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## **Availability of Infection Control Protocol and Facilities, Practice Level and Barrier Perception Among Healthcare Workers in Secondary Healthcare Facilities, Southern Cross River State, Nigeria**

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**ABSTRACT:** *The practice of infection prevention and control is key to prevention of healthcare acquired infections and protection of healthcare workers, patients and public health. There are however several challenges militating against the use of standard precautions among healthcare workers. This study was aimed at assessing availability of infection prevention and control (IPC) protocol and facilities, practice level and barrier perception among healthcare workers in secondary healthcare facilities, Southern Cross River State, Nigeria. The study adopted a cross-sectional descriptive design using quantitative methods to elicit information from 336 healthcare workers. A structured questionnaire was administered to respondents in this study an observational checklist was also used. The data generated was analyzed using SPSS version 25. The study comprised of 87.5% females and 12.5% males. Existence of IPC protocols in the facilities was assessed and over half of the respondents (53%) agreed to the availability of IPC protocols in their healthcare facilities. The study identified lack of: knowledge, time, equipment/materials and resources as factors perceived by healthcare workers as influencing their practice of IPC. Among all the factors, only lack of equipment/materials was found to be a significant perceived barrier to practice of IPC ( $t= 0.269, 0.012$ ). The level of IPC practice was however found to be higher among those who perceived these factors as barriers. It is concluded that lack of time, knowledge, materials/equipment and resources are probable factors influencing practice of infection prevention and control in the secondary healthcare facilities. Healthcare facility management should make adequate provision of requirements for infection control in addition to training of staff and regular monitoring of compliance among health workers to protect public health.*

**KEYWORDS:** infection control, practice, barrier perception, secondary healthcare

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## INTRODUCTION

The practice of infection prevention and control is key to prevention of healthcare acquired infections and protection of healthcare workers, patients and public health. There are however several challenges militating against the use of standard precautions among healthcare workers. The knowledge and implementation of standard precautions have been under debate overtime. Even amidst sufficient knowledge and understanding of standard precautions, inadequate finances especially in low resource settings may limit availability of same (Nwankwo et al., 2020). In low-resource settings, challenges to the implementation of effective IPC programmes have been well documented (Hattie et al., 2021). Most times, poor IPC governance all levels; lack of political will is responsible for dearth of IPC policies at national level, underfunding for IPC activities and dedicated staff, and shortages of resource (Ogunsola et al., 2020; Manchabda et al., 2018; Raka et al., 2010; Sengupta et al., 2019; Ider et al., 2012; Vilar-Compte et al., 2017). Additionally, inadequate infrastructure such as poor water, sanitation and hygiene (WASH) facilities is the major problem of many hospitals (Ogunsola et al., 2020; Manchabda et al., 2018; Vilar-Compte et al., 2017; Alp et al., 2011; Bardosy et al., 2011). The problem of staff shortages can be further worsened by lack of IPC training for available staff and poor compliance with IPC protocols, such as hand hygiene (Alp et al., 2011; Bardosy et al., 2011). Overcrowding (Ogunsola et al., 2020; Manchabda et al., 2018; Raka et al., 2010; Sengupta et al., 2019; Alp et al., 2011) and inadequate infection surveillance systems (Manchabda et al., 2018; Raka et al., 2010; Ider et al., 2012; Vilar-Compte et al., 2017; Bardosy et al., 2011) have also been documented as key constraints to effective IPC in low resource settings. Brisibe *et al.* (2014) presented some of the reasons for non- adherence to infection control policy as poor supervision, lack of in-service training, inadequate supply of consumables, and absence of infection control policy in hospitals. They further reported that implementation of infection control policy, led to some improvements in infection control practices. Society for Quality in Healthcare and Oxford University Press (2012), in their study on assessment of infection control practices in maternity units in Southern Nigeria, observed from their study that only 13% of health care facilities had infection control committees, 50% of the facilities had 24-hour running water, 66.6% of the facilities had soap and antiseptic solutions in delivery and operating theatre areas and 11.1% had recycled gloves in use.

