

RESPONSE TO THE COVID-19 OUTBREAK: LESSONS FROM A TERTIARY HEALTHCARE FACILITY IN SOUTHWEST NIGERIA

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ABSTRACT

Background: Mitigating the risk of nosocomial infection is one of the core functions of healthcare managers in hospital environments. This study aimed to describe the COVID-19 outbreak response in a tertiary healthcare facility in Nigeria.

Methods: A qualitative cross-sectional study was conducted among representatives of Heads of Infection Control Committees and units, the Accident and Emergency unit, Family Medicine unit, and Private Suites on the COVID-19 outbreak response at the University College Hospital, Ibadan, Nigeria. Data were analyzed using Colaizzi's phenomenological method.

Results: Overall, seven (six physicians and one nurse) HCWs were interviewed; six (71.4%) males and two (28.6%) females. The average age of the key informants was 45 ± 4.73 years. Four themes were identified. Theme one "Essentials of screening protocol and screening area" described the development of screening protocol, and dedication of a triage area. Theme two "Infection prevention and control within consultation premises" detailed adequate spacing; hand hygiene, use of personal protective equipment; environmental sanitation; and waste management. Theme three "Mounting up surveillance in the response activity" specified communication with the Disease Surveillance Unit; and surveillance activities. Theme four "Training and psychosocial support for staff" described staff training, and provision of psychosocial care to infected staff.

Conclusion: The COVID-19 outbreak measures implemented by the management of the University College Hospital, Ibadan were aimed at ensuring that the hospital does not get overwhelmed by the surge in COVID-19 cases. In order to improve outbreak response in hospital settings, it is important to undertake training, modify hospital practices, and evaluate implemented measures.

Keywords: COVID-19, Outbreak, Infection prevention and control, Nigeria, Outbreak control

INTRODUCTION

The emergence of the novel Coronavirus disease (COVID-19) has reiterated the frailties in the global health system with profound effects experienced in low and low middle-income countries.^{1,2} COVID-19 was declared a public health emergency of international concern by the World Health Organization on 11th January 2020 after SARS-CoV-2 had been transmitted to more than 100,000 people across international borders.¹ In order to contain the rapid spread of SARS-CoV-2, measures such as border closure, social distancing, and infection prevention and control practices (IPC) including regular hand hygiene were recommended.³ Shortly afterwards, community transmission of COVID-19 commenced and an increased demand for adequate healthcare ensued, thereby causing healthcare workers (HCWs) to be overwhelmed with increased workload.⁴ In parallel to public health responses, health facilities have had to swiftly implement internal strategies to maintain their workforce. The COVID-19 pandemic therefore required the implementation of adequate response in healthcare facilities, a component of which is surveillance within the health facility.⁵

Globally, 689,832,315 COVID-19 cases and 6,885,934 COVID-19 deaths have been recorded as of 3rd June 2023.⁶ Of this global total, Nigeria recorded 266,675 cases and 3,155 deaths.⁶ COVID-19 positivity rate has been reported to be nearly 10% among HCWs globally.⁷ This proportion is like the 13.44% reported of the Middle East Respiratory Syndrome Coronavirus disease infection among HCWs.⁸ China had recorded more than 5,000 HCWs' infection and Spain had recorded more than 50,000 HCWs' infection as of December 2020 with a notable difference in the risk of exposure in different wards.^{9,10} The increasing incidence of COVID-19 among HCWs have disrupted the regular provision of healthcare services to ailing individuals. To ensure that people are not denied their fundamental right to adequate healthcare, strategies for mitigating the risk of exposure to COVID-19 were developed by the administrators of health facilities.

Mitigating the risk of nosocomial transmission of COVID-19 has been demonstrated as one of the core functions of healthcare managers.¹¹ Such a hard undertaking required a thorough modification of long consolidated practices with flexible revisions of services in terms of routine governance, workflows, and task responsibilities.¹² Many risk assessment tools were developed to quantify the differences in the risk of COVID-19 exposure among different groups of HCWs at health facilities.¹³ These tools have also

informed on the safest approach to adopt to safeguard both HCWs and patients against COVID-19 infection. Amidst such a public health challenge facing the entire globe, public healthcare institutions in Nigeria were challenged to respond to a fast-growing hospital demand to cope with the need to provide inpatient care for severely ill individuals with life-threatening contagious conditions.¹⁴

Research among healthcare managers is needed to assess the effectiveness of the response measures as well as the challenges experienced. Findings from this research would be required to inform healthcare managers on evidence-driven solutions to tackling the COVID-19 pandemic and other emerging infectious disease, in healthcare settings. Therefore, this study aimed to describe the COVID-19 outbreak response in a tertiary healthcare facility in Nigeria.

METHODS

Study area

This study was conducted at the University College Hospital (UCH), Ibadan. The UCH is a large, multidisciplinary tertiary health facility, strategically located in Ibadan, Southwest Nigeria. The facility has 850 bed spaces and about 60% occupancy.¹⁵ At this setting, healthcare is provided with the specific task of undertaking high-complexity care within the hierarchical distribution of responsibilities among health services.

As of 28th March 2021, 3,000 individuals had been tested for COVID-19 at the UCH. Among them, 967 persons tested positive. This included 483 staff and 484 non-staff members. Of the 967 COVID-19 positive cases, 854 were managed through home care, while 113 got admitted to the Infectious Disease Centre. Also, 114 COVID-19 deaths were recorded as of 19th March 2021, and this consists of 112 patients and 2 members of staff.

