

# MENTAL HEALTH STATUS AND JOB PERFORMANCE DURING COVID-19 PANDEMIC AMONG NURSES WORKING IN SECONDARY HEALTH FACILITIES IN IBADAN, NIGERIA

E. Isiek, Y.A. Olasunkanmi, F.I. Adeniji, D.A. Adewole, S. Bello

Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of Ibadan.

*Correspondence:*

**Dr. S. Bello**

Department of Epidemiology and Medical Statistics,  
Faculty of Public Health,  
College of Medicine,  
University of Ibadan  
Email: drsegunbello@yahoo.com

*Submission Date: 8th Jan., 2024*

*Date of Acceptance: 2nd July, 2024*

*Publication Date: 30th Aug., 2024*

## ABSTRACT

**Background:** The impact of the COVID-19 pandemic may not only affect the mental health of nurses, but may also affect nurses' job performance. The study was aimed at assessing the mental health status and job performance among nurses in secondary health facilities in Ibadan.

**Methods:** A cross-sectional study among 250 nurses in secondary health facilities in Ibadan, Nigeria. Generalized anxiety disorder, insomnia, depression, post-traumatic stress disorder (PTSD) and job performance were assessed using pre-tested standardized tools.

**Results:** About 34%, 17.2%, and 3.6% had mild, moderate, and severe anxiety, while 31%, 10.4%, and 6% experienced mild, moderate, and severe depression. Additionally, 12%, 2.4%, and 13.6% had mild, probable, and high PTSD. Job performance was significantly associated with marital status, anxiety, insomnia, depression, and PTSD symptoms ( $p < 0.001$ ).

**Conclusion:** This study highlights the need to prioritize the mental health of nurses in order to promote their efficiency.

**Keywords:** COVID-19 pandemic, Nurses, Mental health, Job performance, Public health emergency.

## BACKGROUND

Mental health is defined by the World Health Organization (WHO) as "a state of wellbeing in which every individual realizes his or her own potential, can work productively and fruitfully and is able to make a contribution to his or her community".<sup>1</sup> Mental ill health is an important and rising burden on public health globally and a key contributor to the overall increase in morbidity and disability.<sup>2</sup> As a result, the subject of mental health has continued to gain significance around the world. Since the World Health Organization pronounced COVID-19 a global pandemic on March 11, 2020, the focus has been on the disease transmission.<sup>3</sup> The impact of the pandemic on other spheres of life such as the psychological impact of the pandemic on affected individuals, the general population, and specific groups such as healthcare workers, may have been neglected.<sup>4</sup>

Evidence from previous pandemics, such as the severe acute respiratory syndrome (SARS) in 2003 and the Middle East Respiratory Syndrome (MERS) in 2009, suggests that disease outbreaks result in varying degrees of mental health disorders in both the general population and healthcare workers, particularly nurses.<sup>5,6</sup> For instance, during the peak of the SARS epidemic in Taiwan in 2003, nurses at a hospital caring for suspected cases had mental health issues.<sup>7</sup> Fear,

anxiety, depression, insomnia, exhaustion, and post-traumatic stress disorders (PTSD) were among the mental problems reported among healthcare workers during the MERS and SARS pandemics, majority of which are known to persist for a sustainable period, long after the pandemic.<sup>6,8</sup>

The prevalence of anxiety and depression among nurses during the COVID-19 outbreak has been reportedly high. Nurses were reported to experience the highest anxiety levels ranging from 15% to 92%.<sup>9,10</sup> A study conducted among nurses in an intensive care team reported 50.4% and 30.4% as the prevalence of depression and anxiety respectively.<sup>11</sup> Having a high level of anxiety has detrimental consequences, such as a loss of appetite, dizziness, sleep disturbances, and vomiting or nausea.<sup>12</sup> Higher anxiety levels were also linked to physical impairment, poor coping mechanisms (such as increased alcohol or drug consumption), stress and depression, and increased suicidal ideation.<sup>12</sup> Additionally, unmanaged anxiety may have long-term consequences for nurses' work performance and job satisfaction, resulting in frequent absenteeism and eventual turnover.<sup>13</sup>

Insomnia is currently recognized as one of the most serious public health issues.<sup>14</sup> This disorder has a

negative influence on the quality of life of millions of people around the world and leads to a drop in physical activity.<sup>15</sup> The sleep quality of nurses fighting COVID-19 was observed to be poor, with a prevalence of insomnia as high as 64.7% in Wuhan, China.<sup>16</sup> Nurses with insomnia are more anxious and depressed, and are less productive.<sup>17</sup> This decrease in nurses' productivity has irrevocable implications, with severe cases such as fatigue-related errors resulting in a patient's death.<sup>17</sup> Similarly, the nurses' roles in infection prevention, infection control, isolation, containment may result in a high degree of stress, which may heighten the risk of developing PTSD.<sup>18,19</sup> PTSD in turn may lead to burnout among nurses which is associated with an increase in sick leave, absenteeism, job withdrawal, and poor work performance,<sup>20,21</sup> thereby affecting the patient's health outcome and the health sector at large.<sup>22</sup>

The mental health disorders experienced by healthcare workers who are working during the COVID-19 pandemic, may have an impact on their job performance, affecting their concentration and decision-making abilities.<sup>23,24</sup> Healthcare workers with poor mental health might decrease the quality and quantity of job performance, resulting in poor clinical outcomes of patients.<sup>25</sup> Given the growing global pandemic evidence of nurses' mental health deterioration, it's critical to determine the prevalence of these mental health disorders. Hence, this study was aimed at examining the mental health disorders and job performance among nurses and to determine the association between mental health and job performance of nurses during the COVID-19 pandemic.

## **MATERIALS AND METHODS**

### *Study Design*

This was a cross sectional study conducted between March – November, 2021.

### *Study Area*

This study was conducted in Ibadan, the capital of Oyo State of Nigeria. Ibadan is located in the south-west part of Nigeria with a land size of over 500 km, a population of over 3 million people,<sup>26</sup> and 11 local government areas (LGAs). The study was conducted among nurses' in secondary health facilities in Ibadan. Eight out of the sixteen state owned secondary health facilities in Ibadan were involved in the study. These include Adeoyo Maternity Hospital Yemetu, Jericho Specialist Hospital, Oni Memorial Hospital, Ring-Road State Hospital, St Peters Aremo Maternity Hospital, Moniya General Hospital, Jericho Nursing Home and Head Quarter Oyo State Hospital Management Board/Secretariat clinic.

### *Study Population*

The target population for this study were nurses working in government owned secondary health facilities in Ibadan during the COVID-19 pandemic.

### *Sample Size Estimation*

Following the data obtained from the Department of Planning, Research and Statistics, Oyo State Ministry of Health, the number of registered nurses in secondary health facilities in Ibadan was 665.<sup>27</sup> This constituted the population of this study. Yamane's<sup>28</sup> approach was used to determine the sample size

### *Sampling Technique*

A systematic sampling technique was used for this study. First, eight out of the sixteen state-owned secondary health facilities in Ibadan Metropolis using simple random sampling by ballot. Proportional random sampling was used to determine the number of respondents to be selected from each of the prior selected health facilities. Proportional random sampling was further used to determine the number of respondents from different units/wards to be selected in each facility. Finally, simple random sampling by balloting was used to select the actual respondents from each unit/ward.