Hedayati *et al.* (2014), also reported lack of knowledge, technical difficulties, lack of facilities, heavy workload, lack of good role models, inter-professional conflicts, financial issues and unsupportive organizational culture as some of the factors responsible for poor compliance with standard precautions. Efstathiou *et al.* (2011), reported that benefits, barriers, severity, susceptibility and self- efficacy are some of the factors influencing nurses' compliance with standard precautions. This study was aimed at assessing availability of infection prevention and control (IPC) protocol and facilities, practice level and barrier perception among healthcare workers in secondary healthcare facilities, Southern Cross River State, Nigeria.

## **METHODOLOGY**

### **Study setting**

The setting for the study was Southern Cross River State. The southern districts of Cross River State is one of the three districts in the state; others are Northern and Central senatorial districts. The southern district are the Efik-speaking people they are referred to the Greater Calabar district and also the Qua community in Calabar who speaks Ejagham. The main Ejagham group occupies mostly the greater calabar areas of Calabar municipal, Odukpani, Biase and Akamkpa section of Cross River State. The southern district of Cross River State comprises of seven (7) Local Government Areas (LGAs), namely Akampka, Akpabuyo, Bakassi, Biase, Calabar Municipal, Calabar South and Odukpani. The secondary healthcare facilities are classified according to their local government as stated below:

General hospital Akamkpa, St. Joseph hospital Ikot Ene, General Hospital Calabar, Doctor Lawrence Henshaw memorial Hospital, Cottage Hospital Obam, Cottage Hospital Akpet Central, General Hospital Ukem (PRS department ministry of health calabar).

The southern district of the state is basically an agrarian society with the civil service being the other major employer of labour and the estimated population projection from 2006 census shows that there are about 1,590,200 in the area. (National Population Commission [NPC], 2014). Southern districts of Cross River State belong to tropical rainfall belt where rainfall is usually seasonal and at times very heavy. Humid tropical climate of about 1300 3000mm rain fall and 30°C mean annual temperatures. The vegetation ranges from mangrove swamps, through rainforest to derived savannah.

### **Study design**

The study was a descriptive cross-sectional and observational study.

### **Study population**

The population of the study comprised the Nurses, Midwives, Physicians working in selected secondary healthcare facility in southern Cross River State.

### **Sample size determination**

Sample size for this study was determined using Cochran's formula (1977) which is given as  $n = \frac{Z^2 P * q}{e^2}$

Where n=	Sample size	
Z	=	1.96 (i.e. 95% confidence interval)
d	=	0.04 (acceptable margin of error)
p	=	14.8%
q	=	1-P = 1-0.148 = 0.852

$$\begin{aligned} \text{Therefore, } n &= \frac{(1.96)^2 \times 0.148 \times 0.852}{(0.04)^2} \\ &= \frac{0.4844}{0.0016} = 302.75 = 303 \end{aligned}$$

The sample size for this survey was 303. However, to make room for non-response, the desired sample size was increased by 10% giving a sample size of **336** that was used for the study.

### Sampling procedure

A multistage sampling method was employed to select participants for the study. Multistage sampling is the probability sampling technique where the sampling is carried out in several stages such that the sample population get reduced at each stage.

#### Stage 1

##### Selection of Local Government Area and secondary healthcare facility:

Four (4) local governments out of (6) L.G.A with secondary healthcare facility in Southern district of Cross River State were randomly selected by balloting (excluding Bakassi local government which had no secondary healthcare facility) from the study area.

Balloting: This was done by assigning number to the Local Government Area with secondary healthcare facility only; selection was done without replacement. The selected facilities were: Akamkpa local government- General hospital Akamkpa, Akpabuyo local government- St. Joseph hospital Ikot Ene, Calabar Municipal- General Hospital Calabar, Calabar South- Doctor Lawrence Henshaw memorial Hospital.

#### Stage 2

Selection of departments and respondents:

In each of the randomly sampled healthcare facility, five departments were purposively selected. Seventeen healthcare workers were conveniently sampled in each department based on availability and willingness to participate in the study.

### **Instrument for data collection**

The study made use of a self-administered structured questionnaire consisting of three sections (A B & C): Section A: socio-demographic data; Section B: Practice of IPC among healthcare workers; C: Barriers to practice of Infection prevention control.

### **Method of data analysis**

The completed questionnaire was collected, coded and analyzed. The IBM SPSS Statistics version 23 was used for the analysis. Descriptive statistics were used to analyze data. T-test was used to test hypotheses at 0.05 level of significance.

