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Factors Impacting Nurses' Compliance with Infection Prevention and Control Protocols: A study at Central Hospital in Sapele, Delta State, Nigeria

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Abstract:- Nurses generally play a vital role in fostering patient care and safety, and they take lead in explaining to patients' infection control protocols. This study evaluated factors impacting nurses' compliance with infection prevention and control measures at the Central Hospital, Sapele, Delta State using descriptive research design and convenience sampling techniques. The sample size of 133 was determined using the Taro Yamane formula. A self-developed questionnaire was used. 133 copies of the questionnaires were administered; however, 100 copies of the questionnaires were successfully retrieved. Descriptive statistics were used to analyze the data. A criterion mean of 1.50 was used as a benchmark for acceptance. The results are presented in tables. Findings from this study revealed that most of the participants knew that infection prevention and control is the approach to prevent, control and minimize harm caused by infection to patients and health workers. Inappropriate provision of infection prevention and control supplies (44%), poor maintenance of medical equipment (25%), inappropriate provision of adequate infection prevention supplies (45%), the unavailability of policies and guidelines (23%), etc. were factors influencing compliance level. In conclusion, there is adequate knowledge of infection prevention and control among nurses. Inappropriate provision of infection prevention and control (IPC) supplies was the highest factor hindering compliance with infection prevention and control, while, the provision of adequate infection prevention supplies was the highest factor that promotes compliance to infection prevention and control. However, there was no significant relationship between the level of knowledge and the factors influencing compliance with infection prevention and control. Hence, there is urgent need to establish policies and guidelines on infection control practices and this should be strictly followed.

Keywords:- *Knowledge, Factors, Compliance, Infection, Prevention, Control.*

I. INTRODUCTION

The term "infection prevention and control" (IPC) refers to the pragmatic, evidence-based strategy designed to stop patients and healthcare professionals from suffering unnecessary infections (WHO, 2020; Nwogueze et al. 2020). Standard and transmission-based preventive measures are two categories of infection prevention and control (IPC), a scientific strategy to reducing the harm that infections can cause to patients and healthcare personnel (WHO, 2020). Healthcare personnel are more likely to come into contact with infectious substances through percutaneous needle stick injuries or splashes of infectious bodily fluids (Houghton et al. 2020). For IPC programs to be effective, policymakers, healthcare professionals, administrators, and consumers of healthcare services must work together. Delivering high-quality healthcare is not feasible without efficient IPC. Hand hygiene, appropriate PPE use, injection safety, cough etiquette, waste disposal, disinfection and sterilization of medical instruments, and environmental cleaning are among the standard infection prevention practices that healthcare workers follow (Kisaka, 2021, Nwogueze et al. 2024), as such, in order to prevent hospital-acquired infections and the negative effects they have on health (Ofili and Ncama, 2014; Ofili et al. 2023; Nwogueze & associates. 2023).

Preventing and controlling hospital-acquired infections (HAIs) is essential for patient safety and the efficient management of healthcare facilities. Active involvement of Infection Prevention and Control (IPC) committees is crucial for success in managing cases of HAIs, as recognized by healthcare managers (Nwogueze and Ofili, 2023). Budgeting for IPC programs is necessary to reduce healthcare-associated infections, which significantly impact hospitalization expenses and patient stays. IPC measures recommended by the WHO aim to protect vulnerable individuals from acquiring infections during healthcare procedures (Ofili et al., 2015, WHO, 2020). Transmission-based precautions are additional measures taken when patients are suspected of having infections that can spread through contact, droplets, or airborne routes. These are often used in addition to standard precautions and involve

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prevention practices applied to patients regardless of their infectious status (Gurler, 2014). IPC components include cleaning your hands, wearing personal protective equipment (PPE), managing medical waste properly, administering injections safely, processing instruments, processing linens, coughing, and respiratory etiquette (Faller et al. 2020).

The 2030 Sustainable Development Agenda was adopted by the UN General Assembly in 2015, along with 17 goals aimed at achieving it. The third goal is to guarantee and promote health for people of all ages. The universal health coverage (UHC) of member states was recognized as a crucial objective to accomplish this goal (Verrecchia, et al. 2019). According to the WHO (2018), universal health coverage (UHC) is a way to ensure that everyone in a community or individual gets the healthcare they require without experiencing financial hardship. UHC generally consists of three parts: quality of care, financial risk management, and healthcare coverage. Global efforts, however, have mostly concentrated on the first two objectives, which has increased access to subpar services and, in certain situations, led to negative consequences (Kruk and Pate, 2020; Ofili & Nwogueze, 2024). In public health facilities, adherence to IPC measures is still low despite efforts to improve the quality of care, which leads to a high prevalence of HAIs (Ndegwa, 2019). This emphasizes how crucial it is to look into how the hospital is putting IPC standards into practice in order to pinpoint the precise factors that influence compliance levels and to make it possible to put corrective measures in place that will enhance the facility's ability to provide high-quality and safe healthcare. This is why the study is necessary.

