

# Changing Trends in the Mental Health Status of Healthcare Workers at COVID-19 Wards Three Years After the COVID-19 Pandemic Outbreak in Saudi Arabia

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**Background:** The current study aimed to investigate the severity of anxiety and depression symptoms among the healthcare workers of COVID-19 wards three years after the pandemic outbreak in Saudi Arabia.

**Methods:** An online cross-sectional survey was conducted during the fourth quarter of 2022 and early 2023 at the COVID-19 wards of public primary healthcare hospitals of the AlQassim region of Saudi Arabia. The sample included 323 healthcare workers including physicians, nurses, laboratory, and imaging personnel. The Generalized Anxiety Disorder (GAD-7) and Patient Health Questionnaire (PHQ-9) questionnaires were used to collect data using the self-administered approach. The degree of severity of anxiety and depressive symptoms were the main outcome variables. Descriptive and inferential statistics were derived using Statistical Package for Social Science (SPSS) software version 28.0.

**Results:** Three years following the outbreak of the pandemic, a transition toward a high prevalence of mild symptoms of anxiety and depression was noted. The present study reported 85.1%, 8.4%, and 6.5% mild, moderate, or moderately severe depression and 90.7%, 6.8%, and 2.5% anxiety, respectively. Depression was more common in men ( $t=3.009$ ;  $p=0.003$ ). Phlebotomists, x-ray and imaging personnel, and paramedics showed a strong association with symptoms of depression ( $t=8.36$ ;  $p<0.001$ ) and anxiety ( $t=10.325$ ;  $p<0.001$ ). Sleep deprivation, fatigue, loss of interest, and changes in eating behavior were depressive symptoms with a high degree of severity. Anxiety symptoms that showed a high degree of severity were having trouble relaxing and getting annoyed quickly. An overall depressive and anxiety score of 16.5 and 12.8 was obtained.

**Conclusion:** The long-term impact of the pandemic on healthcare workers in COVID-19 wards includes the persistence of depression and anxiety symptoms. These findings highlight the need for implementing mental health wellness programs and coping strategies that reduce work stress and improve the quality of life.

**Keywords:** healthcare workers, Saudi Arabia, depression, anxiety, COVID-19

## Introduction

Saudi Arabia is the largest country in the Arabian Gulf region. It is crucial to emphasize the strategic significance of Saudi Arabia, as it serves as the focal point for the world's most significant religious pilgrimages, particularly in the two holy cities of Mecca and Madinah, which attract millions of pilgrims from around the world. This situation heightens the risk of rapid transmission of airborne infections among communities. The first coronavirus case in Saudi Arabia was identified on March 2, 2020, before the World Health Organization declared the outbreak a pandemic.<sup>1</sup> The trends in daily new cases exhibited clear wave patterns. The first wave peaked at 4919 cases on June 17, 2020, while the second

wave reached a lower maximum of 1534 cases on July 1, 2021. The third wave, although shorter in duration from November 2021 to February 2022, recorded the highest number of cases at 5928 on January 19, 2022. As of April 13, 2024, Saudi Arabia reported 841,469 coronavirus cases and 9646 fatalities.<sup>2</sup> Nevertheless, the Ministry of Health implemented swift and robust measures, including travel restrictions, lockdowns, the closure of educational institutions, restrictions on large gatherings, social distancing protocols, and digital tracking, which played a significant role in curbing the spread of the virus.<sup>3</sup>