### **Ethical consideration**

Ethical approval was obtained from the Cross River State Research Ethics Committee, Ministry of Health Headquarters, Calabar with REC No.: CRSMOH/RP/REC/2020/112. Verbal informed consent was also sought for and obtained from all participants after having been briefed on the objectives, significance of the study and also assured of strict confidentiality of information provided.

## **RESULTS**

### **Socio -Demographics Characteristics**

About 350 questionnaires were distributed and 336 questionnaires were retrieved, corresponding to a response rate of 96%. As presented in table 1, the majority of the study's respondents were female (87.5%). The mid aged population dominated the study. Most of the respondents (79.5%) were married and mostly Christians, 90.2%. A greater part of the respondents had a RN (71.1%) professional qualification with a degree in nursing (88.4%).

**Table 1**  
**Socio Demographic Characteristics of respondents**

Socio-demographic characteristic	Frequency of Respondents (n=336)	Percentage (%)
<b>Gender</b>		
Female	294	41.4
Male	42	58.6
<b>Age in years</b>		
21-30	168	50
31-40	92	27.4
41-50	43	12.8
>50	33	9.8
<b>Marital status</b>		
Single	42	12.5
Married	267	79.5
Widowed	20	6
Divorced	5	1.5
Separated	2	0.6
<b>Religion</b>		
Christianity	303	90.2
Muslim	31	9.2
Others	2	0.6
<b>Cadre</b>		
RN	239	71.1
RM	69	20.5
PHYSICIAN	28	3.6
<b>Educational qualification</b>		
Diploma	23	6.8
B.N.Sc	297	88.4
M.N.Sc	14	4.2
PhD	2	0.6

Source: Field Study, 2020

**Existing Infection Prevention and Control Protocols in the facility**

The existing protocols in the facility was assessed for. Over half of the respondents (53%) agreed that there exists a protocol presently to control and prevent infections. However, the nurses mostly responded that they do not have infection prevention and control nurses (75.3%). Over half of the respondents indicated that they do not have an infection prevention and control department (78.0%) as shown table 2

**Availability of hand hygiene facilities, materials/ Supplies**

As presented in table 3, all the secondary healthcare facilities had functional sinks readily accessible in the patient care area. About 90% had hand washing supplies such as soap and paper towels available. Only 60% of the facilities had alcohol dispensers readily accessible and functional.

**Availability of Personal Protective Equipment/ supplies**

Observation showed that 88% of the healthcare facilities had provision of Personal Protective Equipment. The most abundantly available (100%) were gloves which readily available at any point of care. The least available were PPE for eye protection (face shields or goggles) as shown in Table 4.

**Availability of facilities for disposal of sharps**

Observation on availability of facility for sharps disposal showed that 84% of healthcare facilities had facilities available for effective sharp disposal and care of laundry while 16% did not have. Only 60% had sharps containers positioned at 52” to 56” above the floor (Table 5)

**Table 2****Existing infection prevention and control protocols in the facility (n=336)**

STATEMENT	YES Frequency (%)	NO Frequency (%)
Presence of existing protocols	180 (53.6)	156 (46.4)
Presence of infection prevention and control nurses	83 (24.7)	253 (75.3)
Presence of infection prevention and control Department	74 (22.0)	262 (78.0)

Source: Field Research, 2020.

**Table 3**  
**Availability of hand hygiene facilities, materials/ Supplies (N=20)**

Observations	Yes(%)	No (%)
Are functioning sinks readily accessible in the patient care area?	20(100)	0(0)
Are all hand washing supplies such as soap and paper towels available?	18(90)	2(10)
Is the sink area clean and dry?	20(100)	0(0)
Are any clean patient care supplies on the counter within a splash-zone of the sink?	18(90)	2(10)
Are signs promoting hand hygiene displayed in the area?	20(100)	0(0)
Are alcohol dispensers readily accessible?	12(60)	8(40)
Are alcohol dispensers filled and working properly?	12(60)	8(40)
<b>TOTAL</b>	<b>85.7%</b>	<b>4.3%</b>

