Factors Associated with Prevalence of Posttraumatic Stress Disorder among Nurses Working in COVID-19 Isolation Centres, Lagos, Nigeria

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ABSTRACT

Background: Nurses are at increased risk of developing posttraumatic stress disorder (PTSD) due to response of the body and mind to a threatening working environment as they care for COVID-19 patients in isolation centres. This study determined the prevalence of PTSD and examined the associated factors among nurses working in COVID-19 isolation centres.

Subjects dan Method: The study was a cross-sectional design. Purposive method was used to select two isolation centres, while 75 nurses who participated in the study were selected using total enumeration sampling technique. A structured questionnaire with validity and reliability established was used to collect data which were screened, collated and analyzed with SPSS 27. The Fisher's Exact Test and Multivariate logistic regressions were the inferential statistics used to test the level of significant at $p<0.050$ and 95% confidence interval. The dependent variable of this study is posttraumatic stress disorder while the independent variables included socio-demographic characteristics of the participants, psychological and working conditions factors.

Results: The mean age of the participants was (Mean=37.60; SD=10.20). Percentage of nurses having mild to severe PTSD was 27.8%. Duration stayed in COVID-19 isolation centres by nurses was significantly associated with the PTSD (p=0.003). The age, gender, marital status, and education level of the nurses were not statistically significant associated with the PTSD (p>0.05). Nurses who felt their life was under threat by working in COVID-19 isolation centres were 4.2 times more likely to develop PTSD compared to nurses who did not (OR=4.22, 95% CI=3.57 to 12.60, p=0.001).

Conclusion: Nurses suffered PTSD due to psychological and physical exhaustion during the care of COVID-19 patients in isolation centres. Support program is recommended for the affected nurses to improve their quality of life.

Keywords: COVID-19 isolation centres, nurses, PTSD, prevalence

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BACKGROUND

The mental health problem associated with COVID-19 pandemic is a major public health problem throughout the world (Zhu et al., 2020). Posttraumatic stress disorder is one of the ill-health an individual nurses who involved in the caring of COVID-19 patients could developed after exposure to a traumatic event that persisted for a month or more causing substantial emotional distress and disruption in one's life (d'Ettorre et al., 2021). During COVID-19 pandemic, Nigeria nurses witnessed an inflow of critically ill patients in the isolation centres leading to a higher rate of exposure to coronavirus infection and this resulted into worries, fear and severe psychological distress (Carmassi et al., 2020; Heir et al., 2019). The psychological distress was due to response of the body and mind to a threatening situation (Ford, 2021; Marthoenis et al., 2021).

The situation was complicated with the feelings of frustration, isolation, hopelessness and irritability due to physical distancing rule to avoid infecting family members and friends (Carmassi, et al., 2020; Moon et al., 2021). According to DSM-5, posttraumatic stress disorder symptoms are based on presence of intrusive symptoms such as having nightmares or flashbacks of the trauma and experiencing recurrent intrusive memories of trauma (APA, 2013). The second is avoidance reminder of the traumatic events, such as avoiding location or people associated with the trauma or avoiding distressing memories of the trauma. The third symptom is negative alteration in cognition or mood like loss of interest in previously enjoyable activities, feelings of guilt, anger and/or shame. Finally, the most detrimental is increase in arousal such as hyper vigilance and trouble sleeping (Chen et al., 2020).

The psychological problem suffered by nurses may have been compounded with the susceptibility to coronavirus infection as they have regular contact with COVID-19 patients with symptoms. This situation precipitated panic attack, anxiety and emotional imbalance that resulted into posttraumatic stress disorder (McLaughlin et al., 2015). Higher levels of anxiety and panic disorder increased the impact of the psychological problem thereby causing impair body functions and negative coping mechanisms (Perna and Caldirola, 2021). Nurses experienced shortage of N95 masks in COVID-19 isolation centres and this might have heightened the psychological problem because the mask was recommended for adequate protection.

The global estimated pooled prevalence of posttraumatic stress disorder for nurses is 21.5% with significant difference across countries; this percentage is high compared to World Health Organization acceptable value of 3.6% (ICN, 2021; Li et al., 2021). Furthermore, it was observed that as the number of COVID-19 patients increases in the isolation centres the more the pressure on nurses and the greater the risk of PTSD. This burden of the risk of exposure to COVID-19 infection caused psychological suffering and increase in the level of fear. Studies reported that nurses were asked to work longer hours, isolate from their family and even stand in for relative of the patients who are dying and this worsen the mental health problem (Liu et al., 2020).

