Risk of Occupational Exposure, Training and Preparedness of Doctors and Nurses against Hospital Spread of Covid-19 in Ogun State, Nigeria.

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Abstract
Background: *Doctors and nurses are frontline healthcare workers responsible for the care and treatment of Covid-19 patients. It is therefore important that they are aware of possible occupational risk, adequately trained and have confidence in their preparedness, essential for limiting in hospital spread of covid-19 infection.*
Aim/ Objectives: *The aim is to assess the knowledge of occupational risk, training and preparedness of doctors and nurses at Babcock University Teaching Hospital, Ogun State, Nigeria, against in hospital spread of COVID 19 infection.*
Materials and Methods: *A self-administered online survey was conducted.*
Result: *The result showed that 51.7% of the respondents demonstrated excellent knowledge of occupational risk of exposure to COVID-19. More than half (57.6%, n=138) of respondents which include doctors (n=60) and nurses (n=78) had formal training on the infection prevention and control of COVID-19.Also, 62.2% (n=107) of respondents had formal training on the use of PPE was higher in this study. About two third of respondents (83.7%) believed they are prepared manage suspected cases of COVID-19 infection*
Conclusion: *Governments and hospital managers should continue to strengthen training of health care personnel, enforce compliance with safety policies and provide adequate PPE to sustain to fight against COVID-19.*
Key Words: *Covid-19; SARS Cov-2; Infection prevention and control*

I.   Introduction

The first case of a novel SARS Cov-2 corona virus (COVID-19) was reported in 2019 in Wuhan, China.it was discovered to be responsible for cases of severe viral pneumonia which rapidly spread through the local community in Wuhan[1, 2].It has since spread worldwide, resulting in a pandemic that has now infected more than 180 million people, causing nearly 4 million deaths globally[3].The severity of clinical presentation ranges from asymptomatic to symptomatic cases with disease severity ranging from mild to critical. Multiple studies have shown that about 80% of patients presents with mild symptoms, while approximately 20% have severe symptoms such as cough, fever, breathlessness, respiratory failure, acute respiratory distress syndrome and shock. Patient with comorbidities such as diabetes, hypertension, congestive heart failure, chronic lung diseases, chronic kidney diseases and particularly elderly patients are at higher risk of developing severe disease[4].

The index case of COVID-19 in Nigeria was confirmed on 27th of February 2020[5]and this led stakeholders in the health sector of the country to ask that the Federal government put in place preventive programmes in order to curb the spread of the virus. Prompt diagnosis, isolation and treatment of COVID 19 have been shown to slow down the spread of the virus[6]; hence health workers are expected to have sufficient knowledge to make prompt diagnosis. Moreover, Healthcare workers particularly Doctors and Nurses are at high risk of contracting and spreading the disease among themselves, to their patients, to their family members, friends and the community at large[7]. Therefore, there is need for adequate preparedness in the face of this pandemic.

From the outset of the pandemic, the World Health organization (WHO) and the Centre for Disease Control, USA have provide online courses and resource about COVID-19 for health workers[8]. These resources are constantly updated in line with most recent scientific information and evidences. Nigeria's Federal Ministry of Health and Nigeria Centre for Disease Control (NCDC) have conducted various workshops and symposiums on COVID-19 and Infection Prevention Control (IPC) measures designed to train and equip health care workers

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(HCWs) and hospital administrators at various level of health care delivery, thereby improving HCWs' preparedness and achieving a more robust national response to the pandemic[9].

Most countries are battling the scrooge of coronavirus and Nigeria is not an exception. As at 30th of June, 2021, Nigeria has recorded 167,543 cases of COVID-19 infections with 2,120 deaths[10]. The prevalence among health care workers in Nigeria has been reported to be high, hence the need to evaluated occupational risk among doctors and nurses, strengthen infection prevention training and evaluate level of preparedness[11].A cross-sectional survey done in Libya measured levels of knowledge and preparedness regarding COVID-19 among physicians and nurses between February 26 and March 10, 2020 obtained 1,572 responses from 2,000 (78.6%) participants across 21 hospitals. 65.1% of respondents were physicians while 34.9% were nurses. The majority of participants (70%) used social media as a source of information. About 47.3% of doctors and 54.7% of nurses were adequately trained on how to use personal protective equipment (PPE). The study also showed that 43.2% of respondents were aware of proper hand hygiene techniques but only 7% of respondents were trained on how to manage COVID-19 cases. About a quarter (20.6% of doctors and 26.3% of nurses) felt prepared for COVID-19 outbreak. Awareness and preparedness for the pandemic were found to be low among doctors and nurses during the study[12].