**Table 4**  
**Availability of Personal Protective Equipment/ supplies (N= 20)**

Observations	Yes(%)	No(%)
Are gloves readily available outside each patient room or any point of care?	20(100)	(0)0
Are cover gowns readily available near each patient room or point of care?	18(90)	2(10)
Is eye protection (face shields or goggles) readily available near each patient room or point of care?	12(60)	8(40)
Are face masks readily available near each patient room or point of care?	18(90)	2(10)
<b>TOTAL</b>	<b>88%</b>	<b>12%</b>



**Table 5**

Observations	Yes(%)	No (%)
Are sharps containers available?	20(100)	0(0)
Are sharps containers properly secured and not full?	20(100)	0(0)
Are sharps containers positioned at 52" to 56" above floor?	12(60)	8(40)
Are hampers for soiled laundry labeled or color- coded?	16(80)	4(20)
Are clean linen supplies spatially separated from soiled areas or waste and covered or contained within a cabinet.	16(80)	4(20)
<b>TOTAL</b>	<b>84%</b>	<b>16%</b>

**Availability of facilities for disposal of sharps (N= 20)****Practice of standard IPC**

The study classified the practice of standard precaution of infection prevention and control protocol into two level using the average score of 52.56. The respondents who scored below the mean value were grouped as having a low practice level of standard precaution of infection prevention and control (47.6%) while the ones who had scores above the mean score were classified as exhibiting high level of standard practice (52.4%) as shown in Figure 1.

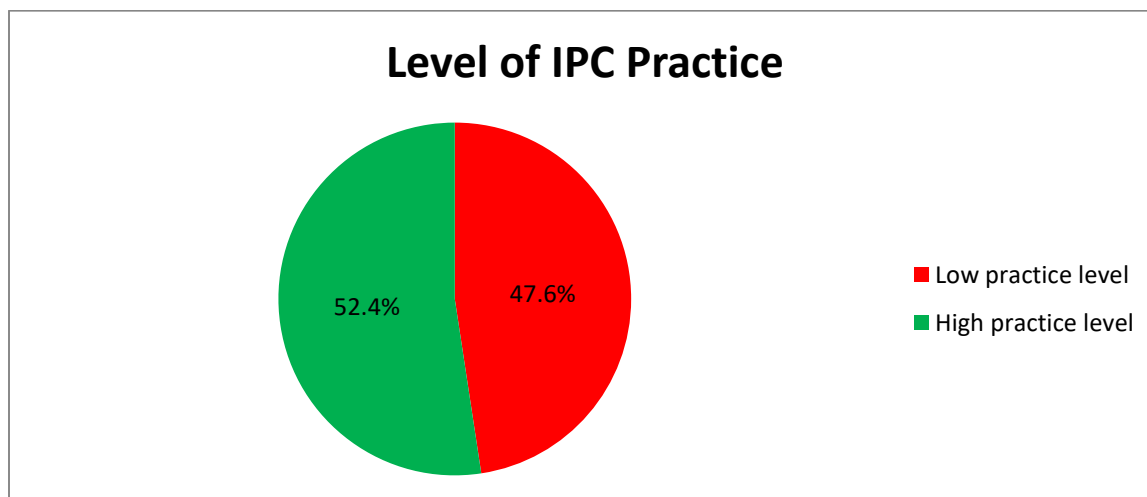


Figure 1: Level of IPC practice among secondary healthcare workers

**Barriers to practice of proper Infection Prevention and Control**

The study identified lack of knowledge, lack of time, lack of equipment/materials and lack of resources as barriers to proper practice of infection prevention and control. Lack of knowledge (72.9%) and lack of resources (72.9%) were indicated as the most prevalent barrier to proper practice of IPC. The lack of time (70.5%) and equipment or materials (68.8%) were also identified by a large number of respondents as being responsible for improper practice of Infection Prevention and Control as shown in the Table 6

**Table 6**  
**Perceived barriers to practice of infection prevention and control (n=336)**

Perceived barriers	Yes n (%)	No n (%)
Lack of knowledge	245 (72.9)	91 (27.1)
Lack of time	237 (70.5)	99 (29.5)
Lack of equipment/materials	231 (68.8)	105 (31.25)
Lack of resources	245 (72.9)	91 (27.1)

A test of hypothesis to ascertain differences in IPC practice between secondary healthcare workers with perceived barriers and those without using the independent sample T- test indicate that there is no differences in IPC practice between secondary healthcare workers with perceived barriers and those without. A further test of difference in IPC practice and the identified barriers to practice of IPC showed that the practice of IPC was higher among those who perceived lack of knowledge as a barrier (mean=52.77) than those who did not (mean=52.01). However, the practice of IPC among these two groups was not significantly different. Hence it can be concluded that there is no significant difference ( $p>0.05$ ) between the IPC practice of health workers who identified lack of knowledge as barrier and those who did not.

