Original Article

Assessment of Health-Care Workers' Knowledge Regarding COVID-19 in Selected Local Government Areas in Cross River State

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Abstract

Background: Health-care workers are at the frontline of COVID-19 pandemic response with an increased risk of infection compared to the general population with a significant number losing their lives. It is therefore crucial that HCWs have adequate knowledge about all aspects of the disease to protect themselves and reduce transmission of COVID-19 in populations they serve. **Aim:** The aim is to determine the level of knowledge of health-care workers (HCWs) regarding COVID-19 in selected local government areas (LGAs) in Cross River State. **Materials and Methods:** A cross-sectional descriptive study involving a pre- and post-test evaluation was carried out among 47 HCWs in five selected LGAs in Cross River State. A 1-day nonresidential training aimed at improving the knowledge of COVID-19 among HCWs was organized by the Efik Young professionals in collaboration with the State Primary Health Care Development Agency. Data were summarized using proportions and paired *t*-test to explore associations between quantitative variables. The level of significance was set at $P < 0.05$. A score of 70 and above represented adequate knowledge. **Results:** The mean age of participants in the workshop was 36.9 ± 7.23 years. The majority of the respondents were female 38 (80.9%) and health facility heads 20 (42.6%). Before the training, less than a fifth (16.2%) demonstrated adequate knowledge regarding COVID-19 infection. Post-test analysis revealed a marked improvement (83.8%) in the knowledge acquired and this was statistically significant ($P < 0.05$). **Conclusion:** Although the training workshop was useful in improving the knowledge of HCWs regarding COVID-19, it is important that these trainings are done periodically to update the HCWs with adequate information particularly frontline HCWs serving in rural areas.

Keywords: COVID-19, cross river state, health-care workers, local government area

Introduction

Since its emergence in Wuhan China late in 2019, the COVID-19 pandemic has become the defining global health-care crisis of our time and the greatest challenge the world has faced since World War two.[1] It has continued to spread and affect all continents of the world and even Antarctica.[2] Since the first COVID-19 case was identified on November 19, 2019, in China, the infection has reached almost every country/territory of the world, with 213,732,925 confirmed cases and a mortality of 4,460,771.[3] Africa, accounts for 4% of COVID-19 cases globally, accounting for over one hundred thousand deaths in the continent.[4] The spread of COVID-19 in Nigeria has continued at an alarming rate with all the states in the country affected. On the January 10, 2021, Nigeria reached the 100,000 milestones of confirmed cases (187,588 cases) with 2,276 reported deaths.[5] Cross River State where our study was conducted has recorded a total of 470 cases since the infection was confirmed in the state with 21 deaths.[5]

Health-care workers (HCWs) are at the frontline in the management of COVID-19. The frontline health-care worker

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is directly involved in COVID-19 prevention and treatment. They are exposed to confirmed or suspected cases through the patient intake, screening, inspection, testing, transport, treatment, nursing, specimen collection, pathogen detection, and pathologic examination.[6] Based on this premise, HCWs are at an increased risk of the infection.[7] They face a scarcity of personal protective equipment, laboratory testing, and other resources needed for protection.[7] In addition, psychological stress, fear, anxiety, and long working hours with associated fatigue and burnout further increase their risk of infection.[7] All of these factors further compounding their risk of infection.

Furthermore, the failure to diagnose COVID-19 promptly can result in the mismanagement of cases resulting in the spread of this highly contagious pathogen. Lack of knowledge of this novel infection among frontline HCWs accounts for the spread of the disease.[7] Since the onset of the pandemic over 100 health workers have lost their lives further hindering the fight to contain the infection.[8] As a matter of urgency, the World Health Organization (WHO), Centre for Disease Control (CDC), and various national government organizations have developed guidelines for HCWs and online continuous medical education courses to improve the knowledge about COVID-19 and its preventive strategies.[9]

The rapid identification of the novel coronavirus in humans, animals, and their reservoir or intermediate host has been made possible by the recent advances in the detection of respiratory viral infections through cutting-edge polymerase chain reaction techniques through respiratory samples such as nasopharyngeal swabs or bronchial aspirates.[10,11] With the high rate of mutation in RNA viruses such as SARS-COV-2, the emergence of variant strains has raised concerns among health workers/researchers globally regarding the impact of these variants with the increased transmissibility of the infection, risk of re-infection, and possible increased risk of disease severity and mortality of illness.[11] Health workers as well as researchers are required to be up to date regarding the emergence of SARS-COV-2 variants to enable the appropriate evaluation of the impact of the virus on diagnostic/detection protocols, vaccine efficacy, prediction of the development and spread of the infection, as well as implementation of specific management and preventive strategies.[11]

