IBOM MEDICAL JOURNAL
Vol.14 No.4 Oct, 2021. Pages 479 - 488
www.ibommedicaljournal.org

Knowledge, awareness and perception of health care workers towards COVID-19 in Southern Nigeria

Iso Precious Oloyede[1], Anyiekere Morgan Ekanem[2], Utibe David[3], Bassey Benjamin[4]

[1]Senior lecturer and Honourary Consultant, Department of Paediatrics, University of Uyo/ University of Uyo Teaching Hospital, P.M.B. 1136, Uyo, Akwa Ibom State, Nigeria.
[2]Senior Lecturer and Honourary Consultant. Department of Community Medicine, University of Uyo/ University of Uyo Teaching Hospital, P.M.B. 1136, Uyo, Akwa Ibom State, Nigeria
[3]Senior Registrar, Department of Paediatrics, University of Uyo Teaching Hospital, P.M.B. 1136, Uyo, Akwa Ibom State, Nigeria.
[4]Senior Registrar, Department of Community Medicine, University of Uyo Teaching Hospital, P.M.B. 1136, Uyo, Akwa Ibom State, Nigeria.

Abstract

Context: Severe acute respiratory coronavirus disease 2019 (SARS-COVID-19) is a novel worldwide pandemic. Health care workers (HCWs) are at high risk of contacting the infection.
Objective: To determine the knowledge, awareness and perceptions of HCWs towards COVID-19 in Southern Nigeria.
Methods: A descriptive cross-sectional questionnaire study carried out between May 2020 and July 2020. Healthcare workers responded to questions covering their sociodemographic characteristics, knowledge of transmission, cure and outcome of COVID-19. Other questions asked were their perception about contacting the disease, and their facility preparedness to handle the pandemic. Data was analysed using Stata version 13.
Results: A total of 366 healthcare workers completed the questionnaires. The mean age of respondents was 35.2 years. There were 209 (57.1%) males. Majority (44.5%) of the respondents were doctors. The top three symptoms identified by respondents were cough (97%), fever (92.9%) and sore throat (88%). Three hundred and sixty-four (99.5%) respondents had good level of knowledge of COVID -19. Two hundred and ninety (79.2%) of the respondents were worried about contacting COVID-19. Two hundred and thirty-five (64.2%) respondents said their facilities were not prepared to manage COVID-19 cases. Areas of concern were the absence of test kits and sample materials (70.5%), lack of personal protective equipment (PPE) (67.2%) and lack of dedicated intensive care units with ventilators (62%).
Conclusion: There was good knowledge of COVID-19 among HCWs. However, there was a high degree of anxiety of contacting COVID-19 among HCWs and concerns about a general lack of preparedness for COVID-19 management. We therefore recommend the adequate provision of PPE and improved testing.

Keywords: COVID-19, Health care workers, perception, knowledge, awareness

Corresponding Author: Dr. Iso Precious Oloyede

Department of Paediatrics,
University of Uyo/University of Uyo Teaching Hospital,
P.M.B. 1136, Uyo, Akwa Ibom State, Nigeria.
Email: isooloyede@yahoo.com, Phone: +2348159997696

Introduction

Severe acute respiratory coronavirus disease 2019 (SARS-COVID-19) was first documented in Wuhan China in December 2019.[1] This novel infection spread rapidly worldwide and thus was

declared a public health emergency by the World Health Organisation in March 2020.[2,3] The first confirmed case of COVID-19 in Nigeria was reported on 27th February and the cases have continually been on the rise with a total number of 175,264 confirmed-cases and a mortality of 2163 as at August 4th 2021. In Akwa Ibom state, a total number of 2238 confirmed cases and 21 deaths was reported as at 25th July 2021.[4]