In addressing nosocomial transmission of COVID-19 and to manage infected persons, the hospital committee in charge of response to emergencies and outbreaks of diseases assumed oversight functions on the COVID-19 response. A plan of action was developed and implemented in active collaboration with the Emergency Operations Centre (EOC), Oyo State Ministry of Health. Seven response pillars were instituted as follows: COVID-19 task force, surveillance, laboratory, case management, risk communication, management of COVID-19 dead and coordination – all under the direct coordination of the Chairman, Medical Advisory Committee (CMAC).

The hospital management made several purchases of personal protective equipment (PPEs), relevant equipment and other consumables. UCH-branded face mask, face shield and Hazmat suit were locally produced. A video on donning and doffing was commissioned by the management and used for trainings on IPC. The hospital received donations of PPEs, ambulance, consumables, and relevant COVID-19 equipment from the Federal Ministry of Health/Nigeria Centre for Disease Control (NCDC), Oyo State government/EOC, individuals, alumni groups of the College of Medicine, University of Ibadan/University College Hospital (CoMUI/UCH), international development partners, local and international non-governmental agencies, and corporate organizations. Laboratory support was provided by the College of Medicine and Oyo State government.

Case management of COVID-19 cases was guided by national protocols and commenced in a 6-bedded isolation and treatment ward; another building on the hospital premises was renovated and re-structured by a philanthropist to accommodate 20 patients during the first wave of the pandemic. Cost of treatment services for all COVID-19 patients was borne by the Oyo State government. Training support for all categories of health staff was provided by the Federal Ministry of Health, NCDC, World Health Organization, the United Nations Children's Fund, and the EOC. Real-time surveillance data capturing, and uploading was done on Surveillance, Outbreak Response Management and Analysis System (SORMAS) which was made available by NCDC via the EOC.

Study design

This was an in-depth interview.

Study population and units

The study was conducted among purposively selected representatives of Heads of Units and Committees that either served as gateways into the hospital or were saddled with surveillance and infection control. These included the accident and emergency unit, family medicine unit, private suites, infection control committee, infectious disease unit and disease surveillance unit. The accident and emergency unit, family medicine unit and private suites received COVID-19 patients from outside the hospital; the infection control committee and infectious disease unit played the roles of IPC and case management; while the disease surveillance unit performed the roles of surveillance, coordination of testing for COVID-19, results dissemination, triaging of confirmed cases for either care in isolation centre or monitored self-isolation and home-based care, and contact tracing.

Interview guide

An open-ended interview guide was developed by one of the researchers and modified by two others. We adapted the interview method to explore detailed information from the key informants in each unit. The following questions were included in the guide: "What are the screening and triaging modalities in place?", "How frequently are the recommended COVID-19 preventive measures such as social distancing, and infection prevention measures being practiced?" "What measures have been adopted to reduce the risk of COVID-19 transmission in your unit?" "On surveillance, what roles are being undertaken?" "Are trainings and psychosocial support provided for healthcare workers? If yes, what are the measures in place?" "What challenges have you experienced thus far?" "How do you think the challenges could be addressed?". To enhance the depth of the discussion, prompts such as "Could you please elaborate on the subject matter" and "Could you please use practical examples" were used.

Data collection procedure

As of the time of the interview, the researchers were members of the COVID-19 outbreak response team. Prior to the conduct of this research, the interviewers had undergone trainings on qualitative research methods. The respondents were approached via e-mail; all of whom provided consent after they had been informed of the research objectives. The survey tool was sent to participants by e-mail, which were filled and submitted within 14 days. Overall, the interview was conducted among seven purposefully selected persons. Because of the good working relationship, the participants had confidence in sharing their experiences. Findings were harmonized by all the authors to ensure that respondents' experiences were adequately captured.

Data analysis

Analysis of the data was done using the Colaizzi's phenomenological approach.¹⁶ This approach is frequently used in the health sciences to enhance the depth of the subject matter under investigation. The method incorporates seven vital steps through which the researcher familiarizes himself with the data, identifies relevant statement, formulate meanings, develop themes and clusters, describes the phenomenon using identified themes, develops a structure, and verifies the phenomenon from few participants. The manual compilation was done by AAA and OSI. For verification purposes, a copy of the compiled contributions was shared with each participant.

Ethical considerations

This study was conducted as one of the activities of the COVID-19 outbreak response; therefore, ethical approval was not required. Verbal informed consent was obtained from each participant, and privacy and confidentiality of information were guaranteed prior to the commencement of data collection. Research participants were not exposed to any harm because of their participation in the study.

RESULTS

Overall, seven (six physicians and one nurse) HCWs were interviewed; six (71.4%) males and two (28.6%) females. The average age of the key informants was 45 ± 4.73 years. From the interviews, four themes and 10 sub-themes were identified. The first theme was named essentials of screening protocol and screening area; theme two was labelled infection prevention and control within consultation premises; theme three was named mounting up surveillance in the response activity in each unit; and theme four was labelled training and psychosocial support for staff (Figure 1).

the COVID-19 pandemic, a 5-item screening algorithm for flu-like symptoms was developed and used for a quick screening of both staff and patients who sought medical services in the hospital. For HCWs and patients with high index suspicion of COVID-19 based on a minimum score of three out of five, they were mandated to undertake a nasopharyngeal swab collection and RT-PCR testing for SARS-CoV-2. If tested positive for viral RNA and symptomatic and have at least one poorly managed co-morbidity such as uncontrolled diabetes mellitus and hypertension, they were admitted into isolation and treatment centres. Those who tested positive and were asymptomatic, and devoid of a co-morbidity were managed on home-based care.

“We have fared well on the development of a definitive screening protocol. Things are a bit different when comparing the first wave with the second wave” (Infectious Disease Unit).

“The protocol developed measured up to standard because it considered the case definition of the disease as per the eligibility for screening” (Disease Surveillance Unit).

“The clinic developed a standard operating procedure for consultations during the COVID-19 pandemic. This was sent to the office of the Chairman, Medical Advisory Committee for approval” (Task Force).