Health care in Nigeria is delivered across three levels; the primary, secondary, and tertiary levels. Health workers particularly those at the primary health-care level constitute the frontline health workers in rural communities. They play a significant role in tackling this pandemic at the grassroots and are expected to be armed with adequate information regarding this novel virus (especially as the information regarding the disease is constantly evolving). However, there is a paucity of literature regarding the knowledge of COVID-19 Infection among HCWs in Nigeria more so those working at the rural level.

A 1-day, nonresidential workshop organized by the Efik Young Professionals (EYP), a nongovernmental organization in Collaboration with the Cross River State Primary Health Care Development Agency (PHCDA) was organized to assess and update the knowledge of frontline HCWs. The objective of this study was to assess the knowledge of COVID-19 among HCWs from selected primary health-care facilities in Cross River State. The knowledge henceforth acquired will hopefully help improve the identification of COVID-19 cases and possibly aid in the reduction/prevention of COVID-19 spread in the community.

Materials and Methods

Study area

Calabar is the capital of Cross River state located in the South-South geopolitical zone of Nigeria and has 18 Local Government Areas (LGAs). It has an estimated population of 375,196 people. The inhabitants are mainly Efiks, Efuts, Quas, and Ibibios. The main occupational groups are civil servants, businessmen, farmers, traders, and fishermen.

The health-care service delivery is done through primary, secondary, and tertiary health facilities. The primary care facilities provide health-care services to mainly rural dwellers and the PHCDA is solely responsible for the delivery of primary health care including training of the HCWs at the grassroots/local government level. A 1-day training workshop was organized by the EYP in collaboration with the State PHCDA in Calabar Municipality LGA of Cross River state to sensitise and train primary HCWs/stakeholders on COVID-19. This was the first training on COVID-19 organized for HCWs at the LGA level in the state.

Purpose and content and rationale

The purpose of the training was to share relevant evidence-based medical information to primary HCWs/stakeholders on COVID-19. The study content included the following:

i. Overview of COVID-19
ii. Principles involved in contact tracing of individuals in contact with suspected/confirmed COVID-19 cases, with special emphasis on the disease surveillance and notification
iii. Nigerian CDC case definition of confirmed and suspected COVID-19 cases
iv. Demonstrations (hand washing, social distancing, and appropriate use of facemask).

Study design

This was a descriptive cross-sectional study involving a pre- and post-test evaluation of primary health-care workers/stakeholders conducted in April (2020).

Study population

Forty-six primary health-care workers/stakeholders who play key roles in the fight against COVID-19 at the lowest level of health-care delivery, i.e., LGAs were recruited into the study (attended the training). They comprised community health extension workers, facility heads, disease surveillance and notification officers (DSNOs) (responsible for reporting cases at the LGA level and contact tracing), and social

mobilization officers (responsible for community sensitisation and mobilization) in five selected LGAs in the Southern Senatorial district of the State.

Sample size and sampling

A total of 47 health-care workers/stakeholders which cut across the groups mentioned above were purposively selected for the training. The reason being that most of these health workers headed facilities with large patient load (primary health-care directors and facility heads), they were also saddled with the responsibility of disseminating health-related information at the community level (Social Mobilization Officers). In addition, DSNOs were recruited into the study. They are involved with reporting and contact tracing of diseases, especially a notifiable contagion such as COVID-19.

Data collection method

A semi-structured self-administered questionnaire was distributed to participants before and after the training. The questionnaire explored their knowledge on the epidemiology of COVID-19, mode of transmission, clinical presentation, and preventive measures. Knowledge was assessed using a 25-item questionnaire. One point was given for every correct response while "0" for incorrect responses. For the purpose of this study, a score of 70% and above indicated good knowledge while a score of <70% indicated poor knowledge among HCWs. This score was chosen because HCWs who are at the front line of the COVID-19 response are expected to have more knowledge compared to the general population. A total of 47 health-care workers/stakeholders who responded to our invitation for the training filled their questionnaires appropriately.