### *Inclusion Criteria*

Nurses who worked during the COVID-19 pandemic.

### *Exclusion Criteria*

Student and intern nurses.

### *Instrument for Data Collection*

The following questionnaire with previously validated assessment scales was adopted for this study. However, the section on socio-demographic characteristics were self-constructed by the investigators and included variables such as age, gender, marital status, level of education, religion, years of experience, units/department.

### *Anxiety*

The 7-item Generalized Anxiety Disorder (GAD-7) was used to measure generalized anxiety. The GAD-7 consists of 7 items and every item uses a four-point scale from 0 ('not at all'), 1 ('several days'), 2 ('nearly half the days'), 3 ('nearly every day'). Four levels of anxiety are divided: minimal (0– 4), mild (5– 9), moderate (10– 14) and severe (15– 21).<sup>29</sup>

### *Insomnia*

The Insomnia Severity Index (ISI) was used to assess the severity of insomnia. The score of ISI which records sleep outcome in the past 2 weeks was

categorised as no clinically significant insomnia (0–7), subthreshold insomnia (8–14), moderate clinical insomnia (15–21) and severe clinical insomnia (22–28).<sup>30</sup>

#### Depression

Depression was assessed with Patient Health Questionnaire- 9 (PHQ- 9)<sup>31</sup>. PHQ-9 consists of nine questions about feeling in the past 2 weeks. A score of 1–4 indicates minimal depression. A score of 5–9 indicates mild depression. A score of 10–14 indicates moderate depression. A score of 15–19 indicates moderately severe depression. A score of 20–27 indicates severe depression.<sup>31</sup>

#### Post Traumatic Disorder

Post-traumatic stress was assessed using the Impact of Event Scale- Revised version (IES-R).<sup>32</sup>

The IES-R is comprised of 22 items and each item is ranked from not at all (0 points), a little bit (1 point), moderately (2 points), quite a bit (3 points), to extremely (4 points). The scores for all items are then summed; a score of under 24 indicates no clinical concerns, 24 to 32 indicates the presence of some PTSD symptoms, 33–36 indicates a cut off for probable diagnosis of PTSD, and a score of more than 37 indicates significant symptoms.<sup>32</sup>

#### Job Performance

Work performance was evaluated using one item of the WHO Health and Work Performance Questionnaire (HPQ). Respondents were asked to rate their overall work performance over the past four weeks. Items are scored on an 11-point scale ranging from 0 (worst) to 10 (best). A high score indicates good work performance.<sup>33</sup>

#### Data Collection Techniques

The investigators distributed copies of the questionnaire to nurses in the selected health facilities and returned at an agreed date to pick up the completed questionnaire. Respondents were required to complete all the sections of the well-structured questionnaire adopted for this study.

#### Data Management and Analysis

Descriptive statistics was presented using frequency and proportions for categorical variable while continuous variables were presented using means and standard deviation. Association between the outcome variables and covariates such as socio-demographic characteristics were examined using a Chi square test for the categorized outcomes, while analysis of variance (ANOVA) and Independent t-test were used for the continuous outcome in other to determine the association between independent and dependent

variables at P-value<0.05. Statistical Package for Social Sciences (SPSS) Version 25.0 was used.

#### Ethical Consideration

Ethical approval was sought and obtained from the Oyo state Ministry of Health research ethics committee with ethical approval number AD 13/479/4384B. An informed consent form was attached to each questionnaire describing the objective and relevance of the study and included information of confidentiality, voluntary participation and the right to withdraw from the study at any time. Written informed consent was obtained by each study participant. Completed questionnaires were kept confidential in sealed envelopes. Questionnaires and consent sheets were only handled by the investigators and assistants during data collection and later stored in a locked cabinet, only accessible to the investigators during analysis. Questionnaires and consent forms are to be destroyed after thesis defense. All participants were informed that participation in this study was voluntary and that they could withdraw from the study at any time without and consequences.

## RESULTS

#### Socio-Demographic Characteristics

The mean age of the patients was  $38.7 \pm 10.5$  years. Out of the 275 participants initially included in the study, a total of 250 participants successfully completed the study. Therefore, the study achieved a response rate of 91%. Of the 250 participants 73 (29.2%) were between 40-49 years while 68 (27.2%) were aged 20-29 years. The majority (82%) of the participants were female, had tertiary education (78.8%) and were Christian (71.2%). About 66% of the participants were married, had between 1-10 years of work experience (44.4%) and were Nurse officer (40.8%) (Table 1).

#### Prevalence of Generalized Anxiety Disorder, Insomnia, Depression and PTSD

More than half of the study participants reported mild (34.4%), moderate (17.2%) or severe (3.6%) anxiety (Figure 1). Only two in five respondents had either subthreshold (27.6%), moderate (10%) or severe (1.2%) levels of insomnia (Figure 1). (Figure 3) describes the prevalence of depression among participants. About a third (30.8%) of respondents had mild, 10.4% had moderate while 6% had severe depression. In (Figure 4), the prevalence of post-traumatic disorder among participants was 28% which was further sub-grouped into clinical concern (11.6%), probable diagnosis (24%) and high enough to suppress immune system's functioning (13.6%) levels.

**Table 1:** Socio-demographic characteristics of respondents (n=250)

Variables	N	%
<b>Age</b>		
20-29	68	27.2
30-39	58	23.2
40-49	73	29.2
≥50	51	20.4
Mean±SD	38.73±10.5	
<b>Sex</b>		
Male	45	18
Female	205	82
<b>Education</b>		
Tertiary	197	78.8
Post-tertiary	53	21.2
<b>Religion</b>		
Christianity	178	71.2
Islam	70	28
Traditional	2	0.8
<b>Ethnicity</b>		
Yoruba	220	88
Others(Hausa/Igbo)	30	12
<b>Marital status</b>		
Single	76	30.4
Married	166	66.4
Divorce/Widow/Separated	8	3.2
<b>Years of Experience</b>		
1=10	111	44.4
11=20	73	29.2
≥21	66	26.4
Mean±SD	13.88±9.46	
<b>Current position</b>		
Nursing officer	102	40.8
Principal nursing officer	30	12
Senior nursing officer	50	20
Chief nursing officer	68	27.2