The psychological trauma suffered by nurses was complicated with the feelings of immediate threat to life, stressful working environment and witnessing unexpected death (Luceno-Moreno et al., 2020; Mukhtar, 2020; Moon et al., 2021; Tan et al., 2020). Hardler (2021) emphasized that nurses who suffered difficulty in concentration and disorganizations while caring for COVID-19 patient were unable to meet established goals or make any decisions. The inefficient to solve patient problems was due to posttraumatic stress disorder suffered by

the nurses as a result of repeated exposure to traumatic events in COVID-19 isolation centres (Dutheil et al., 2020).

Transactional Theory of Stress and Coping (Lazarus, 1966; Lazarus and Folkman, 1987) was applied to this study. Lazarus posited that stressors in isolation centres placed nurses at the center of a threatened situation and there is need to appraise the noxious stressors in the working environment. How individual nurse appraises the stressor (coronavirus contagion) will determine how the nurse will respond to the stressor. The personal resilience, vulnerability, working conditions, skill and activities, available resources, constraints and norms of the healthcare facility will determine the outcomes of posttraumatic stress disorder of nurses who worked in COVID-19 isolation centres (Wong et al., 2020).

There is a dearth in literature on studies that focus on posttraumatic stress disorder among nurses working in COVID-19 isolation centres in Lagos. This study was conducted to fill the gap in knowledge and the specific objectives are to determine prevalence of PTSD, identify socio-demographic characteristics, psychological and working conditions factors that were associated with the PTSD among nurses. The justification for this study is that mental health challenges that do arise during pandemic are often neglected as all efforts are being directed towards control of the plague. The significan of this study included providing data on prevalence of PTSD and establishment of association that exists between dependent and independent variables. This study would impact the quality of life of nurses positively and reduce the morbidity and disability in line of duty in COVID-19 isolation centres.

SUBJECTS AND METHOD

1. Study Design
This study was a quantitative, cross-sectional survey design. The design was preferred because it established the relationship that exists between the variables. The research settings for this study were the two selected COVID-19 isolation centres located in Yaba and Gbagada, Lagos.

Purposive sampling method was used to select the two COVID-19 isolation centres and they were considered appropriate because they were in active operations since the outbreak of coronavirus pandemic in February 27, 2020 in Nigeria. The two COVID-19 isolation centres have male and female wards and Intensive Care Unit (ICU) for criticallyill patients.

The target population for this study was (n=75) nurses, male and female working in the two selected COVID-19 isolation centres in Lagos. The sample size for this study was determined by total inclusion of all nurses working in the two selected COVID-19 isolation centres in Lagos. Complete count of the individual (nurses) in the sampling unit was done. Total enumeration sampling technique was used to select the 75 nurses. The nurses who participated were (n=59) from Yaba and (n=16) from Gbagada. The risk of negative bias due to incomplete coverage of the entire population was guided against as error of under coverage was avoided.

2. Inclusion Criteria
The inclusion criteria for the participant was nurses whose duty post was either Yaba or Gbagada isolation centre in Lagos since the outbreak of the first wave of the COVID-19 pandemic.

3. Exclusion Criteria
The exclusion criteria included nurses who follow patients on emergency to the selected isolation centres. Also, nurses working in other COVID-19 isolation centre in Lagos either belonging to government or private institutions were excluded.

4. Operational Definition of Variables

Dependent variable was posttraumatic stress disorder was measured by 9-items in the (PTSD-9) self-reporting scale (Cloitre et al., 2018). Nurses were asked to describe symptoms in term of upset dream that replay part of experiences at work, memories of work sometimes come into mind, avoiding internal and external reminder, super alert, feel jumpy, affected work, relationship, and other aspect of life during this outset of the COVID-19 pandemic were rated on a 5 points scale for each question on the checklist.