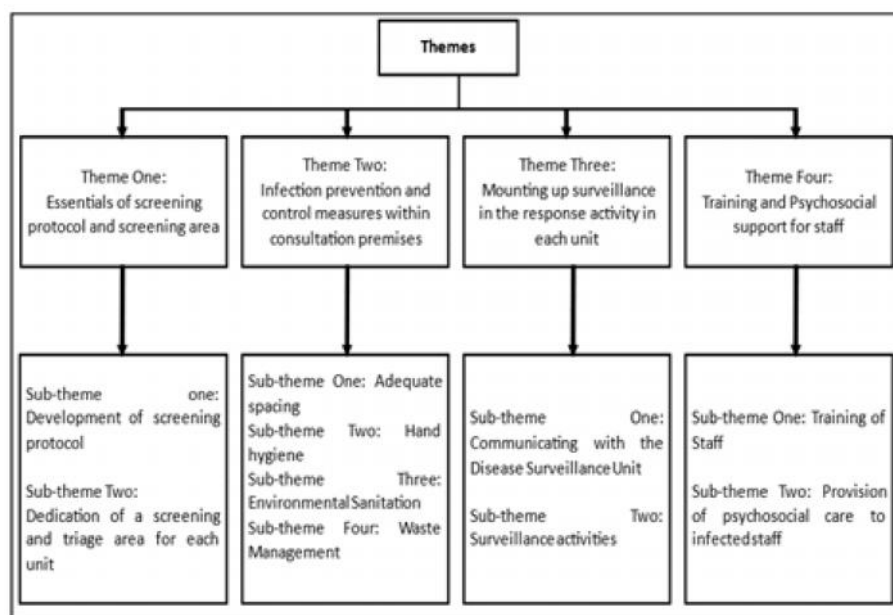


Figure 1: Summary of themes identified from the in-depth interview with heads of selected units in the University College Hospital, Ibadan, 2021

Theme One: Essentials of screening protocol and screening area

Sub-theme one: Development of screening protocol

The development of a screening protocol was prompted by the need to promote public health in health facilities, and this was done according to evidence-based standards. During the first wave of

“There is a wide difference in the screening protocol during the first and second waves of COVID-19. During the first wave, patients and health workers who are probable COVID-19 cases are compulsorily required to do a nasopharyngeal swab collection and RT-PCR testing for SARS-CoV-2. If such tests yield positive results at first, many repeat tests are conducted until the tests are negative. The patient would be retained in the isolation centre until the test is negative. But during the second

wave, discharge is done 14 days after the initial COVID-19 positive test. It is believed that the viral load must have been suppressed by the end of the incubation period” (**Hospital IPC Committee**).

“A screening protocol and tool was developed for all patients and members of staff” (**Staff Clinic**).

“Emergency Unit had a screening tool for patients that incorporated the clinical presentations for risk stratification. Scores were used to determine the level of risk” (**Emergency Unit**).

“Symptoms and signs-based pen and paper checklist have been developed to assess COVID-19 exposure among general out-patients”. Symptoms-based online (Google document enabled) COVID-19 self-assessment checklist have been developed for Department of Family Medicine staff members” (**Family Medicine and Private Suites**).

Many units confirmed that they experienced some challenges while trying to adjust to the needs of the different waves of the COVID-19 pandemic. Other challenges were due to insufficient skills among members of staff.

“We had to modify the standard operating procedure twice based on prevailing circumstances and the COVID waves” (**Disease Surveillance Unit**).

“The NCDC and other bodies made frequent changes to the case definition, and this led to changes in our local protocol. Our protocol was not widely disseminated in good time within the institution” (**Infectious Disease Unit**).

“Lack of adequately trained workforce for the purpose mitigated the response activity in many instances. A designated “Response Squad” for regular training on protocol templates in various scenarios is required” (**Task Force**).

“The screening tool originally did not incorporate O_2 saturation and was not validated locally. Some parameters were changed due to community transmission of SARS-CoV-2. I would have loved to have validation test done (sensitivity, specificity, NPV and PPV conducted for the tool)” (**Emergency Unit**).

At the Family Medicine and Private Suites as well as the Disease Surveillance Unit, more challenges were reported since that was where COVID-19 tests were conducted, and tests results were generated. Many of these challenges were either from patients themselves or officers at the booking centre. Inconsistent use of self-assessment tool by staff members was a major challenge experienced. To address these challenges, education of patients prior to sample collection was required, and regular supply of swabbing materials was considered as necessary.

“Patients present late and always in a hurry to leave the swabbing centre. A times, some patients present at the centre without prior booking or scrutiny. The need to postpone the time or date invited for swabbing may be necessary if members of staff are not informed on time. Management teams may make mistakes in patient’s names, and some patients just simply decline swabbing. Due to the long waiting time (which we tried to improve on), many people prefer to be swabbed at home. Proper assessment and scrutiny of patients should be done using the case definition before presenting for screening. Education and the importance of the procedure should be explained to the patients prior to presentation at the sample collection centre. The Staff Medical Services should take up the eligibility of all members of staff for screening. Swabbing materials should be supplied weekly if not monthly rather than the daily stressful supplies” (**Disease Surveillance Unit**).

“Evasive behaviour by anxious patients wary of being detected. Inconsistent use of self-assessment tool by staff members, especially those without smartphones. Daily health education of patients (by Public Health Nurses) on the importance of assessment for COVID-19 exposure”

(**Family Medicine and Private Suites**).

Sub-theme Two: Dedication of a screening and triage area for each unit

Although it was intended that a screening and triage area is developed in each unit, this response measure yielded suboptimal results. For instance, only a few units such as the Infectious Disease unit, emergency, and staff clinic successfully dedicated a separate screening and triage area.