In another descriptive cross-sectional study done among employees of the University of Benin Teaching Hospital, Benin City which involved a total of 590 respondents with mean age 38.9 ± 9.7 years, 389 (65.9%) of respondents were satisfied with the awareness creation and health education carried out in the facility, 257 (43.6%) were satisfied with the supply of PPEs, 430 (72.9%) were satisfied with the infection prevention and control measures instituted, 324 (54.9%) were satisfied with the screening and triage processes and 239 (40.5%) satisfied with policies and protocols in place to prevent the spread of COVID-19[13].

In an Egyptian study, it was revealed that about 83.1% of our participants were afraid of being infected with COVID-19. 89.2% stated that they were more susceptible to COVID-19 infection in comparism to other members of the health community the most reported reason for this increased risk include scarcity of personal protective equipment (PPE), fear of transmitting the disease to their families, and social stigma. The knowledge level of HCWs about COVID-19 was good particularly among doctors. Risk perception was high among HCWs[14].

A web-based study done in UAE investigated the general understanding of the health risks of COVID-19 among health care workers (HCWs) and their degree of preparedness. 97.6% had up to date information on the modes of transmission, risks of contamination, high-risk groups, and the potential consequences of testing positive COVID-19. Majority had infection control training, or/and had undergone COVID-19 education[15].

A Yemeni study which involved 514 respondents, of which 55.3% were female, showed that physicians and nurses constituted the largest group of participants, with 39.5% and 33.3%, respectively. The median score for self-preparedness the study participant was 9 out of 15[16]. Many studies on awareness, perception and preparedness of COVID-19 among health workers have been done around the world, but very few have been carried out in sub Saharan Africa. This study was designed to assess the knowledge of occupational risk, training and preparedness of doctors and nurses at Babcock University Teaching Hospital, Ogun State, Nigeria, against in hospital spread of COVID 19 infection.

II. Materials And Methods

Study Location
The study was carried out at Babcock University Teaching Hospital (BUTH), Ilishan-Remo, Ogun State, Nigeria. Ilishan is located in Ogun State in Southwest Nigeria. Babcock University Teaching Hospital, a 7th Day Adventist Institution is a 140-bed facility that caters for the immediate community and surrounding environs. The hospital employs about 100 doctors and 300 nurses.

Study Design/ population
The study is a cross-sectional descriptive survey carried out among doctors and nurses working at Babcock University Teaching Hospital, Ilishan Remo, Ogun state, Nigeria.

Study duration
The study was done between July 1st and July 31st 2020.

*Inclusion Criteria***:** Doctors and nurses working and actively providing services at BUTH

*Exclusion Criteria***:** Doctors and nurses older than 65 years.

Sample Size Determination
The sample size was calculated using EpiCalc-2000 based on the following assumption: the proportion of good knowledge 50%, level of confidence of 95% and precision of 5%. It resulted in a required final sample size of 100 individuals. Therefore, to minimize the errors, the sample size taken for this study was 172**.**

Sampling Technique and Data Collection
A convenience sampling technique was used in this study to select participants. Self-administered and anonymous questionnaire adapted from a validated questionnaire was used to collect appropriate data. The

questionnaire included questions about demographic, knowledge of occupational risk, training and preparedness of doctors and nurses. It evaluated knowledge hospital procedures or duties that expose the doctors and nurses to likelihood of being exposed to of COVID-19 infection. It also explored their training in Infection, Prevention and Control. A scoring system in which 1 point is given to each of the knowledge variables was adapted to rate the level of knowledge of risk of exposure to COVID-19 amongst respondents who participated in the survey. 5 knowledge questions were used and the range used in determining the level of knowledge are as follows; score 0-2 (poor knowledge), score 3-4 (good knowledge), score 5 (Excellent knowledge).

Data Analysis
Data was analyzed using SPSS version 26. The Data was subjected to univariate and bivariate analysis. Proportions Mean and Standard Deviation was generated using univariate analysis. Associations between socio-demographic characteristics and knowledge of and preparedness against COVID-19 were derived using chi square test. The level of significance was set at p-value less than 0.05.

Ethical Approval
Ethical clearance was obtained from Babcock University health research and Ethical Committee (**BUHREC NUMBER: 642/21**). All respondents provided informed consents before participating in the study and the information obtained during this study were kept confidential.