The rating on the likert include (0= Not at all), (1= A little bit), (2= Moderately), (3= Quite a bit), and (4= Extremely). The range of total score is from 0 to 36, with higher scores indicating greater severity of posttraumatic stress disorder (Cloitre et al., 2018). The severity was calculated by adding the raw scores for each item in the section to obtain a total raw score. Individual's nurses PTSD were categorized into normal (0 to 8), mild (9 to 17), moderate (18 to 26), severe (27 to 36).

Independent variables: the socio-demographic characteristics of the participants measured included age, gender, education level, marital status, years of experience, family size, and living with vulnerable persons. The psychological factor variables that could lead to PTSD were measured with NO and YES responses on a scale of 0 and 1 respectively, and they includes (immediate threat to life, stressful working environment, regular contact with COVID-19 patient experiencing symptoms, regular contact with Covid-19 patient that die, caring for patient with delta variant of COVID-19 virus, and witnessing unexpected death).

Working conditions factors variables were measured with NO and YES responses on a scale of 0 and 1 respectively, and they includes (increase workload, inadequate staffing, hours spent on duty, PPE availability, safety guideline provided, training on Infection Prevention (IP).

5. Study Instruments

Structured questionnaire was used for this survey and it consists of four (4) sections. Section A consists of 7 questions numbered 1 to 7 and it collected data on socio-demographic characteristics.

Section B consists of 9 questions numbered 8 to 16 and collected data on posttraumatic stress disorder. The questions were from self-reporting assessment scales for posttraumatic stress disorder in (International Trauma Questionnaire – ITQ) for PTSD-9 scales.

Section C consists of 5 questions numbered 17 to 21 and collected data on psychological factors, while Section D consists of 7 questions numbered 22 to 28 and collected data on working conditions factors of nurses in COVID-19 isolation centres.

The instrument face and content validity was established by experts in the field of mental health for clarity, and adequacy of the content. Confirmatory Factorial Analysis (CFA) was run using SPSS and the internal correlation coefficient of the questions was between 0.40 to 0.79 which indicates the scale will measure what it intended to measure. Test-retest method was used to establish reliability of the instrument. The questionnaire was administered to 10 nurses working in a COVID-19 isolation centre outside Lagos. It was collected back immediately after filling was completed. Two weeks later, same questionnaires were given to the same nurses. The results of Cronbach's Alpha of 28 items analyzed was between $\alpha= 0.79$ to $\alpha = 0.92$ which shows the instrument is reliable and appropriate for the study.

6. Data Analysis

The data were collected between 7th February to 25th March, 2022 among nurses working in COVID-19 isolation centre in

Yaba and Gbagada. The researchers were going to the isolation centres daily from Monday to Friday for 7 weeks. The participants were asked to fill the questionnaire after Informed Consent Form had been completed freely without compelling them.

No compensation was offered to nurses for filling the questionnaire. Researcher only explained areas of the questionnaire where clarification was required. The investigator collated filled questionnaires, secured them and protected the data in a fireproof cabinet. The first step took during analysis was to screen the data to correct errors that might have occurred during the field work since primary data were collected. Analysis of the data was done with IBM SPSS version 27.

The frequency distribution Tables with percentages were prepared. The acceptable significant alpha (α) level was p<0.050 at 95%CI. Fisher's Exact Test was run to test association between socio-demographic characteristics and prevalence of PTSD. Multi-ple Logistic Regressions statistical model was run to establish an association that exists between psychological, working conditions factors and prevalence of PTSD.

7. Research Ethics

Ethical issues and right of the participants were protected during the conduct of this study. Babcock University Health Research and Ethical Committee (BUHREC) approval no is 830/21, November 2021 and the permission to collect data was obtained from Lagos State Health Services Commission.