“We operated our clinic under tents at the general out-patient (GOP) car park to ensure adequate ventilation and reduce covid transmission risk in our overpopulated and poorly ventilated GOP complex. In addition, we had a screening and triage area under the tents in the car park” (**Staff Clinic**).

“Initially, two tents A and B were used but were abandoned due to poor logistics. The designated screening area was outside the drive-through area of the Emergency” (**Emergency unit**).

“We only achieved up to sixty percent at the Medical Out-Patient (MOP). Although the performance is above average, I consider it to be sub-optimal” (**Infectious Disease Unit**).

For the Task Force, a centralized area was designed for the registration of names and collection of samples for everyone who wanted to enrol for the COVID-19 test. The open area helped to prevent overcrowding; a risk factor for COVID-19 transmission. The medical out-patient was also able to separate a screening and triage area for her patients.

“A centralized screening area was applicable to reduce the risk of COVID-19 transmission, and this was eventually set up” (Task Force).

“The Medical out-patient achieved the global recommendation for each unit in the healthcare facility to carve out separate screening and triage areas for each unit” (Infectious Disease Unit).

“Demarcation of an outdoor walk-through area for triaging general out-patients before permitting entry for full clinical encounters” (Family Medicine and Private Suites).

Challenges faced in the dedication of a screening and triage area in the units included delays in marking out a screening area, constraints on adequate ventilation, insufficient training, and exposure to unsafe environmental conditions. To address this, making environmental conditions more suitable and comfortable was suggested as strategies for improving service delivery amid the COVID-19 pandemic.

“The staff clinic consulting rooms are well ventilated. Windows were kept open and consulting rooms curtains were folded up when not in active use to ensure cross ventilation. The works department should from time to time send workers to grease the handles of the windows in clinics with machine oil to prevent friction. Non-cooperation of staff members to go through the triage area or screening made the COVID-19 response at the staff clinic to be less effective. (Staff Clinic).

“Delay in marking out and operationalizing a screening area delayed prompt action-taking in other units. Appropriate mapping of the community for various response activities in emergency is all that is needed” (Task Force).

“There were constraints with space and ventilation. This was achieved by limiting the flow of patients and their relatives into the clinic. Some of the non-medical personnel charged with screening and crowd control such as security personnel were not adequately trained. The MOP needs to be expanded and ventilation should be taken into consideration subsequently” (Infectious Disease Unit).

“Disruption of the outdoor triage process occurs whenever it rains. The provision of an expansive awning to protect general out-patient’s outdoor triage area from rainfall is one of our most important needs” (Family Medicine and Private Suites).

“There were no proper donning and duffing areas, no privacy for suspected patients, and there was prolonged waiting time for patients” (Emergency unit).

Theme Two: Infection prevention and control measures within consultation premises

Sub-theme One: Adequate spacing

To ensure adequate spacing in line with the recommended social distancing guideline for the prevention of COVID-19, the Hospital IPC Committee has dedicated wards and consultation rooms for COVID-19 related cases. To address the challenge of delay in preparing a designated area and lack of triage space distinct from other duties, appropriate mapping of the community for various response activities in emergency was necessary.

“Dedicated wards and consult for COVID-19 related cases are some of the activities we have engaged in. Although we experienced delay in preparing a designated area and lack of triage space distinct from other duties, I am certain that appropriate mapping of the community for various response activities in emergency will be needed to overcome such delays” (Task Force).

“Also, at the patient waiting area/ lounge, we ensured patients left a space in between chairs. Patients had to wait outside in the open air under the tents and were brought in at intervals. Major challenges with which the Staff clinic is faced is the inadequate number of chairs to serve patients, so some had to stand, and longer patient waiting time since they were brought in at intervals. To address this, there is an urgent need for the provision of a bigger clinic space for the staff” (Staff Clinic).

“In the Special Treatment Clinic, consulting room patient chair was placed at a 2m distance. The waiting area could only accommodate 4 patients if COVID-19 protocol should be observed. To address this challenge, extra sitting arrangement was needed around the entrance towards the South end” (Hospital IPC Committee).

“De-cluttering of GOP consulting rooms and clinic areas. Prohibition of more than one physician per consulting cubicle. Protection of paper forms on GOP clinic tables by placing them inside see-through plastic folders. But one challenge that we have experienced is in the reduction of the number of seats available for simultaneous patient-doctor consultations per time in GOP clinic. Therefore, I think that developing a staggered roster for GOP patient-doctor consultations will be beneficial” (Family Medicine and Private Suites).

“Initially the number of patients per cubicle was reduced from two to one. We later resolved to return back to two per cubicle with strict mask measures. There was access block as many more patients were always waiting outside to be seen. Due to inadequate social distance, we advocate for reduction in number of visitors and frequency of visiting time, strict mask mandate” (Emergency Unit).

Sub-theme Two: Hand hygiene and use of personal protective equipment

Hand hygiene practices have been promoted in many units at UCH, and individuals, including patients and members of staff, are more responsible towards adhering to this recommended guideline. Hand hygiene is done using either soap and water, or alcohol-based hand rub placed at the entrance of each unit before entry could be gained.

“Wash hand basin with running water was augmented with veronica bucket. Veronica bucket with water and liquid soap was permanently placed at the entrance for regular handwashing by staff, visitors, and patients. All users of the special treatment clinic were required to wash hands before entry to the clinic. All were made to use Face masks correctly. The use of hand gloves was mandatory. Hand Sanitizer (personal and communal) was also available.” (Hospital IPC Committee).

“There was an increase in facilities enabling hand hygiene across the hospital. A documentary video on donning and doffing was commissioned by the management; this is being used for infection prevention and control trainings” (Infectious Disease Unit).