The COVID-19 pandemic had a profoundly negative impact on a vast number of frontline workers and healthcare professionals worldwide. The effects were particularly severe for those healthcare professionals directly involved in COVID-19 wards. Unpreparedness due to the naivety of the causative agent, and lack of knowledge of the course of disease and its management left the healthcare workers overwhelmed. The Key stressors contributing to their heightened anxiety included fear of transmission, personal safety, increased workload, and isolation.<sup>4</sup> The earliest study globally to have measured the mental health outcomes of frontline workers was conducted in January 2020 in China.<sup>5</sup> The study reported symptoms of anxiety, depression, distress, and insomnia in more than half of the surveyed physicians and nurses. The first study to assess the psychological impact of the pandemic on healthcare workers in Saudi Arabia conducted as early as March 2020 at the COVID-19 designated wards found more than two-thirds of the physicians being worried, and more than half felt isolated and fearful due to high risk of exposure, stigmatization, and being quarantined.<sup>6</sup> Since then numerous studies have documented the pandemic's negative and detrimental effects on the mental health of the healthcare staff.<sup>7–9</sup> It has been almost five years following the onset of the pandemic and the health systems and healthcare professionals worldwide continue to face significant challenges. The long-term consequences of this ongoing struggle are likely to persist for an extended period, with healthcare workers enduring relentless pressure, particularly in terms of psychological stress and burnout. These conditions can lead to enduring effects, including anxiety and depression. In light of previous findings, it is essential to evaluate the status of healthcare workers in COVID-19 wards. A significant number of studies have documented the mental health consequences of the COVID-19 pandemic during its initial year of occurrence, however, there is a lack of research focusing on the ongoing mental health status of frontline workers amidst the continuing pandemic. This study seeks to investigate the mental health effects of the COVID-19 pandemic on healthcare professionals in these wards nearly three years following the onset of the pandemic.

## Methods

### Study Design and Sample

An online cross-sectional survey was conducted between August 2022 and early 2023 at the COVID-19 wards of government primary healthcare facilities and hospitals of Al Qassim region. The study sample included the healthcare staff including physicians and nurses, other healthcare staff like paramedic professionals, phlebotomists and radiograph technicians, and other non-healthcare administrative personnel like the reception and floor staff present at the COVID-19 wards.

### Description of the Study Questionnaire

The questionnaire comprised two parts; the first part included the study's purpose, confidentiality statements, and consent forms. Anonymity was maintained and no personal data was included. The participants had the right to withdraw at any time. The second section included questions about sociodemographic characteristics and the use of the certified Arabic versions of the Generalized Anxiety Disorder 7 (GAD-7) and Patient Health Questionnaire (PHQ-9) to screen for anxiety and depression. The Arabic version of the PHQ-9 and GAD-7 was adopted from Al-Hadi et al and Malhame et al who had validated the original English version among the Arab population.<sup>10,11</sup> The GAD-7 and PHQ-9 questionnaires consist of seven and nine items, respectively, about feelings over the last two weeks, rated from “not at all” to “nearly every day” on a 4-point scale. Each response was assigned a score, and the sum of all scores was calculated. Depression was categorized as mild (score of 5 to 9), moderate (score of 10 to 14), moderately severe (score of 15 to 19), and severe depression (score of 20–27). Similarly, a total score of 5–9 indicated mild anxiety, 10–14 indicated moderate anxiety, and 15–21 indicated severe anxiety.

## Sample Size and Data Collection

The sample size was estimated at 323 using G\*Power software to detect a moderate effect size with 80% power and a 5% significance level.

Al Qassim region hospitals with designated COVID-19 treatment facilities in Buraidah, Unaizah, and Ar-Rass were selected and study approval was obtained from the concerned departments of each hospital. All the healthcare staff deployed at the COVID-19 wards of the selected hospitals were eligible to participate in the study. Their official e-mail IDs were obtained and an Email was sent explaining the purpose of the study and an embedded link to the questionnaire. Two systematic reminders were sent at weekly intervals to increase the response rate and participation in the survey.

## Statistical Analysis

Data was analyzed using IBM's Statistical Package for Social Science (SPSS) version 28.0. Descriptive statistics included reporting the categorical and continuous variables. The categorical variables of socio-demographic characteristics were reported in numbers and percentages. The responses to the presence or absence of risk factors of depression and anxiety symptoms were also reported in percentages for the four columns; "not at all, several days, more than half the days, and nearly every day". The total score for grading anxiety and depression was calculated by adding all the scores of the individual four columns. Mean anxiety and depression scores with standard deviations were derived for each demographic variable. Bivariate analysis using Student's *t*-test was done to test the association between the outcome variable (severity of anxiety and depression) and the socio-demographic variables. P values <0.001 were considered significant.

## Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and the study proposal was approved by the Regional Research Ethics Committee, Al Qassim region, Ministry of Health Affairs on August 24<sup>th</sup>, 2022, with reference No: H-04-Q-001.

## Results

The survey was completed by 323 healthcare staff working at the COVID-19 wards. The demographic characteristics of the participants are shown in Table 1. 74.9% were male, and most respondents (52.6%) were in the age range of 21 to 30. The majority held a bachelor's degree (63.8%), followed by 18.6% with a postgraduate qualification. Physicians and nurses comprised 37.2% and 26.9%, respectively. Of the participants, 78.3% were frontline workers dealing directly with COVID-19 patients.

Among the participants, 85.1%, 8.4%, and 6.5% had mild, moderate, or moderately severe depression, respectively. The prevalence of mild, moderate, and severe anxiety was 90.7%, 6.8%, and 2.5%. Depressive symptoms were rated according to the degree of severity and illustrated in Table 2.

**Table 1** Socio-Demographic Profile of the Respondents Who Participated in the Study (n=323)

Variables	Categories	Numbers	Percentage
<b>Age</b>	21–30 years	170	52.6
	31–40 years	139	43.0
	41–50 years	012	03.7
	51 and above	002	00.6
<b>Gender</b>	Male	242	74.9
	Female	081	25.1

(Continued)

**Table 1** (Continued).

Variables	Categories	Numbers	Percentage
<b>Marital status</b>	Single	140	43.3
	Married	183	56.7
<b>Education</b>	Diploma	057	17.6
	Bachelor	206	63.8
	Postgraduate	060	18.6
<b>Profession</b>	Nurse	087	26.9
	Physician	072	22.3
	Others (Healthcare staff)	120	37.2
	Others (Administrative staff)	044	13.6
<b>Working position</b>	Frontline (Medical staff)	253	78.3
	Second-line (Administrative staff)	070	21.7
<b>Experience</b>	Less than five years	152	47.1
	5–10 years	137	42.4
	11 years or more	034	10.5

**Table 2** Degree of Severity of Depressive Symptoms

Risk Factors	Not at All		Several Days		More Than Half the Days		Nearly Every Day		Degree	Level of Depression on 4 Point Scale
	n	%	n	%	n	%	n	%		
Sleep disturbances	101	31.3	161	49.8	39	12.1	22	6.8	25	Severe
Feeling tired/fatigued	126	39.0	130	40.2	49	15.2	18	5.6	24	Severe
Little interest/pleasure in work	125	38.7	149	46.1	28	8.7	21	6.5	22	Severe
Poor appetite/overeating	145	44.9	127	39.3	33	10.2	18	5.6	21	Severe
Feeling down, depressed/ hopeless	167	51.7	124	38.4	19	05.9	13	4.0	17	Moderately severe
Trouble concentrating on reading the newspaper/ watching television etc.	198	61.3	095	29.4	18	05.6	12	3.7	14	Moderate
Feeling bad about yourself / having disappointed your family	227	70.3	079	24.5	09	02.8	08	2.5	10	Moderate
Moving/speaking so slowly that other people could have noticed/ Conversely, moving around a lot more than usual	241	74.6	057	17.6	15	04.6	10	3.1	10	Moderate
Have you ever thought of hurting yourself?	263	81.4	050	15.5	07	02.2	03	0.9	06	Mild
Overall Depression Symptoms									16.5	Moderately severe

The top four depressive symptoms rated as severe on a scale of 27 were sleep disturbance (25), fatigue (24), loss of interest (22), and eating disorders (21). Almost half of the participants experienced sleep disturbances (49.8%) and loss of interest (46.1%) for several days, while around 40.2% and 39.35% felt fatigue and changes in eating behavior. The overall depressive score was 16.5 categorized as moderately severe depression.