III.   Result

Socio-demographic Characteristics of Respondents
A total of 172 respondents took part in this study. All filled the questionnaire and were included in the final data analysis. The average age of the study participants was 31.7 ± 23.7. About 11.0% of participants were less than 26 years old, 44.2% were between the ages of 26 and 35, 27.3% of participants were between the ages of 36 and 45, 13.4% were between the ages of 46 and 55 years while 4.1% were between the ages of 56 and 65. (Table 1)

Table 1 shows the socio-demographic characteristics of study participants.

| Variables	Response	Frequency (N=172)	Percentage (%)
Age	16- 25	19	11.0
	26-35	76	44.2
	36-45	47	27.3
	46-55	23	13.4
	56-65	7	4.1
Total		**172**	**100.0**
Gender	Male	76	44.2
	Female	96	55.8
Total		**172**	**100.0**
Religion	Christianity	160	93.0
	Islam	12	7.0
Total		**172**	**100.0**
Marital status	Single	66	38.3
	Married	102	59.3
	Separated	2	1.2
	Divorced	2	1.2
Total		**170**	**100.0**
Designation	Medical Doctors	72	41.9
	Nurses	100	58.1
Total		**172**	**100.0**
Years of experience **Doctors**	<5 years	21	12.2
	>5 years	51	29.7
Nurses	<5 years	77	44.8
	>5 years	23	13.3
Total		**172**	**100.0**

Less than half (44.2%, n=76) of respondents were males, while (55.8%, n= 96) were females. Therefore, more female respondents than males participated in this study. 66 (38.3%) were single while 102 (59.3%) were married. 2 (1.2%) respondents were either divorced or separated from their spouses. This study

also showed that a larger number of doctors (n=51) had worked for > 5 years while majority of nurses (n=23) had worked for < 5years.Over 90% (n=160) of respondents were Christians while only 7% (n=12) were of the Islamic religion. The institution of study is a Christian tertiary hospital. Majority of study participants were nurses (n=100, 58.1%) while only 72 (41.9%) were doctors. (Table 1)

Table 2 shows the knowledge of procedures that put respondents at greater risk of Covid-19 infection.

Statement	Response	Frequency(N=172)	Percentage (%)
Cleaning contaminated surfaces	Correct	154	89.5
	Incorrect	18	10.5
TOTAL		**172**	**100.0**
Cleaning contaminated surfaces	Correct	128	74.4
	Incorrect	44	25.6
TOTAL		**172**	**100.0**
Examination of body systems	Correct	163	94.8
	Incorrect	9	5.2
TOTAL		**172**	**100.0**
Sorting out patients at emergency room	Correct	143	83.1
	Incorrect	29	16.9
TOTAL		**172**	**100/0**
Surgical procedures	Correct	144	83.7
	Incorrect	28	16.3
TOTAL		**172**	**100.0**

Figure 1 shows the knowledge score of occupational risk among respondents
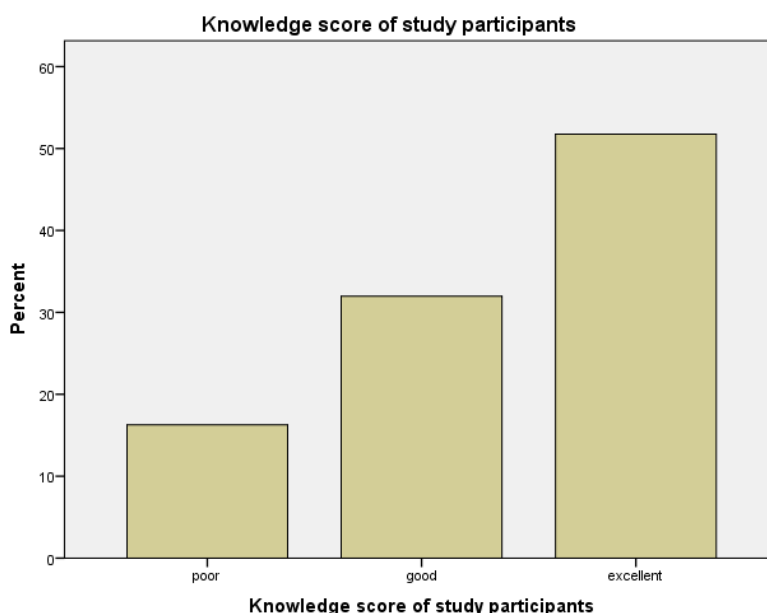
Assessment of knowledge risk of occupational exposure to COVID-19

Almost 90% (n=154) respondents were had correct knowledge that duties and procedures such as cleaning of contaminated surfaces and transportation of suspected cases of COVID-19 put them at greater risks of being infected with COVID-19, 128 (74.4%) correctly believed there is higher risk of COVD-19 infection during the process of transporting patients. 163 (94.8%), 143 (83.1%) and 144 (83.7%) respondents correctly identified increased risk of exposure to COVID-19 during patient examination, during triaging and during surgical procedures respectively. (Table 2)

