

Infection prevention and control assessment during the third wave of COVID-19 in Ekiti State, Nigeria

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ABSTRACT

Introduction: COVID-19 pandemic is still on and infection prevention and control (IPC) protocols are critical in preventing nosocomial outbreak. This study assessed IPC measures in health facilities in Ekiti State during the third wave of COVID-19. **Methods:** A total of 509 health facilities were assessed once weekly across the 16 local government areas (LGA) in Ekiti State between June and August 2021. A checklist was used to assess the availability of functional hand washing station, use of face masks by healthcare workers (HCWs) and availability of waste dis-aggregation management. Distribution of health facility and IPC assessment were summarized with percentages and proportions. Chi-square test was used to ascertain significance in cross-tabulation and statistical significance was defined as $p < 0.05$. **Results:** There were 2,640 visits to the health facilities with majority (87.2%) at the primary health centres. There was functional handwashing station, HCWs using facemasks and waste dis-aggregation management in 96.6%, 85.2% and 82.0% of the visits respectively to the health facilities. Statistically significant difference was observed in the availability of functioning hand washing station ($p = 0.004$), use of face mask by HCWs ($p < 0.001$), and presence of waste dis-aggregation ($p = 0.003$) across public primary, secondary, tertiary, and private health facilities within the state. **Conclusion:** There is a significant observation of IPC protocol as it relates to hand washing, use of face masks and waste dis-aggregation management across all the of health facilities in Ekiti State. It is desirable that this is sustained and improved upon.

KEYWORDS: Hands washing, Face masks, Waste dis-aggregation, Infection prevention and control

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Introduction

In December 2019, the first case of the coronavirus disease 2019 (COVID-19) was reported in the city of Wuhan, Hubei province of China [1]. COVID-19 was declared a Public Health Emergency of International Concern on January 31, 2020, by the WHO and categorized a pandemic by March 11, 2020 [2,3]. As of September 12, 2021, there were 224,180,411 infections with 4,621,205 deaths worldwide [4]. Healthcare workers (HCWs) continue to face an ever-increasing occupational risk of being infected with COVID-19 as they are saddled with the task of managing a rapidly increasing number of acutely ill patients, making crucial and critical choices under enormous physical and psychological pressure [5]. Globally, HCWs accounted for 3.9% of all COVID-19 infections, with as high as 9.3% of all positive cases in Nigeria [6,7].

There have been about 1,700 confirmed cases of COVID-19 as of September, 2021 in Ekiti State with a case fatality rate of 1.5% [8]. HCWs in the state have not been spared in this pandemic, as a result of limited testing as well as other reasons, there is difficulty in obtaining accurate data on HCW infection rate of COVID-19 [9]. However, unpublished data show that they account for about 1.5% of all COVID-19 infections in the state. Infection prevention and control practices (IPC) are practical, proven approaches that avert avoidable harm to patients and protect HCWs from infections. Available evidence demonstrates the effectiveness of safety guidelines including the use of personal protective equipment (PPE), disinfection of equipment as well as environment and waste management [10]. However, despite the good knowledge of IPC practices amongst HCWs, the compliance has been significantly poor [11-13].

Furthermore, the implemented IPC programme in many health facilities is sub-optimal due to unavailability of competent personnel, infrastructure, and inadequate provision of PPE [8]. A look at hand hygiene showed a good knowledge among HCWs, but most did not observe hand hygiene practices regularly and consistently due to lack of running water, soap, and alcohol-based hand rub [14]. HCWs did not have regular access to PPE, including appropriate facemasks [15]. A significant proportion of HCWs did not use medical facemasks

properly, regularly, and consistently [16]. In addition, there was paucity of proper safe disposal facilities of infectious medical waste, including non-implementation of infectious medical waste guidelines and lack of political will on the part of the authorities [17].

It is important to protect health workforce from COVID-19 as infected HCWs can serve as reservoir of infection to colleagues, patients, and the community. The knowledge of IPC is inadequate on its own if there is no high level of compliance to its practice among HCWs. Therefore, this study aimed to assess the level of IPC compliance in healthcare facilities in Ekiti State. This study would add to the existing literature as well as aid to influence policy on IPC in health facilities in Ekiti State, Nigeria.

Methods

This was an IPC assessment survey, carried out in all the health facilities in Ekiti State, Southwest, Nigeria. Ekiti State is one of the 36 states in Nigeria, with 16 local government areas (LGA). The health facilities within the state include the Federal Teaching Hospital, Ido-Ekiti, Ekiti State University Teaching Hospital, Ado-Ekiti, Afe Babalola Multi-System Hospital, Ado-Ekiti, three state specialist hospitals, eighteen general hospitals, 340 primary health centres, five tertiary institutional health centres and private health facilities.