RESULTS

1. PTSD Prevalence Level

The study analysis focus on the levels of prevalence of posttraumatic stress disorder among nurses working in COVID-19 isolation centres. Also, the socio-demographic characteristics of the nurses, psychological factors experienced, and working conditions factors associated with the prevalence of posttraumatic stress disorder were established.
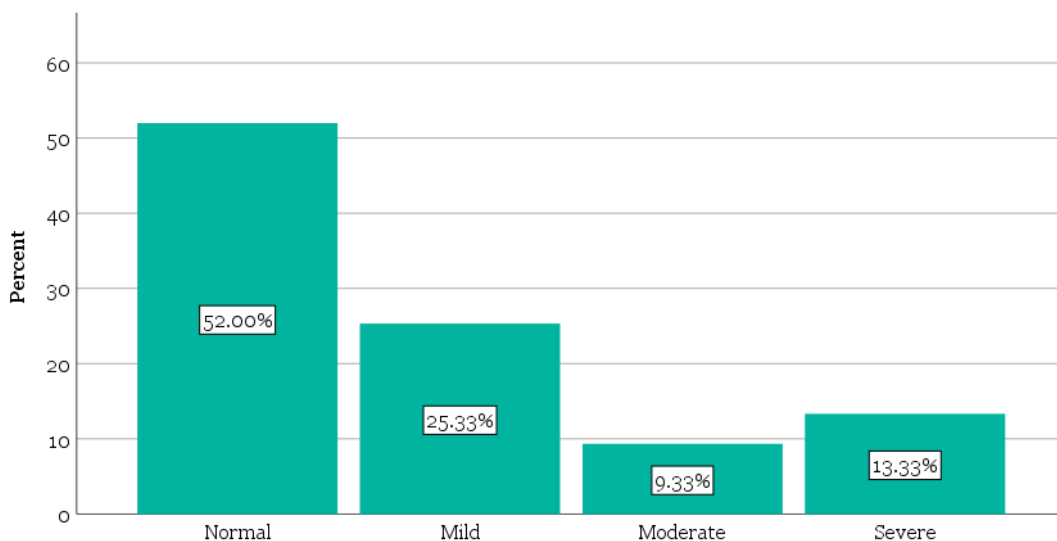

Figure 1. Level of Prevalence of PTSD among Nurses Working in COVID-19 Isolation Centres in Lagos

The Figure 1 on levels of prevalence of PTSD shows that just 10 of the respondents developed severe posttraumatic stress disorder (13.3%), 19 had mild (25.3%), while 7 had moderate PTSD (9.3%). More than half the population of the respondents did not deve-

lop posttraumatic stress disorder as a result of working in COVID-19 isolation centres (52.0%).

2. Socio-demographic Characteristics

Table 1 shows that 75 nurses participated in the study and no missing N value recorded. The finding of this survey showed that 28 of the respondents were between the age range of 21 to 30 years (37.3%), while 9 were in the age range 51 to 59 years (12.0%). The mean age of nurses was (Mean= 37.60 and SD=10.20) years. Majority of the respondents were female nurses (70.7%). The analysis results shows that 35 (46.7%) of the respondents worked in COVID-19 isolation centres for a period more than twelve months. Only ten (13.3%) of the respondents were not living with vulnerable persons while 37 (49.3%) of the respondents were holders of RN/RM/RPHN qualifications.

Table 1. Socio-Demographic Characteristics

Variables	Frequency (n)	Percentage (%)
Age of Nurses		
21 - 30	28	37.3
31 - 40	21	28.0
41 - 50	17	22.7
51 - 60	09	12.0
Gender of Nurse		
Male	22	29.3
Female	53	70.7
Marital Status		
Married	44	58.7
Not Married	31	41.3
Education Level		
RN/RM/RPHN	37	49.3
BNSc	35	46.7
MSN	03	4.0
Living with vulnerable persons		
Young children ≤ 2 years of age	16	21.3
Young children ≥ 2 years of age	28	37.3
Adults ≥ 60 years of age	17	22.7
Aged 65 years and above	04	5.3
Not living with vulnerable person	10	13.3
Duration in COVID-19 isolation centre		
< 3 months	12	16.0
3 – 12 months	28	37.3
> 12 months	35	46.7
Year of professional experience		
< 5 years	20	26.6
5 – 9 years	23	30.7
10 years and above	32	42.7

Table 2 shows an association that exists between prevalence of posttraumatic stress disorder and socio-demographic characteristics. The results revealed that living with vulnerable persons (p=0.001), duration of period working in COVID-19 isolation centre (p=0.003), and years of experience (p= 0.002), were significantly associated with posttraumatic stress disorder with (p <0.050). The age, gender, marital status, and education of the respondents were not significantly associated with the prevalence

of posttraumatic stress disorder with (p>0.050).