Data management

Completed questionnaires were inspected to detect errors and omissions to ensure that they were properly filled. Questions were manually sorted out, coded, and cleaned. Thereafter, it was entered into a computer for statistical analysis using Statistical Package for the Social Sciences (SPSS) version 20.0. Statistical Package for Social Sciences version 20 (PASW statistics 20). Manufactured by IBM, Chicago, IL, USA. Data collected were analyzed using descriptive statistics (frequency, proportions, means and standard deviation) and charts to summarize variables. Bivariate analysis was carried out using Chi-square to test for associations between various categorical variables and the paired *t*-test for associations between continuous variables. Statistical significance was set at $P < 0.05$.

Results

The mean age of participants who attended the workshop was 36.9 ± 7.2 years and more of the respondents were aged between 30 and 39 years followed by 40–49 age bracket. The majority of the respondents were female 38 (80.9%) and facility heads 20 (42.6%) [Table 1].

The overall knowledge assessment revealed that most of the respondents acquired more knowledge about COVID-19 infection with 83.8% having good knowledge in the post-test compared to less than a fifth (16.2%) of the participants who scored 70 and above during the pretest [Figure 1].

The knowledge assessment tool, in comparing responses for the pre- and post-test, identified that a significantly higher proportion of respondents were more knowledgeable after the training as reflected in their post-test scores ($P < 0.05$). The questions include; the name of the virus causing COVID-19, mode of transmission, COVID-19 declaration as a global pandemic, Epicenter of COVID-19 in Nigeria, and whether it is an airborne disease. This is presented in

Table 1: Study site and health worker category by knowledge of COVID-19 assessment (pre- vs. post-test)

Variable	Knowledge assessment, frequency (%)		χ^2	*P*
	Pretest	Post-test		
Age (years)				
<29	0	0	0.08	0.99
30-39	20 (48.8)	22 (46.8)		
40-49	12 (29.3)	15 (31.9)		
≥50	1 (2.4)	1 (2.1)		
Sex				
Male	3 (7.3)	9 (19.1)	2.60	0.11
Female	38 (92.7)	38 (80.9)		
LGA				
Akpabuyo	12 (29.3)	12 (25.5)	0.19	0.10
Bakassi	5 (12.2)	6 (12.8)		
Calabar Municipality	9 (22.0)	11 (23.4)		
Calabar South	7 (17.1)	9 (19.1)		
Odukpani	8 (19.5)	9 (19.1)		
Total	41 (100)	47 (100)		
Category of health worker				
CHEW	14 (34.1)	18 (38.3)	0.94	0.816
Facility heads	16 (39.0)	20 (42.6)		
Disease Surveillance and Notification Officers	5 (12.2)	5 (10.6)		
Social Mobilization Officers	6 (14.6)	4 (8.5)		
Total	41 (100)	47 (100)		

CHEW: Community Health Extension Worker

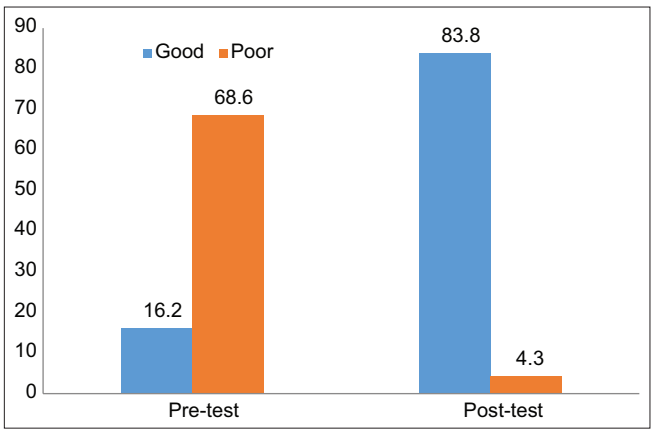

Figure 1: Knowledge scores of respondents by Pre- and Post-test

Table 2. Questions where knowledge improved significantly included the duration of hand washing, hand sanitizers being a replacement for hand washing, physical distance measurement, asymptomatic nature of the disease, and vaccine availability ($P < 0.05$) [Table 3]. Using the paired *t*-test, a statistically significant difference was observed between the pre- and the post-test assessments ($P < 0.0001$; 95% confidence interval 14.4–15.9) [Table 4].