*Job Performance*

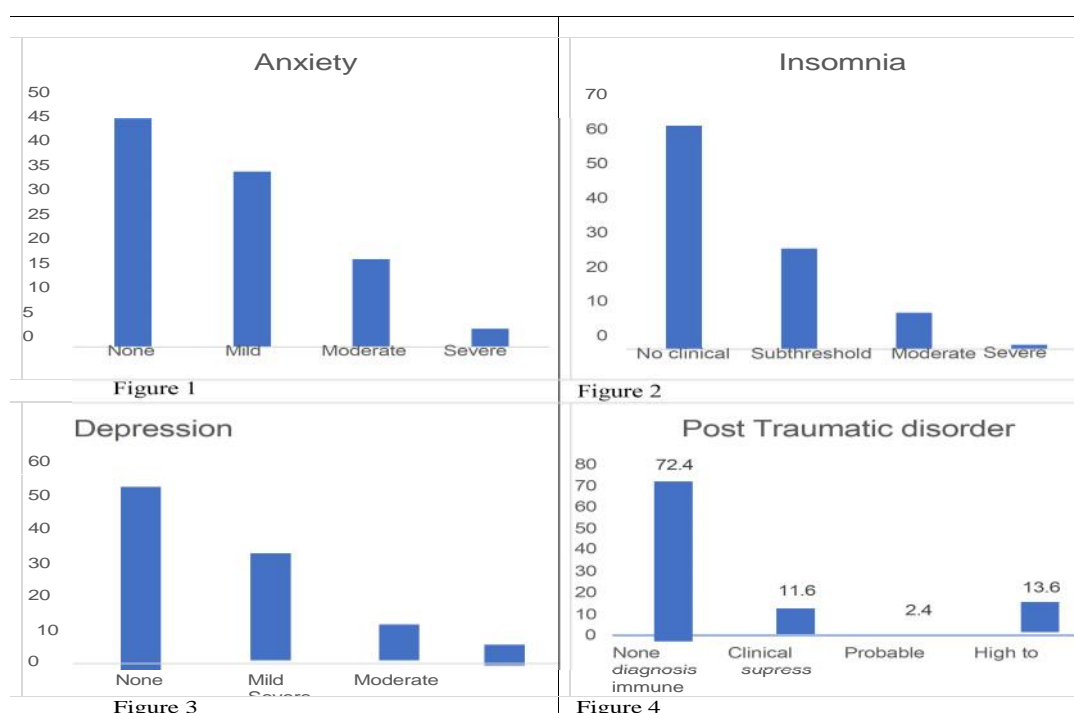
The mean job performance score of the respondents was 10.94±3.07. Although, more than half of the respondents viewed that there is no time their performance is lower than a co-worker. About 68% of the respondents engaged themselves with their work when they are supposed to. More than two-thirds of the respondents are usually careful when working. The majority (67%) of the respondents concentrate more on their work. More than half (55.6%) of the respondents did not have a limit on the work they do (Table 2).

*Association between Respondent Socio-demographic Characteristics and Anxiety level*

As presented in table 3, only sex (p = 0.006) and marital status (p = 0.001) were significantly associated with anxiety. While male sex was more likely to have severe anxiety (11.1% vs. 2.0%), female sex (19.5% vs. 6.7%). Single respondents were more likely to have mild, moderate or severe anxiety compared to married participants (Table 3).

*Association between Respondent Socio-demographic Characteristics and Insomnia Level*

As presented in table 4, age, (p = 0.006) marital status (p = 0.008) and religion (p = 0.001) were Significantly associated with insomnia. Participants who were single were more likely to have higher levels of subthreshold, moderate or severe insomnia compared to married participants (Table 4).



**Figure 1-4:** Distribution of anxiety, insomnia, depression and post-traumatic stress disorder among respondents



**Table 2:** Health and work performance of respondents (n=250)

	None of the time n (%)	A little of the time n (%)	Sometimes n (%)	Most of the time n (%)	All of the time n (%)
How often performance was higher than most workers	27 (10.8)	31 (12.4)	84 (33.6)	57 (22.8)	51 (20.4)
How often performance was lower than most workers	139 (55.6)	78 (31.2)	23 (9.2)	7 (2.8)	3 (1.2)
How often you did not work when you were supposed to be working	174 (69.6)	58 (23.2)	12 (4.8)	1 (0.4)	5 (2.0)
How often did you find yourself not working carefully as you should	152 (60.8)	71 (28.4)	19 (7.6)	6 (2.4)	2 (0.8)
How often did you not concentrate enough on your work?	169 (67.6)	57 (22.8)	15 (6.0)	6 (2.4)	3 (1.2)
How often did health limit the kind of work you could do	138 (55.2)	90 (36.0)	15 (6.0)	4 (1.6)	3 (1.2)

*Association between Respondent Socio-demographic Characteristics and Depression*

Several sociodemographic factors were found to be significantly associated with depression. Age ( $p =$

0.001), sex ( $p = 0.005$ ), marital status ( $p = 0.001$ ), length of working experience ( $p = 0.03$ ) and rank ( $p = 0.001$ ) were all significantly associated with depression (Table 5).

**Table 3:** Association between socio-demographic characteristics and anxiety (n=250)

Variables	None (%)	Mild (%)	Moderate (%)	Severe (%)	$\chi^2$	P-value
<b>Age</b>						
20-29	22(32.4%)	29(42.6%)	13(19.1%)	4(5.9%)	9.36	0.405
30-39	26(44.8%)	18(31%)	13(22.4%)	1(1.7%)		
40-49	39(53.4%)	22(30.1%)	10(13.7%)	2(2.7%)		
≥50	25(49%)	17(33.3%)	7(13.7%)	2(3.9%)		
<b>Sex</b>						
Male	20(44.4%)	17(37.8%)	3(6.7%)	5(11.1%)	12.32	0.006*
Female	92(44.9%)	69(33.7%)	40(19.5%)	4(2.0%)		
<b>Ethnicity</b>						
Yoruba	95(43.2%)	77(35%)	41(18.6%)	7(3.2%)	4.35	0.226
Others (Hausa/Igbo)	17(56.7%)	9(30%)	2(6.7%)	2(6.7%)		
<b>Marital status</b>						
Single	21(27.6%)	29(38.2%)	21(27.6%)	5(6.6%)	23.88	0.001*
Married	89(53.6%)	51(30.7%)	22(13.3%)	4(2.4%)		
Divorce/Widow/Separated	2(25%)	6(75%)	0(0%)	0(0%)		
<b>Religion</b>						
Christianity	80(44.9%)	62(34.8%)	29(16.3%)	7(3.9%)	9.99	0.129
Islam	32(45.7%)	24(34.3%)	12(17.1%)	2(2.9%)		
Traditional	0(0%)	0(0%)	2(100%)	0(0%)		
<b>Education</b>						
Tertiary	82(41.6%)	71(36%)	36(18.3%)	8(4.1%)	3.99	0.262
Post-tertiary	30(56.6%)	15(28.3%)	7(13.2%)	1(1.9%)		
<b>Years of Experience</b>						
1-10	48(43.2%)	40(36%)	18(16.2%)	5(4.5%)	0.99	0.986
11-20	33(45.2%)	24(32.9%)	14(19.2)	2(2.7%)		
≥21	31(47%)	22(33.3%)	11(16.7%)	2(3%)		
<b>Current position</b>						
Nursing officer	36(35.3%)	41(40.2%)	19(18.6%)	6(5.9%)	13.83	0.129
Principal nursing officer	12(40%)	13(43.3%)	4(13.3%)	1(3.3%)		
Senior nursing officer	28(56%)	11(22%)	11(22%)	0(0%)		
Chief nursing officer	36(52.9%)	21(30.9%)	9(13.2%)	2(2.9%)		