The knowledge rating showed that in this study 51.7% of respondents were adjudge to have had excellent knowledge of risk of occupational exposure to COVID-19 infection, 32 % adjudged to have had good knowledge while 16.3% had poor knowledge of COVID-19. (Figure 1)

Infection Prevention and Control and use of PPE training

This study also showed that more than two third (80.2%, n=138) of respondents have had formal training in Infection Prevention and Control which consist of 60 doctors and 78 nurses. About 62.2% (n=107) of

respondents have had formal training on the use of PPE compared to 58.2% (n=99) who had no formal training on the use of PPE. (Table 3)

Preparedness of respondents against the spread of COVID-19 infection
Less than one third 62.8% (n=108) of respondents were not afraid to carry out their routine duties during the pandemic while 83.7% (n=144) of respondents believed they were prepared confident enough to manage suspected cases of corona virus during the pandemic. (Table 4)

Table 3 shows the evaluation of training on infection prevention and control among respondents

Statement	Response	Frequency (N=172)	Percentage (%)
Have you had any training on prevention and control?	Yes	138	80.2
	No	34	19.8
TOTAL	**172**	**100**	**100.0**
Have you had any training on prevention and control?			
Doctors	Yes	60	34.9
	No	12	7.0
Nurses	Yes	78	45.3
	No	22	12.8
TOTAL	**172**	**100**	**100.0**
Have you had any formal training on the use of PPE before?	Yes	107	62.2
	No	65	37.8
TOTAL	**172**	**100**	**100.0**

Table 4 shows the preparedness of respondents to COVID 19 infection.

Statement	Yes (%)	No (%)	Total
Are you afraid of carrying out your routine duties during this scourge?	64 (37.2)	108 (62.8)	172 (100.0)
Are you prepared enough to manage suspected cases of corona virus	144 (83.7)	28 (16.3)	172 (100.0)

IV.   Discussion
The COVID-19 Pandemic has caused great negative health, psycho-social and economic impact worldwide especially in developing countries where health and financial resources were inadequate before the outbreak of the pandemic. Frontline health care workers especially doctors and nurses are under enormous stress while taking care of COVID-19 patients. With rise inCOVID-19 cases across the globe and mounting death toll, curbing the spread of the pandemic among healthcare workers has become more urgent than ever. This study investigated the risk of occupational exposure, training and preparedness of doctors and nurses against hospital spread of covid-19. As at the time of conducting this survey, we were not aware of similar studies in Nigeria.
The result showed that 51.7% of the respondents demonstrated excellent knowledge of occupational risk of exposure to COVID-19, while 32.0% and 16.3% demonstrated good and poor knowledge respectively. This is in agreement with an Egyptian study[14] overall risk assessment among health workers was 89%. More than half (57.6%, n=138) of respondents which include doctors (n=60) and nurses (n=78) had formal training on the infection prevention and control of COVID-19. This finding is higher than the outcome of the study in Libya in which only 7% were trained but similar to findings in Southern Nigeria[13].

Also, 62.2% (n=107) of respondents had formal training on the use of PPE was higher in this study compared with 42.2% in the Southern Nigeria study[13] while 37.8% (n=65) of participants in our study were not trained to use PPE. The percentage that was not trained to use PPE is lower than the findings in Libya[12] where the proportion of doctors and nurses who were not trained to use PPE are 47.3% and 54.7% respectively. It might be assumed that formal IPC training has more emphasis in Continuing Nursing Education than other health care profession. Each hospital should have an infection and prevention control unit consists of infection specialist across disciplines that will help in drafting policies, developing models for disease outbreak and control. There should also be training and retraining of staff, with timely updates and periodic assessment.

The perception of preparedness of respondents was assessed. About two third of respondents (83.7%) believed they are prepared manage suspected cases of COVID-19 infection whilst 16.3% (n=28) of respondents were fearful and not prepared to manage suspected cases of COVID-19; this is in contrast to 83 percent of health workers expressing fear of getting infected with COVID-19 in an Egyptiansurvey[14], but similar to 87.9% who considered themselves prepared to manage cases of COVID-19 in the UAE study[15]. However, the level of preparedness is found to be much higher than in the Yemeni[16] and Saudi study[17] in which just over a third of respondents were well prepared. This high degree of confidence with high rate of fear can help mitigate psychological stress with positive impact on the health of respondents.

V.   Conclusion

The ability to assess occupational exposure and improve training in Infection Prevention and Control and the use of PPE among healthcare workers especially frontline workers such as doctors and nurses may be major determinants in hospitals' ability to play major roles in combating pandemics .Governments and hospital managers should continue to strengthen training of health care personnel, enforce compliance with safety policies and provide adequate PPE to sustain to fight against COVID-19.

Acknowledgement

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