Table 2. Socio-Demographic Characteristics Factors Associated with PTSD in COVID-19 Isolation Centers

Variables	None n (%), < 9	PTSD Present n (%), ≥ 9	Total n=75 (100%)	Statistical Analysis p-value
Age of Nurses				
21 - 30	09 (12.0)	19 (25.3)	28 (37.3)	
31 - 40	11 (14.7)	10 (13.3)	21 (28.0)	0.051
41 - 50	12 (16.0)	05 (6.7)	17 (22.7)	
51 - 60	07 (9.3)	02 (2.7)	09 (12.0)	
Gender of Nurse				
Male	11 (14.7)	11 (14.7)	22 (29.4)	0.468
Female	28 (37.3)	25 (33.3)	53 (70.6)	
Marital Status				
Married	26 (34.7)	18 (24.0)	44 (58.7)	0.444
Not Married	13 (17.3)	18 (24.0)	31 (41.3)	
Education Level				
RN/RM/RPHN	17 (22.7)	20 (26.7)	37 (49.4)	
BNSc	21 (28.0)	14 (18.7)	35 (46.7)	0.356
MSN	01 (1.3)	02 (2.6)	03 (3.9)	
Living with vulnerable persons				
Young children ≤ 2 years of age	06 (8.0)	10 (13.3)	16 (21.3)	
Young children ≥ 2 years of age	22 (29.3)	06 (8.0)	28 (37.4)	
Adults ≥ 60 years of age	05 (6.8)	12 (16.0)	17 (22.7)	0.001
Aged 65 years and above	01 (1.3)	03 (3.9)	04 (5.3)	
Not living with vulnerable person	05 (6.7)	05 (6.7)	10 (13.3)	
Duration in COVID-19 isolation centre				
< 3 months	04 (5.3)	08 (10.7)	12 (16.0)	
3 – 12 months	09 (12.0)	19 (25.3)	28 (37.3)	0.003
> 1 year	26 (34.7)	09 (12.0)	35 (46.7)	
Year of experience				
< 5 years	04 (5.3)	16 (21.3)	20 (26.6)	
5 – 9 years	11 (14.7)	12 (16.0)	23 (30.7)	0.002
10 years and above	24 (32.0)	08 (10.7)	32 (42.7)	

3. Psychological Factors Associated with PTSD

In table 3, multivariate analysis at p<0.050, 95% Confidence Interval (CI) was considered significant. Model adjusted for covariate variables (age, gender, marital status, education, living with vulnerable persons, duration in COVID-19 isolation centres, and years of experience). The results of multivariate analysis revealed that nurses who felt there is threat to their life for working in COVID-19 isolation centre were 4.2 times more likely to experience psychological trauma leading to prevalence of posttraumatic stress disorder compared to nurse who did not (OR=4.22; 95% CI=3.57 to 12.60; p=0.001).

Table 3. Psychological Factors Associated with PTSD in COVID-19 Isolation Centres

Variables	Adjusted Odd Ratio (aOR)	(95% CI, *n*=75)		p
		Lower limit	Upper limit	
Felt threat to life for working in COVID-19 isolation centres				
No	4.22	3.57	12.60	0.000
Yes	1 [Reference]			
Felt work environment was stressful				
No	0.36	0.49	5.71	0.717
Yes	1 [Reference]			
Regular contact with COVID-19 patients with symptoms				
No	1.35	1.19	3.22	0.179
Yes	1 [Reference]			
Regular contact with COVID-19 patients that died				
No	3.40	0.12	7.32	0.019
Yes	1 [Reference]			
Witnessing unexpected death of admitted COVID-19 patients				
No	1.36	1.25	6.23	0.177
Yes	1 [Reference]			

4. Working Condition Factors Associated with PTSD

In Table 4 multiple logistic regression tests was run, p<0.050 at 95% Confidence Interval (CI) was considered significant. Model adjusted for covariate variables (age, gender, marital status, education, living with vulnerable persons, duration in covid-19 centre, and years of experience). The results revealed that witnessing increased workload in COVID-19 isolation centre is 10.2 times more likely to results into prevalence of posttraumatic stress disorder (OR=10.20; 95% CI=0.48 to 5.61; p=0.001).