Furthermore, the grading and severity of anxiety symptoms are displayed in Table 3. Severe anxiety symptoms, including trouble relaxing (19) and getting annoyed easily (16) on a maximum score of 21, were reported. More than half of the participants experienced difficulty in relaxing (52.9%) and felt nervous and anxious (48.9%) for several days. The overall anxiety score was 12.8.

Furthermore, since the dependent variable (severity of anxiety/depression symptoms) was continuous with no outliers and was normally distributed, a Student's *t*-test was applied to test the association with independent variables. The association between the degree of severity of anxiety and depression symptoms and demographic characteristics is shown in Table 4. Depression was more common in men ( $t=3.009$ ;  $p=0.003$ ). Other healthcare staff showed a strong association with symptoms of depression ( $t=8.36$ ;  $p<0.001$ ) and anxiety ( $t=10.325$ ;  $p<0.001$ ). The responses to depression and anxiety are color-coded according to the severity grade and shown graphically in Figures 1 and 2, respectively.

## Discussion

The present research revealed insights into the mental health conditions of frontline workers in COVID-19 wards three years following the onset of the pandemic. The findings indicated a transition in the severity of anxiety and depression, moving from moderate and severe to mild levels. However, the prevalence of psychological symptoms remained alarmingly high. The COVID-19 outbreak created enormous mayhem triggering a profound impact on the mental health of people worldwide. The pandemic's unprecedented nature, rapid spread, and devastating consequences led to a myriad of psychological responses and challenges. The fear of contracting the virus, quarantines and social isolation, restrictions, and disruptions to daily routines contributed to heightened levels of psychological distress. Frontline healthcare workers, in particular, faced immense psychological trauma due to the demands of the nature of their jobs, exposure to high-risk environments, and the emotional toll of caring for infected patients. Saudi Arabia experienced three large and notable waves in 2020, 2021, and 2022 after which the propagation dynamics turned to a constant flow of sporadic cases due to vigilant control measures adopted by the Ministry of Health. However, a fourth wave, which was smaller, lasted from May to November 2022 and had the highest number of new cases (1232) on June 20, 2022. Fear of approaching winter coupled with previous experience of a larger third wave fueled anxiety about the ongoing pandemic among the already

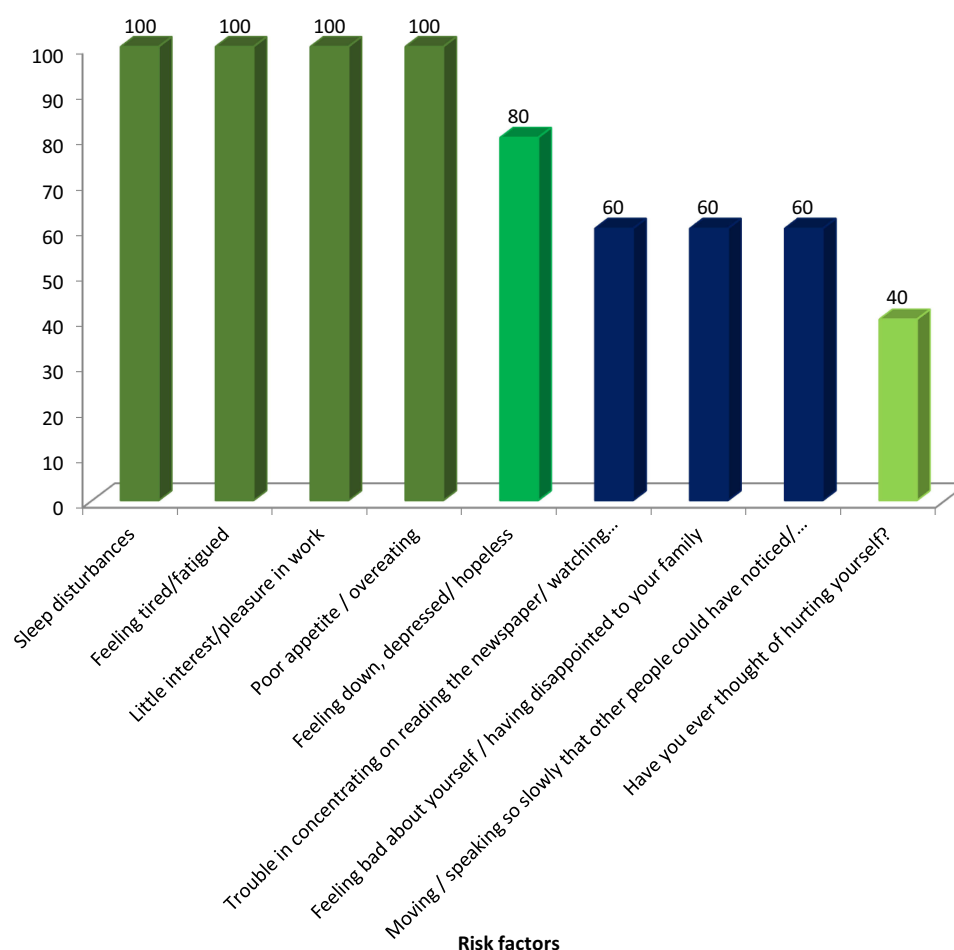
**Table 3** Grading and Severity of Anxiety Symptoms