“Veronica bucket system, soap and water, and hand sanitizers were positioned in designated places” (Task Force).

“The provision of veronica stands and hand washing liquid at the entrances to the clinic including banners to state the need for handwashing before entering the clinic area has helped us to observe handwashing practices in UCH. We were able to develop a risk management plan for the department in collaboration with the Health and safety committee which has been submitted to the UCH Task Force” (Staff Clinic).

“Maintenance of separate hand wash stations for patients, departmental visitors, and staff members is one of our major achievements” (Family Medicine and Private Suites).

Challenges experienced regarding the practice of hand hygiene included inadequate hand hygiene materials, including lack of running water occasionally, and inadequate supply/stock-out of handwashing liquid and hand sanitizers by pharmacy. To promote adherence to hand hygiene practice, alcohol-based hand rub, soap, veronica buckets, and steady water should be provided.

“Though there was an increase in veronica buckets and handwashing sites, but running water remained a challenge. There were difficulties in accessing the PPEs even when they were available. There were challenges with water supply and availability of soap as well as waste disposal. The provision of running water needs to be prioritized” (Infectious Disease Unit).

“Inadequate hand hygiene materials, including lack of running water on many occasions discouraged the frequent practice of handwashing. To promote a culture of handwashing, reengineering

plumbing system of the hospital and water supply for easy access to water are major requirements. Retraining of staff on infection prevention and control measures and special stocking of materials needs to be deployed in an emergency” (Task Force).

“Inconsistent water supply to GOP clinic. Short supply of hand sanitizer and liquid soap. Prioritization of water supply to high volume areas within the hospital should be undertaken” (Family Medicine and Private Suites).

“Inadequate supply/ stock out of handwashing liquid and hand sanitizers by pharmacy was a major issue. Several members of staff refuse to obey covid prevention protocols. The management should empower the pharmacy department to produce more than enough for all departments. Constantly reminding staff members through circulars from the management, messages to their heads of unions and banners all over the hospital is required” (Staff Clinic).

“I was in charge of PPE logistics, but there was an occasional short supply of PPE especially face masks. The quantity of various components of PPE consumed was enormous but the store on various occasions lacks the supply of critical items like Face masks (Surgical, N95) and even Conform gloves. There should be an audit of PPE consumed daily, weekly, and monthly. This will enable the hospital to ensure adequate supply of PPE. Monitoring of PPE use at the clinics, wards, etc. should be carried out from time to time” (Hospital IPC Committee).

“We conducted training for all members of the department in “donning” and “doffing” of PPE. But not all members were directly trained. Doctors from other departments who were not trained used the PPEs inappropriately in the department. Training should be organized for everyone” (Emergency Unit).

Sub-theme Three: Environmental Sanitation

Strategies for promoting environmental sanitation were in place, however, they were suboptimal. Disinfection of surface areas and office environments is required to prevent nosocomial transmission of COVID-19. However, disinfectants were not in adequate supply. Sanctions on the maintenance of environmental sanitation need to be enforced to promote a sense of responsibility among healthcare workers. Further, regular maintenance of equipment used for environmental sanitation needs to be ensured.

“Environmental sanitation improved slightly during the pandemic. Clearing of bushes was not always done routinely and had to be requested when needed” (Infectious Disease Unit).

“Environmental sanitation has improved compared to the past” (Disease Surveillance Unit).

“Dedicated Environment Health Unit for the care of the environment. Limited personnel and dealing with a poor attitude to complying with environmental hygiene. Create more awareness and promote environmental hygiene across the community and applying strict sanctions over violation. Create more awareness and promote environmental hygiene across the community and applying strict sanctions over violation” (Task Force).

“Twice a day disinfecting of all surfaces and door handles in the department. Daily cleaning of the clinic area and offices with chlorinated water and other cleaning materials. Inadequate supply of cleaning materials like JIK and disinfectants by the hospital. The hospital management should procure more than enough materials. The Works department should connect the Staff Clinic with the borehole supplying the adjacent manufacturing unit of pharmacy to ensure constant water supply” (Staff Clinic).

“Use of 0.5% Hypochlorite solution was used to clean all surfaces. The Hypochlorite Water Tanks should be maintained, and the faulty taps and tanks should be repaired” (Hospital IPC Committee).

“We had to introduce disinfection twice daily for all general surfaces in the clinic (such as door handles and tabletops) with 0.5% hypochlorite. The team sustained appropriate remuneration for casual workers hired to implement clinic disinfection protocol. We also adopted task-shifting of disinfection responsibilities to UCH Environmental Sanitation team” (Family Medicine and Private Suites).

Sub-theme Four: Waste Management

Prior to the COVID-19 pandemic, waste management was highly deficient in the hospital premises. However due to the COVID-19 pandemic, waste management practices were scaled up.

“We conducted daily evacuation of all waste and biological waste from the GOP laboratory to the points designated by environmental health department” (Staff Clinic).

“There is adequate supply of appropriate coded nylon bags for disposal of the waste generated in Special Treatment Clinic” (Hospital IPC Committee).

“Dedicated waste management bins for particular wastes have been set apart” (Task Force).

“The Department of Environmental Services was contacted for decontamination and disinfection of contaminated surfaces and area” (Emergency Unit).

Despite the notable improvements, waste management practices were suboptimal. Therefore, public health campaigns on health and safety, and improved training of members of the sanitation department have been implemented.

“Waste disposal and environmental cleaning should be done regularly without requiring a special request” (Infectious Disease Unit).

“Poor adherence to waste coding and separation and inadequate supervision of the waste bins. Public education on waste coding and implication to health and safety, and adequate maintenance and prompt emptying of bins” (Task Force).