These health facilities (509 health facilities) were visited once weekly by trained research assistants and these visits were carried out between epidemiological weeks 24 and 36 (June to August, 2021). The health facilities could not be visited at an equal number of times because of problems with access and/or security challenges in the areas where they are located at the time of the study. All the health facilities had at least five visits with the exception of three that could not be visited because of total security breakdown.

Healthcare workers (resident doctors, nurses, laboratory scientist) and individuals with a Masters in Public Health were recruited as research assistants. In order to prevent intra-observer and inter-observers bias, a three-hour workshop was held to train the research assistants. The training provided them with

knowledge of the study instruments and how to properly interpret the checklist as well as what to look for during the observation process. Other areas covered were the purpose of the survey, its methodology, potential field difficulties and feasible solutions.

Data were collected using Ekiti State COVID-19 health facility supportive supervisory checklist which was uploaded on android phone software-open data kit (ODK). This software has GPS tracker which ensure that the health facilities were visited. The researchers developed the Checklist while the face and content validity was done by Consultants Epidemiologists well as Infectious Diseases Specialists from the Federal Teaching Hospital, Ido-Ekiti, Nigeria. The checklist included questions on the characteristics of the health facility, availability of functioning hand washing station with soap and water, face mask use by all HCWs in the facility and the presence of a waste dis-aggregation management in the health facility. The checklists were completed by the research assistant after they observed each assessed IPC component in the health facility.

Collected data were downloaded from the ODK and analysed with the computer Microsoft excel sheet. Distribution of health facility and IPC assessment were summarized with percentages and proportions in frequency tables. Chi-square test was used to ascertain significance in cross-tabulation. Statistical significance was defined as $p < 0.05$.

Ethical approval for the study was sought and obtained from the Federal Teaching Hospital, Ido-Ekiti, Nigeria. Additionally, permission to use the health facilities in the State was taken from the Ekiti State Ministry of Health and Human Services. Consent was also taken from the head of the health facilities to observe and monitor their facilities. The healthcare workers in the health facilities didn't know they were observed in order to prevent Hawthorne effect.

Results

A total of 2,640 visits were made to all the health facilities in the State. Ilejemeje 246 (9.3%), Gbonyin 237 (9.0%) and Ido/Osi 221 (8.4%) were the local government areas (LGA) with the highest number of visits while Ekiti West 89 (3.4%) and

Irepodun/Ifelodun 118 (4.5%) had the least number of visits. Primary health facilities 2,302 (87.2%) were the most visited while 15 (0.6%) visits were made to tertiary health facilities ([Table 1](#)).

Functioning hand washing station with soap and water was available in the health facilities during majority of the visits 2,549 (96.6%). All HCWs in the facility were using face mask in most of the visits 2,248 (85.2%). Waste dis-aggregation management was present in the health facilities in over three-quarter 2,166 (82.0%) of the visits ([Table 2](#)).

There was a significant difference in the availability of functioning hand washing station with soap and water ($p=0.004$), use of face mask by health workers ($p<0.001$), and presence of waste dis-aggregation management ($p=0.003$) across public primary, public secondary, public tertiary and private health facilities within the state. Private health facilities had the highest proportion (9.2%) of visits with lack of functioning hand washing station while public tertiary health facilities had the highest proportion (33.3%) of visits where HCWs were not using face mask. In addition, public primary health facilities had the highest proportion (19.0%) of visits with no waste dis-aggregation management ([Table 3](#)).

Discussion

There were 2,640 visits to the health facilities in the State during the period to assess for basic IPC compliance. Monitoring/audit is one of the eight core components of the IPC in health facilities (WHO IPCAF). This will allow for feedback and provide opportunity to improve on the current state of IPC activities of the health facilities. Furthermore, most of these visits were at primary health care facilities. This is because these health facilities form a huge proportion of the health institutions within the state.

Three basic but critical IPC activities were assessed in this study- the use of facemasks by HCWs, hand washing station with soap and water as well as dis-aggregation of waste. It was conducted in public primary, secondary, and tertiary health facilities in addition to the private health facilities. This assessment was simplified to cater for all the levels and types of health facilities. The visits with availability of hand washing station with soap and

water was 96.6% of the total visit while HCWs using face masks and waste dis-aggregation in the health facilities were 85.2% and 82.0% respectively. The private and public primary health facilities were less likely to use waste dis-aggregation management. This may be because of less government funding to support waste management as well as unavailability of appropriate cadre of staff to manage waste at these health facilities. Unfortunately, these health facilities (private and public primary health facilities) form the bulk of the healthcare delivery institution in the State. Urgent intervention may prove beneficial in this regard.