Also, inadequacy number of nursing staff working in COVID-19 isolation centre was 7.9 times more likely to results into prevalence of posttraumatic stress disorder (OR=7.97; 95% CI=0.84 to 3.62; p= 0.003) compared to when appropriate number of staffing is being engaged. Finally, nurses who were able to cope with the psychological trauma associated with working conditions in COVID-19 isolation centre were 3.1 times not likely develop PTSD (OR=3.19; 95% CI=0.23 to 9.44; p=0.001) compared to nurses with low personal resilient

Table 4. Working Condition Factors Associated with PTSD in COVID-19 Isolation Centres

Variables	Adjusted Odd Ratio (aOR)	(95% CI, *N*=75)		p
		Lower limit	Upper limit	
Witnessing increased workload in COVID-19 isolation centre				
No	10.20	0.48	5.61	0.001
Yes	1 [Reference]			
Adequate nursing staff caring for COVID-19 patients				
No	7.97	0.84	3.62	0.003
Yes	1 [Reference]			
Spend extra hours on duty per week				
No	0. 71	0.74	1.35	0.071
Yes	1 [Reference]			
Adequate supply of Personal Protective Equipment (PPE)				
No	1.61	0.31	0.96	0.022
Yes	1 [Reference]			
Availability of safety guideline in the workplace				
No	1.60	1.04	9.65	0.047
Yes	1 [Reference]			
Regular training on infection prevention				
No	2.40	0.50	7.58	0.031
Yes	1 [Reference]			
Coping with psychological trauma associated with the caring for COVID-19 patients				
No	3.19	0.23	9.44	0.001
Yes	1 [Reference]			

DISCUSSION

This study assessed the prevalence of post-traumatic stress disorder and associated factors among nurses working in COVID-19 isolation centres in Lagos, Nigeria.

1. Prevalence of PTSD

This study revealed that 27.8% were the proportion of nurses who developed PTSD for working in COVID-19 isolation centres in response to the pandemic. The percentage was high compared to the World Health Organization acceptable baseline value of 3.6% across regions and countries (WHO, 2020). Conversely, the 27.8% is low compared to the finding of the study conducted among health workers in China where the prevalence of PTSD was 40.2% for nurses (Si et al., 2020).

The difference in the prevalence of post-traumatic stress disorder among nurses across regions and countries of the world might be related to the environmental factors, level of emergency preparedness, severity of the pandemic, cultural, socioeconomic diversity and personal resilience factor of coping with the psychological crisis of the pandemic. The implication of these findings is that nurses

suffered enormous mental health pressure and physical exhaustion as they deal relentlessly with the unprecedented demands of the COVID-19 patients in isolation centres. The emotional stress caused the incidence of posttraumatic stress disorder among nurses (ICN, 2021; Azim et al., 2020

2. Socio-demographic Characteristics

The socio-demographic characteristics of the respondents' is an important factors for coping with working conditions and psychological factors associated with the caring of coronavirus patients in isolation centres. The posttraumatic stress disorder suffered by nurses was significantly associated with living with vulnerable persons, duration of period working in COVID-19 isolation centre, and years' of experience.

The finding of this study is consistent with that of the study conducted in Spain where nurses were concerned about infecting people living with them especially children and aged adult thereby resulting into emotional agitation and high incidence of posttraumatic stress disorder (Luceno-Moreno et al., 2020)

3. Psychological Factors Associated with PTSD

The psychological problem of the nurses working in COVID-19 isolation centres was marred with manifestation of intrusion, hyper arousal and avoidance due to exposure to a traumatic event (Si et al., 2020). The personal resilience of the nurses during management of COVID-19 patients could effectively strengthen them by focusing on what is important, find social support, and take necessary precautions (Xiao et al., 2020).

The psychological factors like work environment was stressful, regular contact with COVID-19 patient that died, and

witnessing unexpected death of COVID-19 patients was not associated with prevalence of posttraumatic stress disorder of nurses in this study. Mukhtar (2020) opined that uncontrollable situation was significantly associated with PTSD and focusing on the controlled action could reduce the PTSD.

4. Working condition Factors Associated with PTSD

Majority of the nurses (70.7%) indicated they were spending extra hours on duty due to inadequate staffing of COVID-19 isolation centres. The odd of having adequate number of nurses working in isolation centre is five times more likely to improve the working conditions, reduce workload, and prevalence of PTSD compared to when there is inadequate staffing.