Historically, coronavirus is spread through birds and mammals and man is particularly susceptible to infection and transmission of the virus. The spread could be through aerosols, direct contact or contact with contaminated fomites.[5,6] Coronavirus disease 2019 (COVID-19) was initially characterized with respiratory symptoms like cough, sore throat and fever with most deaths occurring from a severe pneumonia.[7] Anosmia and oxygen desaturation have been recognized as prominent features that are closely linked to the disease and should raise a high index of suspicion.[8] However, with evolution of the disease other non-respiratory symptoms like diarrhoea, myalgia, malaise and fatigue are being increasingly recognized.[7] Most of the infections are mild, but severe and critical infections occur and it may be difficult to predict which patient may progressively deteriorate.[9] Health care workers (HCW), people with chronic diseases like diabetes mellitus, hypertension, chronic renal disease, the elderly, people of black, Asian, and minority ethnicities (BAME) have been identified as being at risk of severe COVID-19 and death.[10] The main stay of treatment is usually supportive with the provision of high-flow oxygen either non-invasively or through invasive mechanical ventilation for severe cases as there is no definitive cure for the disease.8 The recognized modalities for prevention has been with the use of face mask, physical distancing of at least two metres apart, regular hand washing with soap and water for at least 20 seconds or use of alcohol-based hand sanitizers when hands are not visibly dirty, strict adherence to good cough hygiene, isolation of suspect, probable or confirmed cases and use of Personal Protective Equipment (PPE) when in close contact with suspect, probable or confirmed cases.[9] In the last three months, various vaccines have become available for use with efficacies ranging from 60-95% from report of drug trials, however the uptake in Nigeria is presently low due to pre-existing myths, mis-information, preconceptions and a general public distrust.

Healthcare workers are particularly at risk because of their involvement in the management of sick patients, some of which a diagnosis was yet to be made before a known exposure. Healthcare workers are usually at high risk of infection when carrying out procedures such as nebulization, endotracheal suction and intubation, cardiopulmonary resuscitation, nasogastric feeding and during administration of high flow rates of oxygen. The high risk presented by these procedures has implications for medical practice and organization of hospital care during the COVID-19 pandemic. In addition, there is a paucity of PPE caused by surging demand and supply chain disruptions leading to efforts to conserve PPE by extended use, reuse and disinfections.[7,11,12] Furthermore, the COVID-19 pandemic puts HCWs in the unprecedented situation of having to make impossible decisions and work under extreme pressures. Some of the pressures experienced by HCWs include how to allocate scarce resources to equally needy patients, how to balance their own physical and psychological health needs with those of patients and to create a balance between work and family responsibilities and relationships. These challenges can lead to moral injury – ["The psychological stress that results from actions or the lack of them, which violates someone's moral or ethical code"] or mental health problems.[13]

Viral diseases have been shown to be associated with mental health conditions such as anxiety and mood disorder both among HCWs and the general community.[14] Anxiety in HCW could be linked to witnessing patients with ARDs or death from COVID-19 or the fear of developing the diseases after a known or unknown contact with an infected patient. The anxiety is usually worsened in situations where infection control and prevention practices were not adequately maintained. It could also be induced by the fear of dealing with a disease that has protean manifestations with no known cure and no full-proof method of prevention.[15]

In addition, as a relatively new disease, there is still a lot of knowledge gap about COVID-19 and the emergence of new information almost on a daily basis with some retraction of previous information as incorrect with additional research is an added

stressor on the mental health of HCWs. Some previous studies had shown that health workers had a poor knowledge and attitude towards Severe Acute Respiratory Syndrome-Coronavirus (SARS-CoV)16 and Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) which have similar characteristics to COVID-19.[17,18] We therefore sought to determine the knowledge, awareness and perceptions of HCWS towards COVID-19 in Southern Nigeria, to enable us assess our level of preparedness to handle the pandemic. We hope that this work will add to the evidence in Nigeria and help policy makers handle similar and future epidemics/pandemics.

