR = 3.5), females (a OR = 1.9), nurses working with COVID patients (a OR = 2.1) and with injury episode (a OR = 5.1) have a significantly higher risk of developing generalized anxiety disorder. Similarly, female gender (a OR = 4.3), being a nursing supervisor (a OR = 4.7) and having an injury episode (a OR = 5.2) were significantly associated with poor sleep quality. Depression was also found to be significantly higher in nursing doing COVID duties (a OR = 2.01), supervisors (a OR = 2.7) and with history of injury (a OR = 3.5) in past month. [Table 4]

Table 4: Association of influence factors with GAD, sleep quality, and depression during COVID-19 outbreak using multivariate logistic regression.

Variable	GAD aOR(95% CI)	Poor Sleep Quality aOR(95% CI)	Depressive symptom aOR(95% CI)
Age			
<35	1.00	1.00	1.00
>35	3.5 (1.9-6.1)*	2.8(0.1-7)	1.2(0.5- 2.6)
Gender			
Male	1.00	1.00	1.00
Female	1.9 (1.15- 2.99)*	4.3 (2.4-7.9)*	1.1(0.6-2.1)
COVID duty			
Yes	2.1 (1.2-3.3)*	1.1 (0.6-2.1)	2.01 (1.2-3.6)*
No	1.00	1.00	1.00
Rank			
Staff nurse			
Nursing supervisor	1.00	1.00	1.00
	1.5(0.8-2.8)	4.7(2.4- 9.4)*	2.7(1.3- 5.1)*
Injury			
Yes	5.1 (2.6-9.9)*	5.2(2.4-10.8)*	3.5(1.7- 7.3)*
No	1.00	1.00	1.00

* P value less than 0.05,

Abbreviations: GAD, generalized anxiety disorder; aOR, adjusted odds ratio; 95% CI, 95% confidence interval; COVID-19, 2019 Corona Virus Disease.

DISCUSSION: The present study highlights and reports the impact of COVID-19 pandemic on nurses. In the present study, done on 580 nurses working in the tertiary hospitals of Rajasthan, a significant mental health challenge in terms of GAD, depression, and sleep disorder was observed in nurses performing COVID duties. The result of the study is similar but lower compared to a systematic review of 13 studies mostly done in China by Pappa S et al where the pooled prevalence of anxiety (14 vs 23.2%), depression (8.6 vs 22.8%) and sleep disorder (9 vs 38.9%) were estimated in health care workers involved in COVID-19 duties respectively.^[20] These findings can be due to the comparatively early stage of the pandemic in India and access to more information about health care workers compared to China.^[21] Similar to previous studies, we observed that female participants and those with age more than 35 years exhibited higher rates of affective symptoms in terms of anxiety, depression, and sleep disorders compared to males and younger colleagues.^[5, 22] Such phenomenon can be possibly attributed to family and social responsibilities leading to higher physical and emotional demands, leading to overexertion and affecting coping mechanisms in the face of pandemic.^[23, 24] It was also recorded that senior nursing staff (supervisors) had higher anxiety levels, however depression and sleep

quality weren't significantly different from junior nurses. Such observation partially concurs with the findings of where nurses with intermediate technical title or supervisors were experiencing severe depression, anxiety, and distress.¹⁰ Such characteristics can be largely attributed to the job responsibility and increased challenges of ensuring fulfillment of team leadership and rising work demands in the present situation. Multivariable logistic regression analysis showed that nursing personnel on active COVID-19 duties had a higher risk of anxiety and depression compared to their counterparts posted in non-COVID areas. This is similar to previous experiences where frontline nurses treating COVID-19 patients had poorer mental health outcomes due to high risk of infection, frequent contact with patients and longer hours of work.^[10,25, 26] The study demonstrated that previous injury episode is a strong risk predictor of poor mental health status (anxiety, depression and poor sleep) among nurses independent of other variables with a risk 4.3 times for anxiety to 6.6 times for sleep disorders. This is consistent with past literature, which reveals that injuries are found to be associated more with the increased work demands and poor coping response. Furthermore, lack of social support, communication, and lack of training, negatively impact self-efficacy and the workability of health care workers which predisposes to injury taking a vicious form.^[27,28]

CONCLUSION:

The present COVID-19 pandemic has been particularly challenging for healthcare workers across all domains and capacities. There is a need to draft occupational health strategies to support frontline health care workers. Our study identifies several risk factors that indicate vulnerability and poor mental health outcomes among nursing personnel. Educational interventions in terms of training and counseling are required to provide confidence and psychological support. Its, therefore, recommended that regular screening of nursing personnel involved in treating, diagnosing patients with COVID-19 be done for evaluating anxiety, depression, and sleep disorders.

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