This study finding is consistent with that of the study conducted by Luceno-Moreno et al. (2020) and the researchers found that the risk variable for PTSD include nurses working longer hours and excessive workload due to inadequate staffing (Luceno-Moreno et al., 2020). Furthermore, findings of this study revealed that positive working conditions are more likely to lower the prevalence of PTSD. Providing necessary safety materials for nurses working in Covid-19 isolation centres would protect them from developing posttraumatic stress disorder.

In conclusion, twenty-seven percent was the proportion of nurses having mild to severe posttraumatic stress disorder by working in COVID-19 isolation centres. The outcomes of this study points to personal attributes, psychological and working conditions factors as an important interplay on emotions, worries and irritability suffered by nurses. Low emotions will results into high energy for nurses to cope with the stressful working conditions and highly demanding traumatic events of caring for COVID-19 pa-

tients in isolation centres.

Protection of nurses from physical and biological hazards during pandemic is recommended to reduce prevalence of PTSD. This study has some limitations as it utilized a total enumeration sample of nurses in a single state out of 36 states, so, the results may not be generalized to the population of Nigeria nurses. The study was based on response to standardized self-reporting scale adapted into the questionnaires; it may be prone to bias. Finally, it is possible the confounding variables may influence the association that exists between independents variables and prevalence of PTSD. Other areas of mental health not covered by this study are suggested to investigators.

AUTHOR CONTRIBUTION

TOR: conceptualized the study and prepared the manuscript. WAA, YAB and KZ collected the data from COVID-19 isolation centres. All four authors reviewed the manuscript submitted.

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CONFLICT OF INTEREST

Authors declared that there is no conflict of interest associated with this original research.

REFERENCE

APA (2013). Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington, VA.

Azim D, Kumar S, Nasim S, Arif TB, Nanjiani D (2020). COVID-19 as a psychological contagion: A new Pandora's box to close? Infect Control Hosp Epidemiol. 41(8): 989–990. doi: 10.1017/ice.2020-.127.

Carmassi C, Cerveri G, Bui E, Gesi C, Dell'Osso L (2020). Defining effective strategies to prevent post-traumatic stress in healthcare emergency workers facing the COVID-19 pandemic in Italy. CNS Spectrums. 1-2. doi: 10.1017/S109-2852920-001637

Chen Y, Zhou H, Zhou Y, Zhou F (2020). Prevalence of self-reported depression and anxiety among pediatric medical staff members during the COVID-19 outbreak in Guiyang, China. Psychiatry Res, 288. 113005. doi: 10.1016/j.psychres.2020.113005

Cloitre M, Shevlin M, Brewin CR, Bisson JI, Roberts NP, Maercker A, Hyland P (2018). The International Trauma Questionnaire: development of a self-report measure of ICD-11 PTSD and complex PTSD. Acta Psychiatr Scand. 138(6): 536–546. doi: 10.1111/acps.12956

d'Ettorre G, Ceccarelli G, Santinelli L, Vassalini P, Innocenti GP, Alessandri, F, Tarsitani L (2021). Post-Traumatic Stress Symptoms in Healthcare Workers Dealing with the COVID-19 Pandemic: A Systematic Review. Int J Environ Res Public Health. 18(2): 601-607. doi: 10.3-390/ijerph18020601

Dutheil F, Mondillon L, Navel V (2020). PTSD as the second tsunami of the SARS-Cov-2 pandemic. Psychol Med. doi: 10.1017/S0033291720001336

Ford M (2021). Covid-19: New findings point to widespread trauma among nurses. Nursing Times, 13 January, 2021. Available at: https://www.nursingtimes.net/news/workforce/covid-19-new-findings-point-to-widespread-trauma-among-nurses-13-01-2021/.

Hardler N (2021). Posttraumatic Stress Disorder during COVID-19. Department of Psychiatric, University of Michigan Medical School. Retrieved from https://medicine.umich.edu/dept/psychiatry/michigan-psychiatry-resources-covid-19

Heir T, Bonsaksen T, Grimholt T, Ekeberg O, Skogstad L, Lerdal A, Schou-Bredal I (2019). Serious life events and posttraumatic stress disorder in the Norwegian population. BJPsych Open. 5 (5). doi: 10.1192/bjo.2019.62

ICN (2021). The COVID-19 Effect: World's nurses facing mass trauma, an immediate danger to the profession and future of our health systems. Press Information. Geneva, Switzerland.