Materials and methods

A descriptive cross-sectional study was designed and carried out between May 2020 and August 2020 in the University of Uyo Teaching Hospital in Akwa Ibom state in southern Nigeria. The questionnaire was pretested on some resident doctors. It was initially given out by hand but with the nationwide lockdown and the discontinuation of physical meetings, the questionnaire was converted to a google document and sent online to individuals and the different whatsApp group platforms for the different cadre of HCWs. A structured questionnaire included three parts: The first section comprised demographic characteristics of the participants such as age, gender, category of HCW, years of experience and practice setting. The second section included six questions on knowledge comprising of country of origin of the virus, symptoms, transmission, cure, prevention and risk of death. In addition, there was a question on awareness and the source of information on COVID-19. The last part consisted of three questions on perception which comprised of how worried the HCWs were about contracting the disease, their perception on the preparedness of their facilities to manage the pandemic and concerns about the facility's preparedness to manage the pandemic. Health care workers were recruited consecutively over a period of three months until we stopped receiving the questionnaires from the google site. Participants were assured that the information collected would remain anonymous. Ethical review was obtained from the ethics and research committee of UUTH.

Data Analysis

Data was analyzed using STATA version 13. Categorical variables were summarized as frequencies and percentages while quantitative continuous data were summarized as mean and standard deviation. Association between categorical data was assessed with chi square test at a level of significance of $P<0.05$. Twenty-seven questions were asked to assess knowledge of COVID-19 including questions on knowledge of symptoms (9), mode of transmission (5), method of prevention (13). Every correct response was assigned a score of 1 and incorrect response assigned a score of 0. Minimum and maximum score per respondents was 0 and 27 points respectively. Respondents whose total scores fell between 0-13 were categorized as having poor level of knowledge while those with scores of 14-27 were categorized as having good level of knowledge.

Results

A total of 366 healthcare workers completed the questionnaires. The mean age of respondents was 35.2 years with 204 (55.7%) being less than 35 years. There were 209 (57.1%) males and doctors 163 (44.5%) were the majority of respondents. One hundred and thirty-two (36.1%) practiced between 5 to 10 years. Many respondents were from tertiary health centre 253 (69.1%). (Table I)

The top three symptoms known by respondents were cough 355(97%), fever 340 (92.9%) and sore throat 325 (88%) respectively. Fifty-one (13.9%) of respondents knew that COVID-19 patients may be asymptomatic. Breathing of infected air 323 (88.3%), touching of contaminated surfaces 318 (86.9%) and shaking hands with infected persons 316 (86.3%) were the top three modes of transmission know by respondents. Frequent and regular hand washing under running water 365 (99.7%), maintaining social distance 364 (99.5%) and use of hand sanitizer 360 (98.4%) were the 3 common methods of prevention mentioned by respondents. Taking of immune booster drugs 155 (42.4%) and drinking of warm water 144 (39.3%) were also mentioned by respondents as ways of preventing COVID-19. In all, almost all respondents 364 (99.5%) had good level of knowledge of COVID -19. (Table 2)

Table I: Socio-demographic and clinical characteristics of respondents

Variables	Frequency	Percent
Age (in years) Mean+/-SD	35.2+/-7.8	
Less than 35	204	55.7
35 and above	162	44.3
Gender		
Males	209	57.1
Females	157	42.9
Role		
Doctors	163	44.5
Nurses	77	21.0
Pharmacists	34	9.3
Medical Lab Scientists	31	8.5
Radiographers/sonographers	5	1.4
Health attendants	10	2.7
Cleaners	33	9.0
Others	13	3.6
Years of practice		
0-5	108	29.5
>5-10	132	36.1
>10-15	65	17.8
>15-20	23	6.3
>20	38	10.4
Practice setting		
Primary health centres	15	4.1
Secondary health centres	55	15.0
Tertiary health centres	253	69.1
Private facilities	21	5.7
NGOs	12	3.3
Others	10	2.7

Television (72%) and radio (61.2%) were the major sources of information on covid-19 among HCWs. Social media outlets such as Facebook (52%) and WhatsApp (52.5%) were popular. (Figure 1)

Two hundred and ninety (79.2%) of the respondents were worried about contacting COVID-19. (Table III)

Age group of respondents (P=0.06), gender (P=0.25), years of practice (P=0.46) and overall knowledge of COVID-19 were not significantly associated with level of worry of respondents. (Table IV)

Most respondents 341 (93.2%) knew that not all COVID-19 patients die. (Figure 2)

Most respondents 290 (79.2%) knew that COVID-19 has no cure. (Figure 3)