“Littering of Collection point was sometimes observed behind Chemical Pathology Department. Additional Training of the Waste collectors may be necessary” (Hospital IPC Committee).

Theme Three: Mounting up surveillance in the response activity in each unit

Sub-theme One: Communicating with the Disease Surveillance Unit

Keeping communication routes open with the Disease Surveillance Unit is key towards an adequate COVID-19 response in health facilities. The Infectious Disease Unit, Family Medicine and Private Suites, the Hospital IPC Committee, Emergency Unit, and Staff Clinic maintained regular communication with the disease surveillance unit. However, the Disease Surveillance Unit maintained that the objective of keeping communication routes open with the unit was not met.

“The Disease Surveillance Unit staff were very accessible to those of us that worked closely with them. There were ambiguities to many healthcare workers as to the roles and responsibilities of the Disease Surveillance Unit and as to how to get in touch with them. Information about who to contact and how should be widely disseminated” (Infectious Disease Unit).

“We have a good working relationship with Disease Surveillance Unit workers” (Family Medicine and Private Suites).

“The Closed User Group (CUG) number was available and the number to use to contact the Disease Surveillance Unit was made known to all staff” (Hospital IPC Committee).

“We report periodically to the Disease Surveillance Unit” (Emergency Unit).

“The aim of keeping in touch with the Disease Surveillance Unit was not totally achieved because we had few personnel available.” (Disease Surveillance Unit).

Although the Disease Surveillance Unit was responsive to identified needs of other units, their prompt response was slowed by some challenges, most especially large workload. To prevent recurrences, more personnel are required to work with the Disease Surveillance Unit.

“Slowness of Disease Surveillance Unit response to urgencies communicated due to bottlenecks and personnel overwhelm. Allocation of dedicated Disease Surveillance Unit personnel to high-pressure departments and entry points into the hospital” (Family Medicine and Private Suites).

“Appointment of a COVID-19 focal person- consultant Family Physician to liaise with the Disease Surveillance Unit for staff testing positive. Formation of a departmental COVID-19 team of 4 doctors to collate and send names of staff requiring covid testing to the Disease Surveillance Unit is also important” (Staff Clinic).

“Dedicated phones and officers handling calls are of great importance” (Task Force).

Sub-theme Two: Surveillance activities

Surveillance activities were regularly conducted across board. A large proportion of members of staff in each unit actively participated in surveillance activities. *“All the Doctors and Nurses actively participated using the WHO assessment tool for patient’s screening” (Hospital IPC Committee).*

“COVID surveillance was very well executed” (Infectious Disease Unit).

“Development of a COVID-19 symptom screening form which was administered to every patient presenting to clinic. Use of same tool for the staff of the department. Excuse duty for a few days for any departmental staff with upper respiratory tract infection symptoms pending covid testing” (Staff Clinic).

“There was the presence of a Special Surveillance Unit” (Task Force).

“Initiation of routine surveillance by GOP Health & Safety Committee” (Family Medicine and Private Suites).

Surveillance challenges experienced by the different units included lateness in reporting cases, weak data collection, and inadequate resources to provide consistent activities. To ensure a strengthening of surveillance activities, better-equipped surveillance units with requisite personnel, ICT devices, and logistics needs to be provided.

“Surveillance activities suffered drawback during the 1st and 2nd wave. A lot of manual work took much time. Limited staff number. Other cases were missed. Adequate and prompt reporting of cases could not be achieved. There was weak and inconsistent data sources. We need all appropriate data collection tools to be provided, and more officers like Record officers and Statisticians stationed. Enough committed community/ hospital informants are needed. Strengthening other surveillance activities within and outside focal sites. Training of staff in the unit” (Disease Surveillance Unit).

“Distraction of committee members by regular duties hindered the effectiveness of surveillance activities. The provision of institutional support for Health & Safety Committees is quintessential” (Family Medicine and Private Suites).

“Inadequately resourced to provide consistent activities in an evolving circumstance. Better equipped surveillance units with requisite personnel, ICT devices and logistics are needed” (Task Force).

“Some patients do not give truthful answers to the questions and would have unnecessarily exposed the medical staff. Continue to encourage staff to declare their symptoms for the safety of everyone.” (Staff Clinic).

Theme Four: Training and Psychosocial Support for Staff

Sub-theme One: Training of Staff

The training of staff is an activity that has been organized by the hospital. Facilitation of training for all categories of members of staff, and step-down trainings have been organized to improve the response activity within the hospital premises.

“Staff of Special Treatment Clinic joined the various training on infection prevention and control organized by the Hospital. Regular in-house training on infection prevention and control, and hand washing technique is needed” (Hospital IPC Committee).

“We facilitated trainings for all categories of UCH staff on infection prevention and control measures and other relevant modalities related to the pandemic” (Task Force).

“We conducted step-down trainings to all staff by a consultant and Senior Medical Officer who attended the hospitals.” (Staff Clinic).

“Multiple trainings were held, and this was very helpful” (Infectious Disease Unit).

“More than 2,000 federal, state, and local government health staff comprising pharmacists, nurses, doctors, laboratory scientists, physiotherapists and health assistants participated in series of trainings on infection prevention and control, health and work safety practices and case management of COVID-19 disease. (Disease Surveillance Unit).

Although measures were in place to ensure that all training needs were met, the provisions fell short of the demand. As a result, training deficit slowed the progress of the COVID-19 response in the hospital. To prevent subsequent delays in the outbreak response activity, relevant training criteria need to be developed, and training should be continued all year round.

“The training in highly specialized areas like oxygen delivery and therapy fell short of what was needed and should have been

more hands-on. Training should be ongoing and year-round especially for infection prevention and control.” (**Infectious Disease Unit**).