**Table 4:** Association between socio-demographic characteristics and insomnia (n=250)

Variables	None (%)	Subthreshold (%)	Moderate (%)	Severe (%)	$\chi^2$	P-value
<b>Age</b>						
20-29	41(60.3%)	18(26.5%)	8(11.8%)	1(1.5%)	22.96	0.006*
30-39	43(74.1%)	12(20.7%)	2(3.4%)	1(1.7%)		
40-49	42(57.5%)	28(38.4%)	3(4.1%)	0(0%)		
≥50	27(52.9%)	11(21.6%)	12(23.5%)	1(2%)		
<b>Sex</b>						
Male	25(55.6%)	14(31.1%)	4(8.9%)	2(4.4%)	5.41	0.144
Female	128(62.4%)	55(26.8%)	21(10.2%)	1(0.5%)		
<b>Ethnicity</b>						
Yoruba	136(61.8%)	61(27.7%)	21(9.5%)	2(0.9%)	1.8	0.616
Others (Hausa/Igbo)	17(56.7%)	8(26.7%)	4(13.3%)	1(3.3%)		
<b>Marital status</b>						
Single	41(53.9%)	23(30.3%)	10(13.2%)	2(2.6%)	17.23	0.008*
Married	108(65.1%)	45(27.1%)	13(7.8%)	0(0%)		
Divorce/Widow/Separated	4(50%)	1(12.5%)	2(25%)	1(12.5%)		
<b>Religion</b>						
Christianity	114(64%)	43(24.2%)	18(10.1%)	3(1.7%)	23.42	0.001*
Islam	39(55.7%)	26(37.1%)	5(7.1%)	0(0%)		
Traditional	0(0%)	0(0%)	2(100%)	0(0%)		
<b>Education</b>						
Tertiary	124(62.9%)	55(27.9%)	16(8.1%)	2(1%)	4.04	0.257
Post-tertiary	29(54.7%)	14(26.4%)	9(17%)	1(1.9%)		
<b>Years of Experience</b>						
1-10	74(66.7%)	27(24.3%)	9(8.1%)	1(0.9%)	12.02	0.062
11-20	45(61.6%)	24(32.9%)	3(4.1%)	1(1.4%)		
≥21	34(51.5%)	18(27.3%)	13(19.7%)	1(1.5%)		
<b>Current position</b>						
Nursing officer	61(59.8%)	29(28.4%)	10(9.8%)	2(2%)	6.34	0.705
Principal nursing officer	22(73.3%)	7(23.3%)	1(3.3%)	0(0%)		
Senior nursing officer	33(66%)	13(26%)	4(8%)	0(0%)		
Chief nursing officer	37(54.4%)	20(29.4%)	10(14.7%)	1(1.5%)		

**Table 5:** Association between socio-demographic characteristics and depression (n=250)

Variables	None(%)	Mild(%)	Moderate(%)	Severe (%)	$\chi^2$	P-value
<b>Age</b>						
20-29	23(33.8%)	24(35.3%)	10(14.7%)	11(16.2%)	29.06	0.001*
30-39	35(60.3%)	17(29.3%)	4(6.9%)	2(3.4%)		
40-49	47(64.4%)	21(28.8%)	4(5.5%)	1(1.4%)		
≥50	27(52.9%)	15(29.4%)	8(15.7%)	1(2%)		
<b>Sex</b>						
Male	17(37.8%)	14(31.1%)	11(24.4%)	3(6.7%)	12.8	0.005*
Female	115(56.1%)	63(30.7%)	15(7.3%)	12(5.9%)		
<b>Ethnicity</b>						
Yoruba	119(54.1%)	65(29.5%)	22(10%)	14(6.4%)	2.2	0.532
Others (Hausa/Igbo)	13(43.3%)	12(40%)	4(13.3%)	1(3.3%)		
<b>Marital status</b>						
Single	24(31.6%)	26(34.2%)	14(18.4%)	12(15.8%)	39.95	0.001*
Married	106(63.9%)	47(28.3%)	10(6%)	3(1.8%)		
Divorce/Widow/Separated	2(25%)	4(50%)	2(25%)	0(0%)		
<b>Religion</b>						
Christianity	98(55.1%)	51(28.7%)	19(10.7%)	10(5.6%)	6.09	0.413
Islam	34(48.6%)	25(35.7%)	6(8.6%)	5(7.1%)		
Traditional	0(0%)	1(50%)	1(50%)	0(0%)		
<b>Education</b>						
Tertiary	103(52.3%)	61(31%)	21(10.7%)	12(6.1%)	0.13	0.988
Post-tertiary	29(54.7%)	16(30.2%)	5(9.4%)	3(5.7%)		
<b>Years of Experience</b>						
1-10	50(45%)	36(32.4%)	13(11.7%)	12(10.8%)	13.99	0.03*
11-20	48(65.8%)	18(24.7%)	5(6.8%)	2(2.7%)		
≥21	34(51.5%)	23(34.8%)	8(12.1%)	1(1.5%)		
<b>Current position</b>						
Nursing officer	40(39.2%)	35(34.3%)	14(13.7%)	13(12.7%)	28.41	0.001*
Principal nursing officer	23(76.7%)	6(20%)	0(0%)	1(3.3%)		
Senior nursing officer	31(62%)	16(32%)	3(6%)	0(0%)		
Chief nursing officer	38(55.9%)	20(29.4%)	9(13.2%)	1(1.5%)		

**Table 6:** Association between socio-demographic characteristics and PTSD (n=250)

Variables	none	clinical	probable diagnosis	high	$\chi^2$	P-value
Age						
20-29	46(67.6%)	13(19.1%)	1(1.5%)	8(11.8%)	12.66	0.178
30-39	48(82.8%)	4(6.9%)	1(1.7%)	5(8.6%)		
40-49	53(72.6%)	8(11%)	3(4.1%)	9(12.3%)		
≥50	34(66.7%)	4(7.8%)	1(2%)	12(23.5%)		
Sex						
Male	30(66.7%)	8(17.8%)	0(0%)	7(15.6%)	3.53	0.317
Female	151(73.7%)	21(10.2%)	6(2.9%)	27(13.2%)		
Ethnicity						
Yoruba	161(73.2%)	26(11.8%)	5(2.3%)	28(12.7%)	1.38	0.71
Others (Hausa/Igbo)	20(66.7%)	3(10%)	1(3.3%)	6(20%)		
Marital status						
Single	48(63.2%)	12(15.8%)	1(1.3%)	15(19.7%)	17.7	0.007*
Married	129(77.7%)	17(10.2%)	5(3%)	15(9%)		
Divorce/Widow/Separated	4(50%)	0(0%)	0(0%)	4(50%)		
Religion						
Christianity	132(74.2%)	20(11.2%)	5(2.8%)	21(11.8%)	14.01	0.03*
Islam	49(70%)	9(12.9%)	1(1.4%)	11(15.7%)		
Traditional	0(0%)	0(0%)	0(0%)	2(100%)		
Education						
Tertiary	146(74.1%)	24(12.2%)	5(2.5%)	22(11.2%)	4.77	0.19
Post-tertiary	35(66%)	5(9.4%)	1(1.9%)	12(22.6%)		
Years of Experience						
1-10	83(74.8%)	16(14.4%)	2(1.8%)	10(9%)	10.81	0.094
11-20	57(78.1%)	6(8.2%)	2(2.7%)	8(11%)		
≥21	41(62.1%)	7(10.6%)	2(3%)	16(24.2%)		
Current position						
Nursing officer	71(69.6%)	15(14.7%)	2(2%)	14(13.7%)	7.15	0.622
Principal nursing officer	23(76.7%)	4(13.3%)	0(0%)	3(10%)		
Senior nursing officer	41(82%)	2(4%)	1(2%)	6(12%)		
Chief nursing officer	46(67.6%)	8(11.8%)	3(4.4%)	11(16.2%)		