Agbana et al observed the absence of running water in 53.4% of cases of HCWs that do not observe hand hygiene in a tertiary health facility in Ekiti State [14]. However, Ipinimo et al revealed in their study that 96.5% of HCWs have water available in their health facilities in Nigeria [11]. Furthermore, 73.3 % of HCWs were seen to use medical face mask in a report by Uche et al in Southeast Nigeria [16]. The IPC practices in this study showed statistical significance across the different types of health facilities. Another study conducted during the first wave revealed that private and public primary health facilities HCW are less likely to engage in good practice of IPC than those in public secondary and tertiary health facilities [11].

These other studies were conducted either before or during the early part of COVID-19 outbreak (year 2020 or before) and there has been a general increase compliance by HCWs and health facilities during the period of this study which witnessed the third wave of COVID-19 (year 2021). A more recent study conducted in 2021 in North West, Nigeria had 77% of primary health facilities observed proper disposal of waste [18]. This may be due to the regular IPC sensitization and training as well as the supply and distribution of IPC material by the state, National Centre for Disease Control and other partners. However, an improvement in the level of compliance to IPC protocols- hand hygiene facilities, use of face masks and proper waste disposal, is still desirable to ensure that chains of infection were adequately broken to prevent nosocomial infections.

The limitation of this study is that the visitation to the health facilities was done once weekly and that may not make it possible to assess the consistent IPC protocol at the facilities throughout the week.

Conclusion

In conclusion, this assessment showed a high level of compliance with infection prevention and control protocol, however continuous supportive supervision and assessment is advocated to ensure that this is sustained and then improved upon.

What is known about this topic

- COVID-19 pandemic is still ongoing and IPC protocols are critical in preventing nosocomial outbreak
- Evidences have demonstrated the effectiveness of PPE use, hand hygiene and waste management in combating infectious diseases including COVID-19
- It is common for HCWs to have good knowledge of IPC but this does not usually translate into compliance with IPC protocol

What this study adds

- This study found a significant observation of IPC protocol across all the of health facilities in the State
- However, private health facilities were found to have inadequate functioning hand washing station
- Likewise, the public primary health facilities had inadequate waste dis-aggregation management

Competing interests

Authors declare no competing interest.

Authors' contributions

AOA and TMI conceptualized and designed the study, TMI carried out literature search, all the authors collected the data. Data analysis was by AOA. The manuscript was drafted by TMI and OTO. OOK, EEE, TMI, BAA and VOA edited and reviewed the manuscript. All authors read and approved the final draft.

Tables

[Table 1](#): Distribution of Visits

[Table 2](#): IPC Practice in the Health Facilities

[Table 3](#): Comparison between IPC Practice and Health Facility Type

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Table 1: Distribution of Visits		
Variable	Number of Visits (n=2640)	Percent (%)
Local Government Areas		
Ado Ekiti	133	5.0
Efon	185	7.0
Ekiti East	154	5.8
Ekiti S/West	207	7.8
Ekiti West	89	3.4
Emure	135	5.1
Gbonyin	237	9.0
Ido/Osi	221	8.4
Ijero	200	7.6
Ikere	147	5.6
Ikole	125	4.7
Ilejemeje	246	9.3
Irepodun/Ifelodun	118	4.5
Ise/Orun	138	5.2
Moba	151	5.7
Oye	154	5.8
Type of Health Facility		
Private	120	4.5
Public Primary	2302	87.2
Public Secondary	203	7.7
Public Tertiary	15	0.6

Table 2: IPC Practice in the Health Facilities		
Variable	Number of Visits (n=2640)	Percent (%)
Functioning Hand washing station with soap and water		
No	91	3.4
Yes	2549	96.6
Health workers using face mask in the facility		
No	392	14.8
Yes	2248	85.2
Waste dis-aggregation management in the health facility		
No	474	18.0
Yes	2166	82.0

Variable	Health Facility Type				X ²	p-value
	Private n (%)	Public Primary n (%)	Public Secondary n (%)	Public Tertiary n (%)		
Functioning Hand washing station with soap and water					13.185	0.004
No	11(9.2)	72(3.1)	8(3.9)	0(0.0)		
Yes	109 (90.8)	2230 (96.9)	195(96.1)	15(100.0)		
Health workers using face mask in the facility					18.166	<0.001
No	27 (22.5)	317 (13.8)	43 (21.2)	5 (33.3)		
Yes	93 (77.5)	1985 (86.2)	160 (78.8)	10 (66.7)		
Waste dis-aggregation management in the health facility					13.738	0.003
No	16 (13.3)	437 (19.0)	20 (9.9)	1 (6.7)		
Yes	104 (86.7)	1865 (81.0)	183 (90.1)	14 (93.3)		

X²: Chi-square test