One hundred and twenty-two (66.7%) respondents said there was a drug to treat COVID. (Figure 4)

Most respondents 235(64.2%) said their facilities were not prepared to manage COVID-19 cases. Respondents were most concerned about absence of test kits and sample materials 258 (70.5%), lack of personal protective devices 246 (67.2%) and lack of dedicated intensive care units with ventilators 227 (62%). The area of least concern to respondents was lack of flowing water and soap 137 (37.4%). (Table V)

Table II: Knowledge of COVID-19 among respondents

Variables	Yes n (%)	No n (%)
Knowledge of symptoms		
Sneezing	310 (84.7)	56 (15.3)
Cough	355 (97.0)	11 (3.0)
Fever	340 (92.9)	26 (7.1)
Catarrh	194 (53.0)	172 (47.0)
Sore throat	325 (88.0)	41 (11.2)
Body pains	233 (63.7)	133 (36.3)
Vomiting	84 (22.9)	282 (77.1)
Frequent stooling	119 (32.5)	247 (67.5)
Asymptomatic	51 (13.9)	315 (86.1)
Mean Knowledge Score (total 9): 5.5 +/-1.8		
Knowledge of Mode of transmission		
Breathing of infected Air	323 (88.3)	43 (11.7)
Eating food cooked by an infected person	10 (2.7)	356 (97.3)
Touching contaminated surfaces	318 (86.9)	48 (13.1)
Handling soiled objects	249 (68.0)	117 (32.0)
Shaking of hands	316 (86.3)	50 (13.7)
Mean Knowledge score (total 5): 3.3+/-0.8		
Knowledge of methods of Prevention		
Maintaining social distance	364 (99.5)	2 (0.5)
No hand shaking	343 (93.7)	23 (6.3)
Staying at home when sick	361 (98.6)	5 (1.4)
Coughing into a tissue paper and properly disposing it	354 (96.7)	12 (3.3)
Use of face mask when coughing	353 (96.5)	13 (3.5)
Frequent and regular hand washing under running water	365 (99.7)	1 (0.3)
Use of hand sanitizer	360 (98.4)	6 (1.6)
Eating of garlic	105 (28.7)	261 (71.3)
Drinking of warm water	144 (39.3)	222 (60.7)
Gargling of salt water	98 (26.8)	268 (73.2)
Drinking of Aloe vera	42 (11.5)	324 (88.5)
Taking of immune booster drugs	155 (42.4)	211 (57.6)
Use of face mask when going out	292 (79.8)	74 (20.2)
Mean score of methods of prevention (total 13): 11.3+/-1.6		
Mean overall total knowledge score =21.1 +/-3.0		
Overall total knowledge grade		
Poor	2 (0.5%)	
Good	364 (99.5%)	

Table III: Level of worry of respondents about COVID-19

Variables	Frequency	Percent
Are you worried about COVID-19?		
Not worried	76	20.8
Worried	290	79.2
How worried are you about COVID-19 (n=290)		
Worried	98	33.8
Very Worried	104	35.9
Extremely worried	88	30.3

Table IV: Association between selected characteristics of respondents and worry about COVID-19

Variables	Level of worry		Total n (%)	Statistical test and P value
	Not worried	worried		
Age group (in years)				
Less than 35	35 (46.1)	169 (58.3)	204 (55.7)	$\div^2$=3.65
35 and above	41 (53.9)	121 (41.7)	162 (44.3)	P=0.06
Gender				
Males	39 (51.3)	170 (58.6)	209 (57.1)	$\div^2$=1.31
Females	37 (48.7)	120 (41.4)	157 (42.9)	P=0.25
Years of Practice				
0-5	19 (17.6)	89 (82.4)	108 (100.0)	$\div^2$=3.65
>5-10	32 (24.2)	100 (75.8)	132 (100.0)	P=0.46
>10-15	11 (16.9)	54 (83.1)	65 (100.0)	
>15-20	7 (30.4)	16 (69.6)	23 (100.0)	
>20	7 (18.4)	31 (81.6)	38(100.0)	
Overall Knowledge				
Poor	0 (0.0)	2 (100.0)	2 (100.0)	Fisher's
Good	76 (20.9)	288 (79.1)	364 (100.0)	exact=0.99