“It was difficult mobilizing committed and motivated staff. We had to establish criteria for identifying relevant profile for training is stressful” (**Task Force**).

Sub-theme Two: Provision of psychosocial care to infected staff

The provision of psychosocial and medical care to infected staff did not gain cognizance in the early period of the outbreak response. Challenges were also experienced on where suspected cases among members of staff could be managed. To overcome these challenges, pre-planning of a holistic care for members of staff, including the establishment of a social welfare committee consisting of representatives of different heads of departments was mandatory.

“This aspect was largely neglected. The welfare of staff needs to be prioritized even for those who did not get infected while caring for COVID patients. A psychosocial committee was also established but at a rather late period.” (**Infectious Disease Unit**).

“Formation of virtual support groups (using social media) for COVID-19 infected and exposed members of staff on self-isolation or quarantine was necessary. We had to do all these” (**Family Medicine and Private Suites**).

“Provisions were made for a designated helpline for staff with no or mild symptoms to call in the event they have complaints. This was shared with the Disease Surveillance Unit and put on a patient information leaflet which was shared with any newly diagnosed staff member. We had to put calls through to check on the welfare of members of staff who were diagnosed with COVID-19. We had to provide a small welfare package for our staff who got infected. Collaboration with the Department of Psychiatry and clinical psychology for the provision of mental health services to infected staff” (**Staff Clinic**).

“We had a lot of challenges as to where to put members of staff or their relatives who were COVID-19 suspects. Many times, East 2 was not available, the Accident and Emergency unit also would not take and because we were working under tents in the car park, we had no isolation area to use, and some patients had to wait in their cars for hours. The hospital should provide funds for a social welfare package for infected staff. This is apart from the provision of free vitamins. Get well soon cards can be signed by the CMAC or CMD and sent to infected staff. A social welfare committee can be set up to consisting of representatives of staff clinic, psychiatry, clinical psychology, Nursing and Medical Social Services” (**Task Force**).

“Staff were provided available medical care and had some follow-up by a dedicated officer. We had a general lack of organized

social welfare. Preplanning of holistic care for staff members is important” (**Emergency Unit**).

DISCUSSION

This study described the response to the COVID-19 outbreak in a tertiary healthcare facility in Nigeria. Many activities, including the development of a screening protocol, designation of triaging area, and the provision of materials to reduce the risk of patients and staff to SARS-CoV-2 helped to promote health and safety in the UCH. Similar activities have been reported at the University of Benin Teaching Hospital, Benin city, Nigeria, where risk stratification programs were undertaken to reduce the risk of exposure to SARS-CoV-2 in the health facility.¹⁴ A study conducted in a resource-limited setting in India reported that the enforcement of hand hygiene and other IPC measures as well as the organization of capacity-building trainings for HCWs boosted the confidence of HCWs and helped to prevent cross-infection in health facilities.¹⁷

Assessment of the temperature of individuals was done to promptly identify persons with febrile illness. Results from previous studies have revealed the effectiveness of the fever clinic concept in the conventional identification of high-risk COVID-19 positive cases.¹⁸ As a result, temperature check was done before any patient could enter any of the units in the UCH. Similarly, the enforcement of the use of face masks was overseen by members of the COVID-19 Task Force. These individuals were positioned at the entrances of the health facility to ensure adherence to the use of face masks by commuters, pedestrians, as well as HCWs. As a result, people became intentional on adhering to the recommended guidelines to protect themselves against COVID-19. Thus, the COVID-19 pandemic created the opportunity for promoting public involvement in the outbreak response activity.

Regarding the challenges experienced during the COVID-19 outbreak response, this study identified the presence of inadequate surveillance officers and surveillance activity. These deficits need to be addressed immediately. Since surveillance is a major determinant of the effectiveness of any outbreak response,¹⁹ maintaining communication with the disease surveillance unit, the command centre of the COVID-19 outbreak response, is key. Due to the critical role it performs, facility-based disease surveillance has been included as one of the eight components of IPC. In a study conducted in Benin, Nigeria, the combination of surveillance approaches with risk assessment during a five-month period helped to identify 78 COVID-19 positive cases.²⁰ Epidemiological links to contacts were also identified through surveillance activities. As

a result of surveillance activities at the UCH, nearly 1,000 COVID-19 positive hospital staff and patients (more than 10% of COVID-19 cases reported in Oyo State) were confirmed. This finding emphasizes the role of disease surveillance in the timely identification of probable COVID-19 cases, most of whom have been previously exposed to a confirmed case. Thus, surveillance activities should be intensified in health facilities during the COVID-19 outbreak. The recruitment of data analysts and information management and dissemination officers into the surveillance team in health facilities should be prioritized.

We found that hospital policies were modified to observe physical distancing in office spaces and consultation areas. Despite these modifications, poor logistics regarding ventilation and poor IPC practices placed many constraints on the effectiveness of the COVID-19 outbreak response in reducing the risk of COVID-19 transmission in the health facility. A retrospective account from Spain revealed that physical distancing during lunch breaks contributed to a decline in the number of COVID-19 infections among HCWs.²¹ Adequate staff training regarding the donning and doffing of personal protective equipment and other IPC-related matters should therefore be undertaken in health facilities. This will help to improve the capacity of HCWs in each unit to respond appropriately when presented with possible COVID-19 cases. HCWs will also be empowered to take responsibility for the health of both themselves and their colleagues.

From this study, we found that the provision of psychosocial support to HCWs, especially the COVID-19 positive cases among them, was quintessential to reducing experiences of mental stress. Evidence-proven interventions that could be adopted by administrators of healthcare facilities and heads of units include the organization of virtual support groups, welfare teams, and distribution of welfare packages.²² Linkages of HCWs to professional counselling services have been reported as a viable strategy to improve the COVID-19 outbreak response strategy in health facilities.²³ Therefore, prompt assessment of the psychosocial needs of HCWs should be promptly undertaken to inform on their felt and expressed psychosocial needs. Knowledge acquired in this regard would be important to design appropriate interventions to meet the specific needs of HCWs.