Risk Factors	Not at All		Several Days		More Than Half the Days		Nearly Every Day		Degree	Level of Anxiety on 4 Point Scale
	n	%	n	%	n	%	n	%		
Trouble relaxing	99	30.7	171	52.9	40	12.4	13	4.0	19	Severe anxiety
Becoming easily annoyed	135	41.8	140	43.3	31	9.6	17	5.3	16	Severe anxiety
Feeling nervous or anxious	139	43.0	158	48.9	17	5.3	9	2.8	14	Moderate anxiety
Not being able to stop or control worrying	197	61.0	93	28.8	21	6.5	12	3.7	11	Moderate anxiety
Worrying too much about different things not expected	192	59.4	104	32.2	22	6.8	5	1.5	11	Moderate anxiety
Feeling afraid of something horrible that might happen	216	66.9	74	22.9	19	5.9	14	4.3	10	Moderate anxiety
Being so restless that it's hard to sit still	211	65.3	94	29.1	15	4.6	3	0.9	9	Mild anxiety
Anxiety Symptoms									12.8	Moderate anxiety

**Table 4** Association of Depression and Anxiety with Demographic Variables

Variables	No. of Samples	Depression Symptoms				Anxiety Symptoms			
		M	SD	t	P	M	SD	t	P
Age									
21–30 years	170	4.9	4.2	2.41	0.066	3.8	3.4	2.11	0.098
31–40 years	139	6.2	5.1			4.8	4.2		
41–50 years	012	5.6	3.2			4.0	2.9		
51 and above	002	3.0	2.8			3.0	4.2		
Gender									
Male	242	5.8	4.9	3.00	0.003	4.4	3.9	1.44	0.149
Female	081	4.3	3.4			3.7	3.3		
Nationality									
Saudi	302	5.5	4.7	0.08	0.931	4.3	3.8	0.88	0.377
Non-Saudi	021	5.4	3.3			3.5	2.7		
Marital Status									
Single	140	4.9	4.5	−1.75	0.081	3.8	3.7	−1.64	0.102
Married	183	5.9	4.7			4.5	3.8		
Education									
Diploma	057	6.1	5.6	0.60	0.546	4.7	3.9	0.64	0.527
Bachelor	206	5.3	4.5			4.1	3.7		
Postgraduate	060	5.5	4.2			4.3	3.8		
Profession									
Nurse	087	4.4	3.6	8.36	0.000	3.3	2.9	10.32	0.000
Physician	072	4.9	3.9			3.7	3.4		
Other healthcare staffs	120	7.1	5.6			5.7	4.5		
Administrative staffs	044	4.0	3.3			2.9	2.2		
Working Position									
Frontline staffs	253	5.5	4.6	−0.00	0.999	4.2	3.7	−0.54	0.588
Second-line staffs	070	5.5	4.8			4.5	3.8		
Experience									
Less than five years	152	5.3	4.8	1.05	0.349	3.8	3.6	2.55	0.079
5–10 years	137	5.4	4.1			4.4	3.6		
11 years or more	034	6.6	5.8			5.4	4.6		