Table V: Preparedness and concern about their facilities' preparedness to manage COVID-19 patients

Variables	Yes n(%)	No n(%)
Level of preparation of facilities to treat COVID-19 cases		
Not Prepared	235 (64.2)	
Prepared	86 (23.5)	
Very prepared	14 (3.8)	
Extremely Prepared	31 (8.5)	
Concerns about facilities preparedness		
Lack of personal protective equipment	246 (67.2)	120 (32.8)
Lack of isolation centre	190 (51.9)	176 (48.1)
Lack of dedicated intensive care unit with ventilators	227 (62.0)	139 (38.0)
Absence of test kits and sample materials	258 (70.5)	108 (29.5)
Inadequate trained manpower	188 (51.4)	178 (48.6)
Insufficient awareness in hospital/community	140 (38.3)	226 (61.7)
Inadequate waste disposal system	139 (38.0)	227 (62.0)
Lack of regular flowing water and soap	137 (37.4)	229 (62.6)

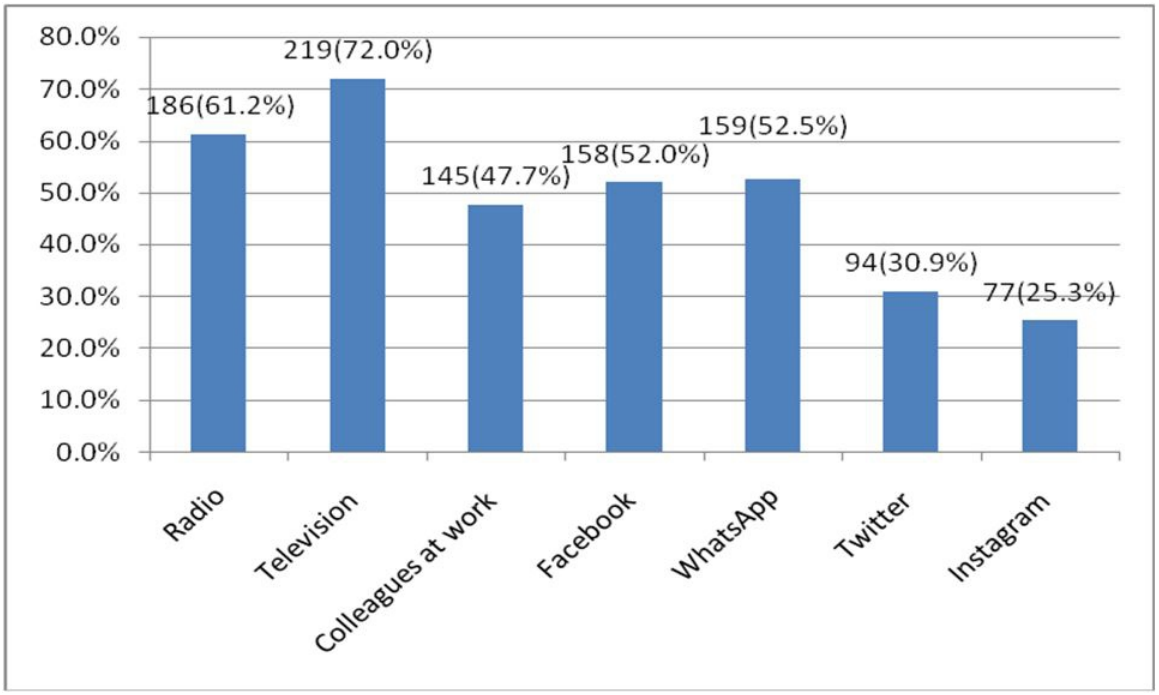

Figure 1: Sources of Information on COVID-19 among health care workers

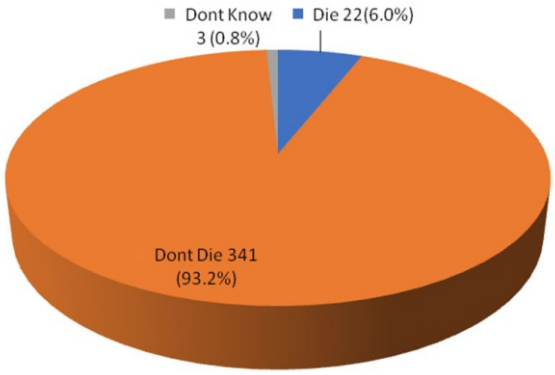

Figure 2: Respondents' Knowledge of outcome of Infection with COVID-19

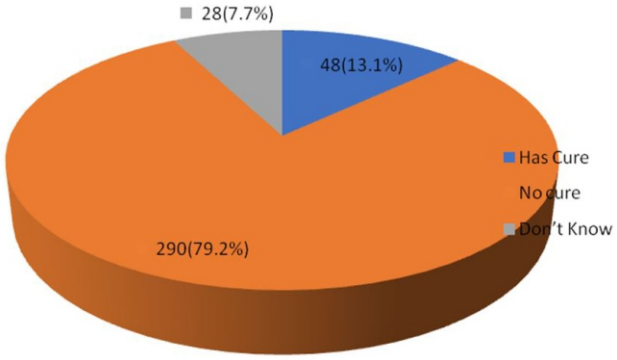

Figure 3: Respondents' awareness of cure for COVID-19

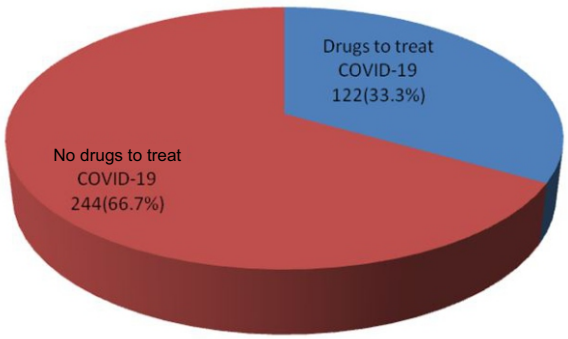

Figure 4: Respondents' awareness of drugs to treat COVID-19

Discussion

Our results show that most of our respondents were less than 35 years, with a male preponderance. Majority of our respondents were clinical staff (Doctors and nurses), with a practice duration of < 10 years and worked in a tertiary institution. The demographics of our study population when compared with a study done in Vietnam showed some similarities although our respondents had a higher mean age of 35.2 years compared to the 30 years seen in the Taiwan study.[19] The predominance of a younger population may also be attributed to the fact that the younger population are more

technologically advanced and were better able to respond to an online questionnaire compared to the older HCWs. The gender differences seen in both studies could be attributed to the high percentage of nurses who responded to the Taiwan study as it is well known that females are usually the predominant gender in the nursing profession.