CONCLUSION

The COVID-19 outbreak measures implemented by the hospital management were aimed at ensuring that the hospital does not get overwhelmed by the surge in

COVID-19 cases. The success stories and activities effective in promoting health and safety includes the development of a screening protocol, designation of triaging area, and the provision of materials. Positioning task force members at the entrances of the health facility to ensure adherence to the use of face masks by commuters, pedestrians, as well as healthcare workers was helpful. Prompt modification of hospital policies to observe physical distancing in office spaces and consultation areas also contributed to the progress. Despite these achievements, notable challenges were faced regarding surveillance, IPC practices, and lack of psychosocial support for HCWs and this could have limited the effectiveness of the outbreak prevention and control efforts. For this cause, we recommend that regular trainings on IPC measures are organized for all cadres of HCWs. For heads of the units in health facilities, psychosocial support should be enhanced, and a working relationship need to be established with the Medical Psychology department so that prompt psychosocial care could be provided for HCWs in need of such. Overall, regular evaluation of the outbreak control measures in place should be conducted by all unit and departmental heads to the CMAC to inform on the existing gaps and opportunities for improving the outbreak response efforts.

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Conflict of interest

The authors declare that there is no conflict of interest.

REFERENCES

1. World Health Organization. WHO Director-General's Remarks at the Media Briefing on 2019-nCoV on 11 February 2020. <https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020>
2. Lu H, Stratton CW, Tang Y-W. Outbreak of pneumonia of unknown etiology in Wuhan China: the mystery and the miracle. *J Med Virol.* 2020; 25678.
3. World Health Organization. Novel Coronavirus (2019-nCoV): Situation Report - 10. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200130-sitrep-10-ncov.pdf?sfvrsn=d0b2e480_2
4. Ilesanmi OS, Afolabi AA. Verifying the real estimates of COVID-19 deaths in Africa. *GERM.* 2020; 10:392-395.

5. **Ilesanmi OS**, Afolabi AA. In Search of the True Prevalence of COVID-19 in Africa: Time to Involve more Stakeholders. *International Journal of Health and Life Sciences*. 2020;e108105.
6. Worldometer. (2023). COVID-19: Coronavirus Pandemic. <https://www.worldometers.info/coronavirus/>
7. **Kim R**, Nachman S, Fernandes R, *et al.* Comparison of COVID-19 infections among healthcare workers and non-healthcare workers. *PloS One*, 2020; 15: e0241956.
8. **Xiao J**, Fang M, Chen Q, He B. SARS, MERS, and COVID-19 among healthcare workers: A narrative review. *J Infect Public Health*. 2020; 13: 843-848.
9. **Crespo J**, Calleja JL, Zapatero A. Widespread COVID-19 infection among Spanish healthcare professionals did not occur by chance. *BMJ Open*. 2020.
10. **Nienhaus A**, Hod R. COVID-19 among Health Workers in Germany and Malaysia. *Int J Environ Res Public Health*. 2020; 17(13): 4881.
11. **Du Q**, Zhang D, Hu W, *et al.* Nosocomial infection of COVID-19: A new challenge for healthcare professionals (Review). *Int J Mol Med*. 2021; 47: 31.
12. **Bielicki JA**, Duval X, Gobat N, *et al.* Monitoring approaches for health-care workers during the COVID-19 pandemic. *Lancet Infect Dis*. 2020.
13. **World Health Organization**. 2020c. Risk assessment and management of exposure of health care workers in the context of COVID-19. https://apps.who.int/iris/bitstream/handle/10665/331496/WHO-2019-nCov-HCW_risk_assessment-2020
14. **Obaseki DE**, Akoria OA, Mokogwu N, *et al.* Staff risks stratification in preparation for COVID-19 in a tertiary healthcare facility in Nigeria. *Pan Afr Med J*. 2020; 35: 124.
15. UCH. The University College Hospital. <https://uch-ibadan.org.ng/>
16. **Turunen H**, Perälä ML, Meriläinen P. Modification of Colaizzi's phenomenological method; a study concerning quality care. *Hoitotiede*. 1994;6: 8-15.
17. **Loembé MM**, Tshangela A, Salyer SJ, *et al.* COVID-19 in Africa: the spread and response. *Nat Med*. 2020; 26: 999 – 1003.
18. **He S**, Qiu Y, Jiang D, *et al.* COVID-19 screening- A report from a fever clinic in Shenzhen, China. *J Clin Microbiol Biochem*. 2020; 7: 006-013.
19. Federal Ministry of Health. (2019). National technical guidelines for integrated disease surveillance and response. <https://ncdc.gov.ng/themes/common/docs/protocols/>
20. **Ogboghodo EO**, Osaigbovo II, Obarisiagbon OO, *et al.* Facility-based surveillance activities for COVID-19 infection and outcomes among healthcare workers in a Nigerian Tertiary Hospital. *Am J Trop Med Hyg*. 2021; 104: 1034–104.
21. **Suárez-García I**, de Aramayona López MJM, Vicente A.S., *et al.* SARS-CoV-2 infection among healthcare workers in a hospital in Madrid, Spain. *J Hosp Infect*. 2020; 106: 357–363.
22. **Shanafelt T**, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *JAMA*. 2020; E1–E2.
23. **Mellins CA**, Mayer LES, Glasofer DR. Supporting the well-being of health care providers during the COVID-19 pandemic: The Cope Columbia response. *General Hospital Psychiatry*. 2020; 67: 62–69.