**Notes:** A p-value less than 0.05 is considered to be statistically significant. (The significant p-values are presented in bold font)



**Figure 1** The prevalence of individual risk factors for depression. Data is expressed in percentages.

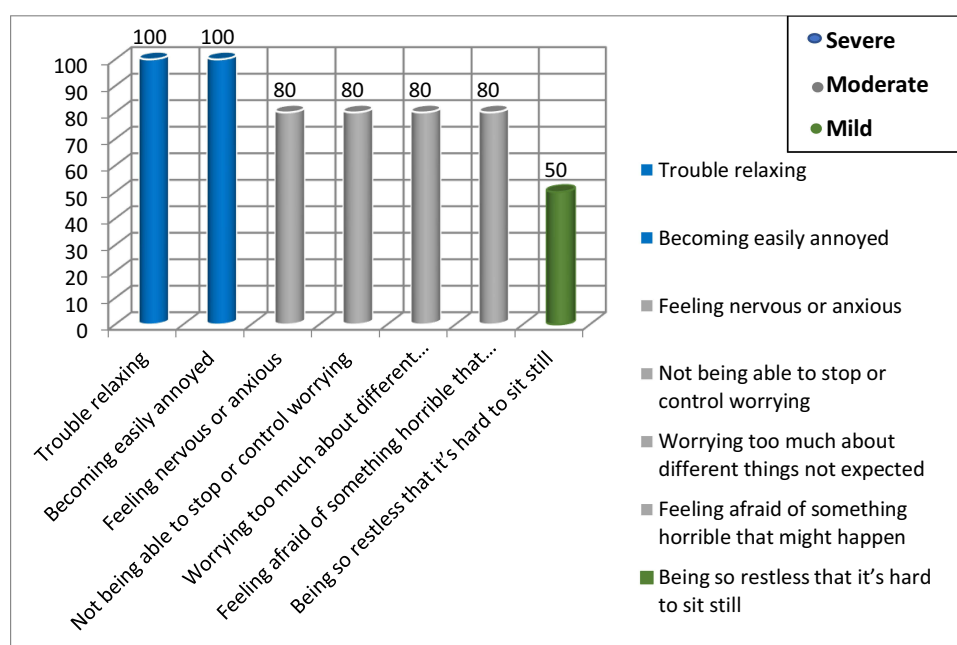
burdened healthcare workers. However, from 2023 onwards, the new cases followed a constant pattern of steady cases ranging from below 100 to over 400 new cases per day. Nevertheless, frontline healthcare workers in Saudi Arabia are on constant alert due to the high risk of propagation from the sites of mass gatherings like the pilgrimage centers where millions of pilgrims gather annually from across the globe.

## Severity of Anxiety and Depression Symptoms

The present study found a high prevalence of mild anxiety (90.7%) and mild depression (85.1%), a lower prevalence of moderate and severe anxiety, and no cases of severe depression among the respondents that included frontline and healthcare staff at COVID-19 wards. Men showed more depressive symptoms than women (mean score 5.89 vs 4.39;  $p=0.003$ ). Other healthcare staff like paramedics, phlebotomists, x-ray technicians, and imaging staff showed a strong association with depression (mean depression score 7.13;  $p=0.000$ ) and anxiety (mean anxiety score 5.72;  $p=0.000$ ). In addition, variables that showed higher mean depression scores but did not reach the level of statistical difference in the association include more than ten years experience in service (mean score 6.61), age 31–40 years (mean score 6.28), diploma holders (mean score 6.12), and being married (mean score 5.91). The most common depressive symptoms were insomnia, fatigue, loss of interest, and loss of appetite or overeating while the most common anxiety symptoms included trouble relaxing, getting annoyed, and feeling nervous. Many studies support our findings correlating COVID-19-related worsening of symptoms of sleep deprivation<sup>12</sup> and eating disorders<sup>13</sup> leading to deteriorating mental health.