\* Statistically significant ( $p < 0.05$ )**Table 7a:** Association between mental health and job performance

Variables	Mean ±SD	Test statistics	P-value
<b>Age</b>			
20-29	11.62±3.42	1.506	0.214
30-39	10.78±3.46		
40-49	10.64±2.31		
≥50	10.69±3.04		
<b>Sex</b>			
Male	10.44±2.45	-1.21	0.226
Female	11.05±3.19		
<b>Ethnicity</b>			
Yoruba	10.92±2.90	-0.351	0.726
Others(Hausa/Igbo)	11.13±4.21		
<b>Marital status</b>			
Single	11.67±3.34	3.13	0.045*
Married	10.61±2.89		
Divorce/Widow/Separated	11±3.30		
<b>Religion</b>			
Christianity	10.97±3.20	0.5	0.606
Islam	10.83±2.77		
Traditional	13.00±2.82		
<b>Education</b>			
Tertiary	10.99±3.04	0.41	0.679
Post-tertiary	10.79±3.22		
<b>Years of Experience</b>			
1=10	10.89±3.11	0.1	0.907
11=20	11.08±3.42		
≥21	10.89±2.61		
<b>Current position</b>			
Nursing officer	11.25±3.14	1.71	0.165
Principal nursing officer	11.27±4.29		
Senior nursing officer	10.10±2.40		
Chief nursing officer	10.99±2.72		
<b>Anxiety</b>			
None	10.39±3.40	4.83	0.003*
Mild	11.00±2.53		
Moderate	11.70±2.63		
Severe	13.78±3.67		

\* Statistically significant ( $p < 0.05$ )

**Table 7b:** Association between mental health and job performance

Variables	Mean $\pm$ SD	Test statistics	P -value
<b>Insomnia</b>			
No clinical	10.29 $\pm$ 2.90	13.09	0.001*
Subthreshold	11.17 $\pm$ 2.78		
Moderate	13.92 $\pm$ 2.97		
Severe	14.33 $\pm$ 3.06		
<b>Depression</b>			
None	10.54 $\pm$ 3.13	14.3	0.001*
Mild	10.52 $\pm$ 2.32		
Moderate	11.73 $\pm$ 2.47		
Moderately severe	15.40 $\pm$ 3.40		
Severe	10.94 $\pm$ 3.07		
<b>Post traumatic disorder</b>			
None	10.23 $\pm$ 2.80	14.2	0.001*
Clinical	12.41 $\pm$ 2.88		
Probable diagnosis	12.50 $\pm$ 4.09		
High to suppress immune	13.24 $\pm$ 2.93		

\* Statistically significant ( $p < 0.05$ )

**Table 8:** Factors influencing the respondent job performance during COVID-19 pandemic

Variables	aOR	95%CI	P-value
<b>Traumatic</b>			
None(ref)	1		
Clinical	3.72	1.54-9.04	0.004*
Probable diagnosis	6.01	0.99-36.29	0.05*
High to suppress immune	3.72	1.37-10.09	0.010*
<b>Depression</b>			
None(ref)	1		
Mild	0.92	0.46-1.84	0.821
Moderate	1.23	0.42-3.59	0.707
Severe	3.53	0.81-15.31	0.092
<b>Insomnia</b>			
No clinical (ref)	1		
Subthreshold	1.61	0.81-3.20	0.169
Moderate	2.18	0.67-7.10	0.195
Severe	3.05	0.19-47.67	0.426

\* Statistically significant ( $p < 0.05$ )

#### *Association between Respondent Socio-demographic Characteristics and PTSD (n=250)*

As was found with insomnia, both marital status ( $p = 0.007$ ) and religion ( $p = 0.03$ ) were significantly associated with PTSD (Table 6).

#### *Association between Mental Health and Job Performance*

As presented in (Table 7b), Insomnia was observed to be significantly associated with job performance at  $p=0.000$ . Furthermore, depression and post-traumatic disorder were observed to be significantly associated with job performance at  $p=0.000$  and  $p=0.000$  respectively (Table 7b).

#### *Factors influencing the respondents job performance during COVID-19 vaccine among respondents.*

As presented in table 8, the factor influencing the job performance of respondents during COVID-19

pandemic. The factors modelled were controlled for confounder, respondents with clinical trauma (aOR=3.72,  $p=0.004$ , CI: 1.54-9.04), probable diagnosis of trauma (aOR=6.01,  $p=0.05$ , CI:0.99-36.29) and high to suppress immune trauma (aOR=3.72,  $p=0.01$ , CI: 1.37-10.09) are more likely to have poor job performance compared to those without any form of trauma (Table 8).

#### **DISCUSSION**

This study assessed the prevalence of generalized anxiety, insomnia, depression, and PTSD as well as the association between these mental health conditions and job performance during the COVID-19 pandemic among nurses in secondary health facilities in Ibadan metropolis. The prevalence of mild, moderate, and severe anxiety reported in this study is comparable to that reported in a similar study conducted in China

among nurses.<sup>34</sup> The study reported that the incidence rates of depression and anxiety were 34.3% and 18.1, respectively<sup>34</sup>, which is within the same range as that reported in this study. However, previous studies<sup>35–37</sup>, reported lower prevalence rates while some have also reported higher rates<sup>18,38,39</sup>, compared to what is reported in this study. Generally, most of the studies conducted among nurses during the first wave of the pandemic reported higher prevalence rates of anxiety. The differences in the prevalence rates reported in the cited studies may be due to differences in the times when the studies were conducted and how this relates to the stage of the pandemic. For instance, the prevalence and incidence of anxiety and depression are likely to be higher during the peak of the pandemic when very little was known about the origin, spread, fatality rate and control of COVID-19. Also, during that period healthcare professionals were working under pressure due to the high number of infected persons. Nonetheless, variables such as the magnitude of the COVID-19 pandemic (in terms of the number of cases reported and fatality), the knowledge and experience of nurses, the level of expertise and study settings may be important in explaining the variations in the prevalence rates reported in different studies. Furthermore, findings in this study showed that nurses experienced poor sleep during the COVID-19 pandemic. However, it was observed that the prevalence of insomnia was low among nurses as about 60% of them reported not having the condition. Meanwhile, an earlier study by Huang *et.al.* reported that the increased workload on nurses occasioned by the COVID-19 pandemic, especially during the first wave, led to a significant increase in the prevalence of insomnia in that nurses were predisposed to poor sleep due to the COVID-19 situation<sup>40</sup> In comparison, the low prevalence of insomnia reported in our study may be attributed to the relatively low number of COVID-19 cases reported in Nigeria especially when compared to the situation in developed countries. Similarly, the prevalence of depression among nurses was higher in previous studies<sup>41,42</sup> compared to that obtained in this study. However, a lower prevalence, 8.9%, of depression was found among nurses during the COVID-19 pandemic which was attributed to improved mental preparedness and the rigorous infection control measure.<sup>43</sup>