Majority of our respondents were aware of COVID-19 and they also had relatively good knowledge of the symptoms of COVID-19. However, 86.1% of our respondents were not aware of asymptomatic carriers. This value is higher than the 64% seen in some HCWs in Saudi Arabia, who were not aware that MERS coronavirus disease could present with asymptomatic carriers.[18] This difference could be attributed to the quality and depth of health education and enlightenment campaigns done in both locations. This knowledge deficit is dangerous as it would lead to increased transmission of infection from asymptomatic carriers especially due to a reduced level of infection control practices when dealing with asymptomatic carriers. Breathing of infected air (88.3%) shaking hands of an infected subject (86.3%) or touching contaminated surfaces (86.9%) were the predominant routes of transmission acknowledged by our respondents. These responses are higher than the 67% response observed in HCWs in Vietnam.[19] This difference may also be attributed to a better quality and depth in the health education given to the HCWs in our setting. In addition, the higher number of physicians in our study compared to the study in Vietnam could also contribute to this difference. The use of immune boosters (42.4%), drinking warm water with or without lemon (39.3%), and the use of garlic (28.7%) were some non-pharmacologic methods identified by our respondents as preventive methods for COVID-19. This was not surprising as there were a lot 'preventive methods' being peddled on the social media and the airwaves by alternative health practitioners for the prevention and cure of COVID-19. In addition, the fact that this was a novel disease with very little information on its epidemiology and management, contributed to the adoption of any available information before the results of some scientific studies became available. It was also interesting to note that in spite of the palpable fear generated at the onset of the pandemic, majority of our HCWS were able to identify that not everyone with disease died. Television, radio and social media such as Facebook and whatsApp were the major sources of information about COVID-19 for our respondents. Our result, were similar to studies in Vietnam and Saudi Arabia, in which the television and social media were very important sources of COVID-19 information.[19,20] However, these studies[18,19] observed that their various ministries of health memos were also a very high source of information. Our study did not ask about information from the ministry of health however, the Nigerian Centre of Disease Control (NCDC) were very committed in dispensing real-time information on COVID-19 through their numerous social media handles, the airwaves and the print media.