The practice of IPC was found to be higher among those who identified lack of time (mean=52.74) as a perceived barrier than those who did not (mean=52.13). However, the practice of IPC among these two groups was not significantly different ( $p>0.05$ ).

The practice of IPC was also higher among those who perceived lack of equipment/materials (mean=53.01) as a barrier than those who did not (mean=51.57). The practice of IPC among these two groups was significantly different ( $p<0.05$ ). Hence it can be concluded that there is a significant difference between the IPC practice of health workers who identified lack of materials/equipment as barrier and those who did not. The practice of IPC was found to be higher among those who identified lack of resources (mean=52.82) as a perceived barrier than those who did not (mean=51.87) (Table 7).

**TABLE 7**  
**Influence of perceived barriers on Practice of IPC among HCWs**

Practice of Infection Prevention and Control protocol			Mean practice score	Std. Deviation	Std. Error Mean	T	Sig
<b>Lack of knowledge</b>	No	91	52.01	4.523	0.474	2.426	0.209
	Yes	245	52.77	5.025	0.321		
<b>Lack of time</b>	No	99	52.13	4.698	0.472	1.08	0.298
	Yes	237	52.74	4.979	0.323		
<b>Lack of equipment /materials</b>	No	105	51.57	4.759	0.464	0.269	0.012
	Yes	231	53.01	4.906	0.323		
<b>Lack of resources</b>	No	91	51.87	4.870	0.511	0.043	0.113
	Yes	245	52.82	4.895	0.313		

## DISCUSSION

The present study found infection prevention and control protocols available in over half of the secondary health institutions. Infection prevention and control nurses and infection prevention and control departments were available in two thirds of the facilities. All the secondary healthcare facilities had functional sinks readily accessible in the patient care area. Majority had hand washing supplies such as soap and paper towels available. A little above half of the facilities had alcohol dispensers readily accessible and functional. Majority of the healthcare facilities had provision of Personal Protective Equipment. The most abundantly available were gloves. The least available were PPE for eye protection (face shields or goggles). Majority of the healthcare facilities also had facilities available for effective sharp disposal and care of laundry. Previous studies by Efstathjoui et al. (2011); Hedayate et al. (2014) and Yawson and Hesse (2013), observed that the absence of materials such as water, soap or detergents and other materials was largely absent in secondary health institutions and this could serve as barriers to the practice of Infection prevention and control protocols.

The level of adherence to the protocol by HCWs was averagely high. Kotwal and Taneja (2010) found a high proportion of the health workers following the right protocols than those who did not. However, the study by Yousafzai et al. (2014), did not find adherence to standard protocol popular among health workers in both public clinics and licensed clinics. The study by Nabavi et al. (2015), in a hospital in Iran on hand hygiene found a very low awareness and practice level among the staff. The attitude and adherence to IPC protocol were equally very low.

Lack of knowledge, time, equipment/materials and resources were identified by the healthcare

workers in this study as perceived barriers to practice of infection prevention and control protocols. Atalla et al. (2016) also reported that their respondents indicated lack of knowledge and lack of equipment as common barriers to compliance. The practice of IPC was however found to be higher among those who perceived the above factors were barriers than those who did not. This could be due to the fact that the respondents in this study believed in the importance of adherence to protocol using available resources.

## CONCLUSION

The present study investigated the barriers to practice of standard infection prevention control by healthcare workers in secondary healthcare facilities in Southern Cross River State Nigeria. The study found that the perceived barriers to effective practice of IPC included lack of time, lack of knowledge, lack of equipment and lack of resources. A significant difference was found in the level of practice of HCWs who identified lack of equipment/materials as a barrier to the practice of infection prevention and control compared to those who did not. However, level of IPC practice was found to be higher among those who perceived the aforementioned barriers than those who did not.

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