In addition, some important characteristics of the reviewed studies differ, which might have had an impact on the prevalence of the anxiety, depression and some other mental health conditions reported the studies. Some of these characteristics include factors related to study sample size, study instrument as well as the perceived risk of working in certain wards/units. Similarly, extreme psychological reactions tend

to occur during the severe epidemic stage among nurses working in critical units such as the COVID-19 ward and ICU.<sup>44,45</sup> Also, increased risk perception especially among nurses who were in contact with suspected or confirmed cases may elicit higher psychological reactions such as depression and other conditions.<sup>46</sup> Even under normal conditions, nurses are one of the healthcare professionals most at risk of developing PTSD.<sup>47</sup> The result of this study revealed that 13.6% of respondents had significant symptoms of PTSD, a finding that was corroborated by a previous study.<sup>48</sup> On the other hand, higher results were obtained among nurses in a high-risk hospital during the pandemic.<sup>49</sup> Even though PTSD may take months to develop, if left untreated can last up to ten years.<sup>50</sup>

Several risk factors have been associated with anxiety among nurses. Being a woman, being younger, being married, having a family, and having other responsibilities such as children all contribute to a higher level of anxiety among nurses.<sup>51,52</sup> Findings in this study showed that being female was independently associated with more severe anxiety. This finding has also been confirmed in the literature. According to Etheridge and Spantig, females are more likely to report worse mental health than males in terms of the impact of the COVID-19 pandemic on mental health.<sup>53</sup> Also, a significant association was observed between marital status and anxiety with unmarried nurses reporting more severe anxiety than those who were married. This finding is supported by findings in earlier studies.<sup>51,52</sup> Furthermore, a statistically significant association was found between age, marital status, and insomnia with younger nurses experiencing poor sleep relative to older ones. In the Etheridge and Spantig study, younger women were also reported to have a decline in wellbeing during the pandemic compared to those who are older. Also, a similar association among older women especially women before, and after menopause has been reported.<sup>54</sup> In the current study, single nurses experienced higher insomnia than their married counterparts. This can be attributed to the social support system often enjoyed by those who are married, especially from their spouses.

Furthermore, this study found a significant association between gender, age, and depression. This association has been reported in a similar study.<sup>51</sup> Also, we found significant associations between nurses' years of experience, current position, and depression which is consistent with the findings of a previous research conducted to investigate the factors associated with depression, anxiety and the level of stress experienced among physicians.<sup>55</sup> Also, previous studies have reported that nurses' lack of experience in dealing with an infectious disease outbreak may predispose them

to a higher risk of being depressed<sup>46,56</sup>. Earlier studies reported that women were more vulnerable to PTSD than men and those in the younger age group and with less professional experience were at a higher risk of experiencing PTSD<sup>14,37,57</sup> but none of these findings were validated in the current study. However, in this study marital status was significantly associated with PTSD. Similarly, in a case-control study among healthcare workers fighting the COVID-19 pandemic it was reported that unmarried, divorced, or widowed healthcare workers reported higher scores for PTSD than the unmarried<sup>58</sup>. This finding suggest that married people may have stronger social support networks which could potentially buffer against the development or the severity of PTSD compared to unmarried individuals. Religion was also significant associated with PTSD among the nurses. The association between religion and PTSD implies that religious beliefs, practices and support systems may play significant role in mitigating or exacerbating the risk of developing PTSD. Religious coping strategies such as seeking solace in faith or participating in religious rituals may provide individuals with resilience against traumatic experiences and subsequent psychological distress. In essence, the evidence provided in this study as well as that reported in earlier studies, point to the need to pay attention to the mental health of nurses and indeed, other healthcare workers. As such, necessary professional support should be provided in such a way that helps healthcare workers to cope with demands of their jobs.

Regarding the job performance of the nurses, only a few had poor job performance. Previous studies reported high reduction in job performance attributed to the mental and job-related stress experienced during the pandemic.<sup>59,60</sup> Studies that reported poorer job performance were conducted in high-risk settings and countries with higher numbers of confirmed COVID-19 cases resulting in higher workload and mental exhaustion.<sup>34</sup> On the other hand, Nigeria had fewer confirmed cases of COVID-19 which may equal less workload and emotional fatigue hence, the low impact on the job performance of the nurses. Furthermore, this study found significant associations between the occurrence of mental health disorders (anxiety, insomnia, depression, and PTSD) and job performance. Similar to the findings of in the current study, anxiety, depression, and PTSD were reported to be significantly associated with lower job performance among healthcare workers in an earlier study<sup>61</sup>. These findings suggest that nurses experiencing insomnia, depression and PTSD may have impaired job performance. These mental health conditions can lead to difficulties in concentration, decision-making, and task execution, ultimately affecting the quality and efficiency of patient care delivery. Similarly, health

facilities may experience negative consequences such as increased absenteeism, turnover rates and clinical errors when nurses job performance is affected by their mental health conditions. Apart from mental health, other factors that affect job performance during a pandemic include inadequate support, occupational stress, workplace preparedness, financial concerns associated with income and daily living, fear of transmission, burnout, and fatigue.<sup>62</sup> In contrast, no statistically significant correlation between the mental health and the mean score of job performance was found in another research.<sup>63</sup> This was attributed to nurses' internal efforts to deal with the crisis, as well as external encouragement from organizations and the community's positive view of nurses' performance during the crisis.<sup>63</sup> Overall, these findings underscore the importance of prioritizing the mental health of nurses as well as healthcare workers' in general, providing resources to support and promote a healthy and productive work environment at all times particularly during pandemics.

#### **Contribution to Literature**

- This study offers a crucial quantitative evaluation of nurses' mental health during a public health crisis in a low-income country, addressing a notable gap in the literature that has primarily focused on high-income countries, providing valuable insights into the African context.
- The research not only assesses mental health but also explores its impact on job performance among nurses, revealing a significant correlation between mental health issues (anxiety, insomnia, depression, and PTSD) and job performance, which has practical implications for healthcare administrators and policymakers aiming to enhance support for healthcare workers.
- This study, focused on nurses in secondary health facilities in Ibadan, Nigeria, offers a localized perspective on the variable impact of the COVID-19 pandemic across different regions and healthcare settings, underlining the importance of tailored interventions and support systems for healthcare workers and advocating for prioritized mental health support to bolster healthcare system efficiency.

#### **CONCLUSION**

This study assessed the prevalence of anxiety, insomnia, depression, and PTSD among nurses in secondary health facilities in Ibadan as well their job performance during the COVID-19 pandemic. Most of the nurses had moderate to severe anxiety, insomnia, and depression with a few severe cases. A few nurses had significant symptoms of PTSD. More than half of the nurses had moderate job performance. Anxiety, insomnia, depression, and PTSD were significantly associated with sociodemographic characteristics such

as age, gender, marital status, and years of experience. Also, the mental health condition of nurses was associated with their job performance. Hence, the mental health of nurses should be prioritized. Interventions to address psychological effects of the pandemic on nurses are crucial for improving their job performance.