Majority (79.2%) of our respondents had varying degrees of worry concerning contracting COVID-19. This result is similar to the 82.3% seen in HCWs in Vietnam.[19] Some studies have also reported the increased psychological impacts of anxiety and depression associated with COVID-19 disease, and these has been attributed to the increased internet use and information overload about rising infections and mortality which is a stressor on its own. In addition, concerns about facility preparedness, suboptimal testing facilities for exposed HCWS, unavailability of postexposure prophylaxis, shortages in Personal protective equipment, concerns with the high risk presented when performing aerosol producing procedures, work pressure when faced with decisions on how to allocate scanty resources to equally needy patients and concerns about transmitting the disease to their family members are also causes of anxiety.[15,18,20-22] These concerns are not unfounded, as a study has reported that that frontline HCW were at increased risk for reporting a positive COVID-19 test (adjusted HR 11.61, 95% CI [10.96-12.33]) compared to the general community. The study also observed that adequacy of PPE and clinical settings were important factors in the risk.[10]

Two hundred and thirty-five of our respondents reported that their facilities were not prepared to handle the pandemic. To mitigate some of these challenges, system level improvements such as continuous medical education programs, early testing of HCWs to detect infection and ensure self-

isolation, the implementation of isolation and infection control resources and appropriate nursing-to-patients ratio would also improve preparedness. In addition, the provision of adequate PPEs, provision of a forum for all HCWs to safely discuss the emotional and social challenges of caring for patients, planning for the inevitability of loneliness and its sequelae using digital technologies, and provision of a multidisciplinary team consisting of psychiatrist, psychologist, counsellors and other mental health experts is a basic requirement for dealing with the emotional distress and other mental health disorders caused by pandemics and other public health emergencies. Furthermore, improving relevant policies, strengthening personnel training, optimizing organizational and management policies and regularly reviewing experience in practice can resolve, most of the deficiencies observed in our handling of the pandemic.[21-24]

Conclusion

Our study has shown a good knowledge and awareness of COVID-19 among HCWs in Uyo metropolis. However, there was a relatively high degree of anxiety of contacting COVID-19 among HCWs and an observation of a general lack of preparedness for COVID-19 management in the represented facilities. We therefore recommend the improvement of relevant policies, strengthening of personnel training, adequate provision of PPEs, improved testing, improved infection control practices and the provision of a dedicated mental health team to deal with the emotional and psychological stress caused by epidemics, pandemics and other public health emergencies.