Discussion

This cross-sectional descriptive study involving a pre- and post-test evaluation of selected (47) community-based HCWs in five LGAs in Cross River State showed that the majority of HCWs interviewed were in the 30–39 age bracket and mostly females. This is consistent with a similar study done in the northern senatorial district of the state.[9] The longer duration required in training the higher cadre of medical personnel (such as doctors and nurses) may account for the younger age group seen among the community-based HCWs in our study.[9] A younger workforce of HCWs being at the forefront of COVID-19 care maybe advantageous, considering that the mortality and morbidity associated with the infection are increased in the older age group who tend to have concomitant underlying chronic medical conditions.[9]

The overall knowledge displayed by most HCWs before the training was poor, with less than a fifth of them (16.2%) having optimal knowledge regarding COVID-19. Similarly, Omoronyia *et al*. demonstrated a poor level of knowledge (28%)

Table 2: Assessment of knowledge on general information on COVID-19 by pre- and post-test

Variable	Knowledge assessment, frequency (%)		χ^2	*P*
	Pretest	Post-test		
Full meaning of COVID-19				
Coronavirus disease-2019 (correct)	11 (26.8)	21 (44.7)	3.02	0.082
Others	30 (73.2)	26 (55.3)		
COVID-19 was first discovered in				
China	41 (97.6)	47 (100)	FET	0.282
Incorrect options	1 (2.4)	0 (0.0)		
What is the name for the virus causing COVID-19				
SARS-CoV-2	12 (29.3)	40 (85.1)	28.2	<0.001
Others	29 (70.7)	7 (14.9)		
The virus causing COVID-19 is novel				
True	33 (80.5)	37 (78.7)	0.04	0.838
False	8 (19.5)	10 (21.3)		
Which is not a symptom of COVID-19				
Jaundice	35 (85.4)	45 (95.7)	FET	0.139
Incorrect options	6 (14.6)	2 (4.3)		
80% of cases present with severe symptoms				
False	25 (61.0)	23 (48.9)	1.28	0.258
Others	16 (39.0)	24 (51.1)		
The epicentre of the epidemic in Nigeria				
Lagos	12 (29.3)	30 (63.8)	10.5	0.001
Others	29 (70.7)	17 (36.2)		
COVID-19 is an airborne disease				
False	10 (24.4)	38 (80.9)	28.16	<0.0001
Others	31 (75.6)	9 (19.1)		
Which is not a mode of transmission of COVID-.19				
Human to animal	20 (48.8)	34 (72.3)	5.13	0.024
Others	21 (51.2)	13 (27.7)		
COVID-19 declaration as a pandemic was on March 15th, 2020				
False	4 (9.8)	23 (48.9)	FET	<0.0001
Incorrect option	37 (90.2)	24 (51.1)		
NCDC is charged with providing real-time data on cases of COVID-19				
True	37 (90.2)	45 (95.7)	FET	0.411
Others	4 (9.8)	2 (4.3)		
Suspected cases are quarantined for				
14 days	39 (95.1)	46 (97.9)	FET	0.596
Others	2 (4.9)	1 (2.1)		

FET: Fischer's exact test, Others: Incorrect options, SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2

Table 3: Assessment of knowledge regarding preventive measures/management of COVID-19 by pre- and post-test

Variable	Knowledge assessment, frequency (%)		χ^2	*P*
	Pretest	Post-test		
Washing of hands should be done regularly under running water for 10 s				
Correct response	7 (17.1)	17 (36.2)	4.03	0.04
Incorrect/no idea	34 (82.9)	30 (63.8)		
Hand sanitizers are not a replacement for hand washing				
True	18 (43.9)	34 (72.3)	7.33	0.007
False/no idea	23 (56.1)	13 (27.7)		
Social distancing is not required when one puts on a face mask				
False	35 (85.4)	43 (91.5)	FET	0.50
True/no idea	6 (14.6)	4 (8.5)		
Everyone is at risk of developing COVID-19				
True	40 (97.6)	46 (97.9)	FET	1.00
False/no idea	1 (2.4)	1 (2.4)		
The elderly are at a reduced risk of acquiring COVID-19				
False	29 (70.7)	34 (72.3)	0.03	0.87
True/no idea	12 (29.3)	13 (27.7)		
The incubation period for COVID-19				
2-14 days	37 (90.2)	46 (97.9)	FET	0.18
Others	4 (9.8)	1 (2.1)		
Physical distance measurement				
Correct (1-2 m)	4 (9.8)	23 (48.9)	FET	<0.0001
Incorrect	37 (90.2)	24 (51.1)		
Some cases of COVID-19 are asymptomatic				
True	32 (78.0)	45 (95.7)	FET	0.02
False/no idea	9 (22.0)	2 (4.3)		
Recognized treatment is available				
False	25 (61.0)	37 (78.7)	3.31	0.07
True/no idea	16 (39.0)	10 (21.3)		
Least precautionary measure for COVID-19				
Wearing a facemask/face covering	10 (24.4)	11 (23.4)	0.012	0.91
Other measures like hand washing	31 (75.6)	36 (76.6)		
A vaccine is available				
False	29 (70.7)	42 (89.4)	4.88	0.03
True/no idea	12 (29.3)	5 (10.6)		
Locking down will help flatten the curve				
True	38 (92.7)	44 (93.6)	FET	1.00
False/no idea	3 (7.3)	3 (7.3)		
Isolation is the same as quarantine				
False	18 (43.9)	15 (31.9)	1.34	0.25
True/no idea	23 (56.1)	32 (68.1)		