An earlier study by Alenazi et al conducted in the COVID-19 wards during the early phase of the pandemic in May 2020 reported that healthcare workers experienced higher rates of moderate (36.1%) and severe anxiety (32.3%), alongside mild





**Figure 2** The prevalence of individual risk factors for anxiety. Data is expressed in percentages.

anxiety (31.5%).<sup>14</sup> Additionally, another study from that period indicated prevalence rates of 44.1%, 16.2%, and 12.2% for mild, moderate, and severe anxiety, respectively, among healthcare workers at a private medical center in Saudi Arabia.<sup>15</sup> A comparison of anxiety trends from the onset of the pandemic to three years later indicates a transition from moderate and severe anxiety to a predominance of mild anxiety. Nevertheless, the current study identified a notable prevalence of mild anxiety among frontline workers and other personnel in COVID-19 wards. Upon examining anxiety symptoms, it was found that over half of the participants reported challenges in relaxing, as well as prolonged feelings of nervousness and anxiety. Additionally, more than one-third of the participants indicated experiencing increased irritability, persistent worry, and restlessness over several days. These findings indicate a trend towards lower anxiety levels; however, they also highlight the persistent presence of anxiety symptoms among frontline workers. The current research reveals that, similar to the observed trends in anxiety, mild depressive symptoms continue to be present among healthcare professionals, while rates of moderate depression have decreased and severe depression cases are absent. Previous studies conducted in March 2020 reported a higher prevalence of moderate to severe depressive symptoms, with a rate of 30% at the beginning of the pandemic.<sup>16,17</sup> Our findings suggest a transition from moderate and severe depressive states to a sustained experience of psychological distress characterized by milder symptoms. Additionally, consistent with other research, insomnia was found to be more severe.<sup>18</sup> Interestingly, while earlier studies indicated that female healthcare workers experienced higher levels of anxiety and depression, our results showed a greater prevalence of symptoms among male workers.<sup>19</sup> Moreover, individuals with extensive work experience exhibited a significant correlation with anxiety and depression symptoms during the COVID-19 pandemic. Although the present study witnessed a shift from moderate and severe levels to mild levels, there is evidence of the continued presence of anxiety and depression symptoms among healthcare professionals working in COVID-19 wards. A probable explanation to the shift could be post-traumatic growth, a mechanism of positive change following exposure to trauma. However, extensive research is required to establish the evidence. Policymakers must implement targeted strategies to support mental health and well-being during the ongoing pandemic, recognizing the various forms of psychological distress that frontline workers experience. Additionally, to mitigate the long-term psychological effects of the COVID-19 pandemic, it is crucial to prioritize equitable access to mental health services, foster resilience, and enhance mental health literacy.



## Limitations

The study contains several limitations. Measuring psychological impact using a self-administered questionnaire may introduce bias and increase self-reporting. The cross-sectional design and convenience sampling method may undermine the accuracy of the results. In addition, the cross-sectional design cannot establish the causal relation between the cause and the effect. The generalizability of results is limited as the data was collected from a single region (Northern). The gender distribution of the sample showed a predisposition towards males. The sample size was inadequate for larger generalizability. However, the findings provide valuable insights into the persistence of the psychological burden among the healthcare workers attending to COVID-19 patients.

## Conclusion

The research highlighted the persistence of symptoms of anxiety and depression among healthcare personnel at COVID-19 wards. The psychological well-being of these professionals is jeopardized and is at significant risk. This scenario necessitates prompt measures, underscoring the need for extensive interventions to tackle the mental health issues faced by frontline workers. Future research should document the current status of frontline workers from different regions of the country.

## Data Sharing Statement

Data will be made available upon request from the corresponding author.

## Informed Consent

Informed consent was obtained from all the study participants before data collection.

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## Disclosure

The authors report no conflicts of interest in this work.

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