References

1. WHO. Coronavirus disease 2019 (COVID-19): World Health Organization.2020. [Online]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 [Accessed on 1st March 2020].
2. Carlos WG, Dela Cruz CS, Cao B, Pasnick S, Jamil S. Novel Wuhan(2019-nCoV) Coronavirus. Am J Respir Crit Care Med 2020; 201(4): 7-8.
3. WHO. Situation reports. 2020. [Online]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200306-sitrep-46-covid-19.[Accessed on 7th March 2020]
4. Nigeria centre for disease control. COVID-19 situational report. Weekly epidemiological report 41. Epi week 29. 19th- 25th July 2021. Covid19.ncdc.gov.ng. Accessed on 4th August 2021.
5. Schoeman D, Fielding BC. Coronavirus envelope protein: Current knowledge. Virol J 2019; 16(1): 69.
6. CDC. Coronavirus disease 2019 (COVID-19). 2020. [Online]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/about/transmission. html [Accessed on 1st March 2020].
7. Chow EJ, Schwartz NG, Tobolowsky FA, Zacks RL, Huntington-frazier M, Reddy SC et al. JAMA 2020 doi:1001/jama.2020.6637. [Accessed on 19th April 2020].
8. WU Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. JASMA 2020; 323(14): 1239-1242.ss.
9. WHO. WHO Director-General's opening remarks at the mission briefing on COVID-19. 2020. [Online]. Available from: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-missionbriefing- on-covid-19 [Accessed on 1st March 2020].
10. Nguyen LH, Drew DA, Graham MS, Joshi Ad, Guo C-G, Ma W et al. Risk of COVID-19 among frontline healthcare workers and the general community: a prospective cohort study. Lancet Public Health 2020. https://doi.org/10.1016/S2468-2667 (20) 30164-X.
11. Schwartz A, Stiegel M, Greeson N, et al. Decontamination and reuse of N95 respirators with hydrogen peroxide vapor to address worldwide personal protective equipment shortages during the SARS-CoV-2 (COVID-19) pandemic. ApplBiosaf 2020; 25: 67–70.

12. Livingston E, Desai A, Berkwits M. Sourcing personal protective equipment during the COVID-19 pandemic. JAMA 2020; 323: 1912–14.
13. Greenberg N, Dooherty M, Gnanapragasm S. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. BMJ 2020; 368:m1211. Doi:10.1136/bmj.m1211 (accessed 5th April 2020.).
14. Coughlin SS. Anxiety and depression: linkages with viral diseases. Public Health review 2012: 34 (2).
15. Shanafelt T, Ripp J. Treckel M. Understanding and addressing soiurces of anxiety among healthcare professionals during COVBID-19 pandemic. JAMA 2020. Doi.10.1001/jama.2020.5893. (Accessed online on 19th April 2020).
16. Deng JF, Olowokure B, Kaydos-Daniels SC, Chang HJ, Barwick RS, Lee ML, et al. Severe acute respiratory syndrome (SARS): Knowledge, attitudes, practices and sources of information among physicians answering a SARS fever hotline service. Public Health 2006; 120(1): 15-19.
17. Sameer A, Mohammad B, Mansour A, Abdulrahman A. Knowledge and attitude of dental health professionals about Middle East respiratory syndrome in Saudi Arabia. J Int Soc Prev Community Dent 2018; 8: 137-144.
18. Abdullah A, Allen C. Knowledge, attitudes and behaviours of healthcare workers in the Kingdom of Saudi Arabia to MERS coronavirus and other emerging infectious diseases. Int J Environ Res Public Health 2016; 13: 1214.
19. Giao H, Han NTN, KhanhTV, Ngan VK, Tam VV, Le An P. Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. Asian Pacific Journal of Tropical Medicine 2020; 13(6): 260-265.
20. Black JRM, Bailey C, Przewrocka J, Dijkstra KK. COVID-19: The case for healthworker screening to prevent hospital transmission. Lancet 2020; 395: 1418.
21. Greenberg N, Dooherty M, Gnanapragsm S, WesseleyS.,. Managing mental health challenges faced by healthcare workers during COVID-19 pandemic. BMJ 2022; 368: M1211. doi:10.1136/bmj.m1211 (accessed 5th April 2020).
22. Jiang H-J, Nan J, Lv Z-Y, Yang J. Psychological impacts of the COVID-19 epidemic on the Chinese people: Exposure, Post-traumatic stress, symptom and emotion regulation. A Pac J Trop Med 2020; 1316:252-9.
23. Galea S, Merchant Rm, Lurie N. The Mental Health Consequences of COVID-19 and Physical Distancing. The Need for Prevention and Early Intervention. JAMA Internal Medicine 2020;180(6): 817-8.
24. Duan L, Zhu G.Psychological interventions for people affected by the COVID-19 epidemic. Lancet Psychiatry 2020; 7:300-2. https://doi.org/10.1016/S2215-0366(20)30073-0.