FET: Fischer's exact test, Others: Incorrect options

Table 4: Association between pre- and post-test assessment of health workers' knowledge of COVID-19

Variable Knowledge assessment	Mean±SD	*t*	*P*	95% CI
Pre- versus post-test	15.13±3.40	41.7	<0.0001	14.4-15.9

CI: Confidence interval, SD: Standard deviation

among community-based HCWs.[9] They alluded that the low level of knowledge displayed by HCWs may impact negatively on the delivery of appropriate information/care regarding COVID-19 among rural residents, especially in a resource-poor setting such as ours.[9] The provision of appropriate health education/evidence-based information about the COVID-19 pandemic can help stem the current misconceptions about the virus.[9] Especially in the rural setting was unbelief in its existence, as well as conspiracy-driven ignorance about the origins of the disease and its prevention is rift.[9] It is expected that with the appropriate knowledge about COVID-19 and its prevention, behavioural changes among HCWs can strengthen their willingness to carry out their duties effectively.[12]

Post-test analysis following the intensive 1 day training, revealed a sharp rise in knowledge to 83.8% among our study participants and this was statistically significant ($P < 0.05$). In a multicenter study carried out in Ethiopia, a high percentage

of knowledge (88.2%) regarding COVID-19 was demonstrated among HCWs.[13] The higher cadre of HCWs (i.e., nurses and doctors) and the sustained global/local media coverage of COVID-19 since its outbreak were alluded as the reason for this good response among the study participants.[13] Obtaining adequate knowledge irrespective of the cadre of the health worker is relevant to promote health education which should target reducing misinformation and ignorance surrounding the COVID-19 pandemic, particularly among rural dwellers many of whom do not believe in the existence of the disease.[9] Improved knowledge also enables compliance among HCWs with current guidelines as a means of preventing the infection as well as timely identification of cases[9,12] The sharp rise of knowledge demonstrated following the post-test, also suggests that updated medical education training should not be limited to the higher cadre of HCWs (doctors and nurses) but should be scaled down to include those HCWs working in the community and this should be done periodically. The reason being, that there is minimal supervision of HCWs at the community level, especially in the face of a shortage of this personnel.[9] Community health workers should be regularly provided adequate and up-to-date knowledge on topical health issues to provide optimal health-care services in their communities.

Regarding key preventive strategies against COVID-19, significant ($P < 0.05$) post-test analysis concerning knowledge of hand washing and physical distancing was observed. This finding may suggest that ensuring compliance with these simple preventive measures in a resource-constrained setting such as ours can be accomplished. The knowledge gained by HCWs may influence attitudes and practices among the workers as well as their immediate community by creating awareness and implementing sanitary measures and recommendations in the society.[14] At the early stage of the COVID-19 pandemic, improving infection prevention and control behaviours of HCWs was paramount.[15] Hand hygiene is widely recognized as a leading measure of infection prevention and control, which has been shown to be effective in decreasing the transmission of common respiratory viruses, including human coronaviruses, SARS, Ebola, and bird flu.[15] The WHO recommends hand hygiene, use of medical mask, sterilization of patient-care equipment, and linen as basic infection prevention and control strategies that can be readily deployed in a rural setting.[15]

Conclusion

This study demonstrates that HCWs at the primary level of health-care delivery in cross river state (CRS), have a poor level of knowledge of COVID-19 infection. Post-test analysis suggests that capacity building through training workshops and effective continuing medical education programs should not be limited to the higher cadre of health workers. In addition, training curricula for HCWs may need to be revised, to reflect infection prevention and control measures, especially at the grassroots level.

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Conflicts of interest

There are no conflicts of interest.

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