Lazarus RS and Folkman S (1987). Transactional theory and research on emotions and coping. Eur J Pers. 1: 141–169.

Lazarus RS (1966). Psychological Stress and the Coping Process. New York, NY: McGraw-Hill.

Li Y, Scherer N, Felix L, Kuper H (2021). Prevalence of depression, anxiety and post-traumatic stress disorder in health care workers during the COVID-19 pandemic: A systematic review and meta-analysis. PLoS ONE. 16(3). doi: 10.1371/journal.pone.0246454

Liu CY, Yang YZ, Zhang XM, Xu X, Dou QL, Zhang WW, Cheng A (2020). The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey. Epidemiol Infect. 148. doi: 10.1017/S0950268820001107

Luceño-Moreno L, Talavera-Velasco B, García-Albuerne Y, Martín-García J (2020). Symptoms of Posttraumatic Stress, Anxiety, Depression, Levels of Resilience and Burnout in Spanish Health Personnel during the COVID-19 Pandemic. Int J Environ Res. 17(15). doi: 10.3390/ijerph17155514

Marthoenis M, Fathiariani L, Nassimbwa J (2021). Investigating the burden of mental distress among nurses at a provincial COVID-19 referral hospital in Indonesia: a cross-sectional study. BMC Nurs. 20: 76-85. doi: 10.1186/s12912-021-00596-1

McLaughlin KA, Koenen KC, Friedman MJ, Ruscio AM, Karam E G, Shahly V, Kessler RC (2015). Subthreshold posttraumatic stress disorder in the world health organization world mental health surveys. Biol Psychiatry. 77(4): 375–384. doi: 10.1016/j.biopsych.2014.03.028.

Moon D J, Han MA, Park J (2021). Posttraumatic Stress and Related Factors Among Hospital Nurses during the COVID-19 Outbreak in Korea. Psychiatry Quarterly. doi: 10.1007/s11126-021-09915-w

Mukhtar S (2020). Mental Health and Psychosocial Aspects of Coronavirus Outbreak in Pakistan: Psychological Intervention for Public Mental Health Crisis. Asian J Psychiatry. 51. 102069. doi: 10.1016/j.ajp.2020.102069

Perna G, Caldirola D (2021). COVID-19 and panic disorder: clinical considerations for the most physical of mental disorders. Braz J Psychiatry. 43: 110-111. doi: 10.1590/1516-4446- 2020-1235.

Si MY, Su XY, Jiang Y, Wang WJ, Gu XF, Ma L, Qiao YL (2020). Psychological impact of COVID-19 on medical care workers in China. Infect Dis Poverty. 9(1): 113. doi: 10.1186/s40249-020-00724-0

Tan B, Chew N, Lee G, Jing M, Goh Y, Yeo L, Sharma VK (2020). Psychological impact of the COVID-19 pandemic on health care workers in Singapore Ann Intern Med. 173(4): 317–320. doi: 10.7326/M20-1083.

WHO (2020). Global Surveillance for human infection with coronavirus di-

sease (COVID-2019), Interim Guidance, Switzerland, Geneva. World Health Organization.

WHO (2016). Healthy Workers, Healthy Future, Why investing in healthy workers is fundamental to national development. WPR/2016/DNH/016. World Health Organization

Wong AH, Pacella-LaBarbara ML, Ray JM, Ranney ML, Chang BP (2020). Healing the healer: Protecting emergency health care workers' mental health during COVID-19. Ann Emerg Med. 76(4): 379–384. doi: 10.1016/j.annemergmed 2020.04.041

Xiao S, Luo D, Xiao Y (2020). Survivor of COVID-19 are at high risk of post-traumatic stress disorder. Global Health Research and Policy. BMC. 5(29): 1-3. doi: 10.1186/s41256-020-00155-2

Zhu J, Sun L, Zhang L, Wang H, Fan A, Yang B, Li W et al. (2020). Prevalence and influencing factors of anxiety and depression symptoms in the first-line medical staff fighting against COVID-19 in Gansu. Front Psychiatry. doi: 10.3-389/fpsyt.2020.00386.