### Study Limitation

This study had some limitations. The analyses in the current study were based on a cross-sectional design, and thus do not confirm causality, hence the study could not specifically determine whether poor mental health precedes poor job performance and vice versa. Since the study focused on nurses in secondary health facilities, the results may not be generalized to nurses in tertiary, primary, and private health facilities. Also, since there was no data on the mental health of nurses before the pandemic, it could not be determined whether the prevalence of mental health disorders reported in this study increased or decreased as a result of the pandemic.

### REFERENCES

1. World Health Organization. Out of the shadows: making mental health a global development priority. 2021. [http://www.who.int/mental\\_health/advocacy/WB\\_event](http://www.who.int/mental_health/advocacy/WB_event)
2. **Vigo D**, Thornicroft G, Atun R. Estimating the true global burden of mental illness. *The Lancet Psychiat*. 2016;3(2):171-178.
3. **Jose S**, Dhandapani M, Cyriac MC. Burnout and resilience among frontline nurses during COVID-19 pandemic: A cross-sectional study in the emergency department of a tertiary care center, North India. *Indian journal of critical care medicine: peer-reviewed, official publication of Indian Society of Critical Care Medicine*. 2020;24(11):1081.
4. **Torales J**, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int. J. Soc. Psychiatry*. 2020;66(4):317-320.
5. **O'sullivan TL**, Amaratunga CA, Hardt J, *et al*. Are we ready? Evidence of support mechanisms for Canadian health care workers in multi-jurisdictional emergency planning. *Can. J. Public Health*. 2007;98:358-363.
6. **Waterman S**, Hunter EC, Cole CL, *et al*. Training peers to treat Ebola centre workers with anxiety and depression in Sierra Leone. *Int. J. Soc. Psychiatry*. 2018 Mar;64(2):156-165.
7. **Chen WK**, Cheng YC, Chung YT, Lin CC. The impact of the SARS outbreak on an urban emergency department in Taiwan. *Medical care*. 2005;1:168-72. <https://www.jstor.org/stable/3768267>
8. **Maunder R**. The experience of the 2003 SARS outbreak as a traumatic stress among frontline healthcare workers in Toronto: lessons learned. *Philos. Trans. R. Soc. Lond., B, Biol. Sci. PHILoS T R SOC B*2004;359(1447):1117-1125.
9. **Alwani SS**, Majeed MM, Hirwani MZ, *et al*. Evaluation of knowledge, practices, attitude and anxiety of Pakistan's nurses towards COVID-19 during the current outbreak in Pakistan. *MedRxiv*. 2020.
10. **Pappa S**, Ntella V, Giannakas T, *et al*. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav. Immun*. 2020;88:901-7. <https://www.sciencedirect.com/science/article/pii/S088915912030845X>
11. **Azoulay E**, Cariou A, Bruneel F, *et al*. Symptoms of anxiety, depression, and peritraumatic dissociation in critical care clinicians managing patients with COVID-19. A cross-sectional study. *Am J Respir Crit Care Med*. 2020;202(10):1388-1398.
12. **Lee JY**, Hong JH, Park EY. Beyond the fear: Nurses' experiences caring for patients with Middle East respiratory syndrome: A phenomenological study. *J. Clin. Nurs*. 2020;(17-18):3349-3362.
13. **Labrague LJ**, de Los Santos JA. Fear of Covid 19, psychological distress, work satisfaction and turnover intention among frontline nurses. *J. Nurs. Manag*. 2021;(3):395-403.
14. **Zhan Y**, Liu Y, Liu H, *et al*. Factors associated with insomnia among Chinese front line nurses fighting against COVID 19 in Wuhan: A cross sectional survey. *J. Nurs. Manag*. 2020;(7):1525-1535.
15. **Kousloglou SA**, Mouzas OD, Bonotis K, *et al*. Insomnia and burnout in Greek Nurses. *Hippokratia*. 2014; 18(2):150. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4201402/>
16. **Wu F**, Zhao S, Yu B, *et al*. A new coronavirus associated with human respiratory disease in China. *Nature*. 2020; 579 (7798):265-269.
17. **Salari N**, Khazaie H, Hosseini-Far A, *et al*. The prevalence of sleep disturbances among physicians and nurses facing the COVID-19 patients: a systematic review and meta-analysis. *Glob. Health*. 2020;16:1-4.
18. **Li X**, Zhou Y, Xu X. Factors associated with the psychological well being among front line nurses exposed to COVID 2019 in China: A predictive study. *Journal of nursing management*. 2021;29(2):240-249.

19. **Mo Y**, Deng L, Zhang L, *et al.* Work stress among Chinese nurses to support Wuhan in fighting against COVID 19 epidemic. *J. Nurs. Manag.* 2020;28(5):1002-1009.
20. **Giusti EM**, Pedroli E, D'Aniello GE, *et al.* The psychological impact of the COVID-19 outbreak on health professionals: a cross-sectional study. *Front. Psychol.* 2020;11:1684.
21. **Salvagioni DA**, Melanda FN, Mesas AE, *et al.* Physical, psychological and occupational consequences of job burnout: A systematic review of prospective studies. *PloS one.* 2017;12(10): e0185781.
22. **Khatun MF**, Parvin MF, Rashid MM, *et al.* Mental health of physicians during COVID-19 outbreak in Bangladesh: a web-based cross-sectional survey. *Front. Public Health.* 2021;9:592058.
23. **dos Santos C.F.**, Picó-Pérez M. and Morgado P. 2020. COVID-19 and Mental Health—What Do We Know So Far? *Front. Psychiatry.* 2020;11: 565698.
24. **Kang L**, Ma S, Chen M, *et al.* Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain Behav. Immun.* 2020;87:11-17.
25. **Kotera Y**, Ozaki A, Miyatake H, *et al.* Mental health of medical workers in Japan during COVID-19: Relationships with loneliness, hope and self-compassion. *Curr Psychol.* 2021;1-4.
26. **Ilesanmi OS**, Adebisi AO, Fatiregun AA. Contribution of household health care expenditure to poverty in Oyo State, South West Nigeria: A rural and urban comparison. *J. Health Manag.* 2017;4(3):64-70.
27. Oyo State Hospital Management Board. 2021. Secondary Hospitals and healthcare workers in Oyo State, Nigeria.
28. **Yamane T.** Statistics, An Introductory Analysis, 2nd Ed., New York: Harper and Row.1967
29. **Spitzer RL**, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch. Intern. Med.* 2006 May 22;166(10):1092-1097.
30. **Bastien CH**, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Med* 2001; 2(4):297-307.
31. **Kroenke K**, Spitzer RL, Williams JB. The PHQ 9: validity of a brief depression severity measure. *J. Gen. Intern. Med.* 2001;16(9):606-613.
32. **Creamer T.L.** Secondary trauma and coping processes among disaster mental health workers responding to the September 11th attacks. Auburn University.2002
33. **Kawakami N**, Inoue A, Tsuchiya M, *et al.* Construct validity and test-retest reliability of the World Mental Health Japan version of the World Health Organization Health and Work Performance Questionnaire Short Version: a preliminary study. *Ind. Health.* 2020;58(4):375-387.
34. **Zheng R**, Zhou Y, Fu Y, *et al.* Prevalence and associated factors of depression and anxiety among nurses during the outbreak of COVID-19 in China: A cross-sectional study. *Int. J. Nurs. Stud.* 2021;114:103809 .
35. **Arafa A**, Mohammed Z, Mahmoud O, Elshazley M, Ewis A. Depressed, anxious, and stressed: What have healthcare workers on the frontlines in Egypt and Saudi Arabia experienced during the COVID-19 pandemic? *J. Affect. Disord.* 2021;278 :365-371.
36. **Li LQ**, Huang T, Wang YQ, *et al.* COVID 19 patients' clinical characteristics, discharge rate, and fatality rate of meta analysis. *J. Med. Virol.* 2020; 92(6):577-583.
37. **Wang QQ**, Fang YY, Huang HL, *et al.* Anxiety, depression and cognitive emotion regulation strategies in Chinese nurses during the COVID 19 outbreak. *J. Nurs. Manag.* 2021;29(5):1263-1274.
38. **Aly HM**, Nemr NA, Kishk RM, bakr Elsaid NM. Stress, anxiety and depression among healthcare workers facing COVID-19 pandemic in Egypt: a cross-sectional online-based study. *BMJ open.* 2021;11(4):e045281.
39. **Salari N**, Khazaie H, Hosseinian-Far A, *et al.* The prevalence of sleep disturbances among physicians and nurses facing the COVID-19 patients: a systematic review and meta-analysis. *Glob. Health.* 2020;1-4.
40. **Huang Y**, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry Res.* 2020;288: 112954.
41. **Al-Amer R**, Malak MZ, Aburumman G, *et al.* Prevalence and correlates of psychological reactions among Jordanian nurses during the coronavirus disease 2019 pandemic.
42. **Luceño-Moreno L**, Talavera-Velasco B, García-Albuérne Y, Martín-García J. Symptoms of posttraumatic stress, anxiety, depression, levels of resilience and burnout in Spanish health personnel during the COVID-19 pandemic. *Int. J. Environ. Res. Public Health* 2020;17(15):5514.
43. **Tan W**, Hao F, McIntyre RS, *et al.* Is returning to work during the COVID-19 pandemic stressful? A study on immediate mental health status and psychoneuroimmunity prevention measures of Chinese workforce. *Brain Behav. Immun.* 2020;87:84-92.



44. **Huang Y**, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry Res.* 2020;288: 112954.
45. **Keubo FR**, Mboua PC, Tadongfack TD, *et al.* Psychological distress among health care professionals of the three COVID-19 most affected Regions in Cameroon: Prevalence and associated factors. In *Annales Médico-psychologiques, revue psychiatrique* 2021;(179)2,141-146). Elsevier Masson.
46. **Pang Y**, Fang H, Li L, *et al.* Predictive factors of anxiety and depression among nurses fighting coronavirus disease 2019 in China. *Int J Ment Health Nurs.* 2021;30(2):524-532.
47. **Marcomini I**, Agus C, Milani L, *et al.* COVID-19 and post-traumatic stress disorder among nurses: A descriptive cross-sectional study in a COVID hospital. *La Medicina del lavoro.* 2021;112(3):241.
48. **Qutishat M**, Sharour LA, Al-Dameery K, *et al.* COVID-19–Related Posttraumatic Stress Disorder Among Jordanian Nurses During the Pandemic. *Disaster Med. Public Health Prep.* 2022;16(6):2552-2559.
49. **Rodriguez RM**, Montoy JC, Hoth KF, *et al.* Symptoms of anxiety, burnout, and PTSD and the mitigation effect of serologic testing in emergency department personnel during the COVID-19 pandemic. *Ann Emerg Med.* 2021; 78(1):35-43.
50. **Smith JR**, Workneh A, Yaya S. Barriers and facilitators to help seeking for individuals with posttraumatic stress disorder: A systematic review. *J. Trauma. Stress.* 2020;;33(2):137-150.
51. **Varghese A**, George G, Kondaguli SV, *et al.* Decline in the mental health of nurses across the globe during COVID-19: A systematic review and meta-analysis. *J. Glob. Health.* 2021;11. <https://www.ncbi.nlm.nih.gov/pmc/articles/pmc8053406/>
52. **Aly HM**, Nemr NA, Kishk RM, bakr Elsaid NM. Stress, anxiety and depression among healthcare workers facing COVID-19 pandemic in Egypt: a cross-sectional online-based study. *BMJ open.* 2021;11(4):e045281.
53. **Etheridge B**, Spantig L. The gender gap in mental well-being during the COVID-19 outbreak: evidence from the UK. ISER Working paper series; 2020.<http://hdl.handle.net/10419/227789>
54. **Drake CL**, Pillai V, Roth T. Stress and sleep reactivity: a prospective investigation of the stress-diathesis model of insomnia. *Sleep.* 2014;37(8): 1295-304.
55. **Elbay RY**, Kurtulmuş A, Arpacıođlu S, Karadere E. Depression, anxiety, stress levels of physicians and associated factors in COVID-19 pandemics. *Psychiatry Res.*2020; 290:113130.
56. **Kim-Godwin YS**, Lee MH, Logan JG, Liu X. Factors influencing sleep quality among female staff nurses during the early COVID-19 pandemic in the United States. *Int. J. Environ. Res. Public Health.* 2021;18(9):4827.
57. **Bassi M**, Negri L, Delle Fave A, Accardi R. The relationship between post-traumatic stress and positive mental health symptoms among health workers during COVID-19 pandemic in Lombardy, Italy. *J. Affect. Disord.* 2021;280:1-6.
58. **Lai J**, Ma S, Wang Y, *et al.* Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw. Open.* 2020;3(3):e20 3976
59. **Brooks SK**, Webster RK, Smith LE, *et al.* The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The lancet.* 2020; 395 (10227):912-920.
60. **Hossain MM**, Sultana A, Purohit N. Mental health outcomes of quarantine and isolation for infection prevention: a systematic umbrella review of the global evidence. *Epidemiol Health.* 2020;42.
61. **Barello S**, Caruso R, Palamenghi L, *et al.* Factors associated with emotional exhaustion in healthcare professionals involved in the COVID-19 pandemic: an application of the job demands-resources model. *Int Arch Occup Environ Health.* 2021;1-1. <https://doi.org/10.1007/s00420-021-01669-z>
62. **Nowrouzi-Kia B**, Sithampanathan G, Nadesar N, *et al.* Factors associated with work performance and mental health of healthcare workers during pandemics: a systematic review and meta-analysis. *J Public Health.* 2022;44(4):731-739.
63. **Pourteimour S**, Yaghmaei S, Babamohamadi H. The relationship between mental workload and job performance among Iranian nurses providing care to COVID 19 patients: A cross sectional study. *J. Nurs. Manag.* 2021;29(6):1723-1732.