II. MATERIALS AND METHODS

- *Study Setting*

The study was carried out at the Central Hospital, Sapele. The hospital was established in 1929. The hospital is located in the northern part of Sapele Local Government Area. The hospital has several units such as; accident and emergency unit, antenatal clinic, out-patient department, maternity ward, male and female medical wards, antiretroviral unit, the sickle cell unit and gynecology ward. The hospital also has an affiliation with the school of midwifery, Sapele, Delta State.

- *Study Participant*

The target population for this study includes all nurses currently working at Central Hospital, Sapele, Delta State, Nigeria. A total of 133 nurses comprising of male and female nurses, according to the report from the administrative department of Central Hospital Sapele, Delta State, constituted the study participants.

- *Study Design and Sampling*

The study employed a descriptive research design. For sampling method, the convenience sampling technique was used. Convenience sampling also known as availability sampling implies a specific type of nonprobability sampling method that relies on data collection from population members who are conveniently available to participate in the study. This can be due to geographic proximity, availability at a given time, or willingness to participate in the research.

- *Inclusion Criteria*

This included staff nurse working in the following ward surgical, medical and orthopedic ward, accident and emergency, pediatric, neonatal intensive care unit, intensive care unit, dialysis, labor, theatre, child emergency, maternity and gynecology wards.

- *Ethical Consideration*

A signed letter of introduction was obtained from the Department of Nursing Science, Delta State University, Abraka. This was used to obtain approval from the hospital ethical committee, and study participants were clearly informed about the study in order to gain their consent. They were informed about the confidentiality and anonymity of their responses and their right to withdraw from the study at any time. Permission was obtained from the Faculty of Basic Medical Sciences of Delta State University Abraka with the ref no: RBC/ FBMC/ DELSU/ 23/ 220.

- *Instrument for Data Collection*

Data for the study were collected using an interviewer-assisted questionnaire. The questionnaire had three sections. The first section asked questions on the socio-demographic and other background information of the respondents. The second section provided information about the knowledge of nurses on infection control. The third section identified the factors influencing compliance with infection prevention and control.

- *Method of Data Collection*

A well-structured questionnaire was used to collect the required data. For this study, a face-to-face method of data collection was used. The researcher visited the study setting, met with the target participants, obtained relevant data for the study by distributing the questionnaires according to the sampling technique and a trained research assistant on the process of data collection, and respondents were allowed a period of 30 minutes to 1 hour to fill the questionnaires before the same was retrieved from them after which verbal consent was taken. A total number of 133 questionnaires were administered and 100 copies of the questionnaires were successfully retrieved, giving a total return rate of 75.2%. The data collection process lasted for 3 weeks to allow the researcher to cover all the subjects.

- *Method of Data Analysis*

Analysis was performed using statistical package for social sciences (SPSS) for window version 23 and summary data was presented using descriptive (frequency distribution and percentages) and inferential statistical methods such as (chi – square).

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III. RESULTS

Table 1: Socio-Demographic Characteristics of Respondents (n=100)

Variables n= 100	Frequency (f)	Percentage (%)
Age (years)		
25-30	5	5
31-35	5	5
36-40	27	27
41-45	31	31
46-50	26	26
51 and above	6	6
Gender		
Male	11	11
Female	89	89
Religion		
Christian	100	100
Muslim	-	-
Ethnicity		
Urhobo	53	53
Itsekiri	16	16
Ijaw	5	5
Isoko	16	16
Igbo	5	5
Ukwuani	5	5
Educational level		
RN	14	14
Post Basic	14	14
BNSc	62	62
MNSc	10	10
Year of working experience		
1-3	9	9
4-7	9	9
8-11	9	9
12-15	51	23
16 years and above	22	22

The demographic variables of the study participants are presented in Table 1. As shown in the table, the age group of the respondents revealed that 31% were between the age of 41 to 45 years, 27% were between 36 to 40 years, 26% were between 46 to 50 years, 6% were 50 years and above, while 5% each were between 25 to 30 years and 31 to 35 years, respectively. Most (89%) were women while only 11% were men. All of the respondents (100%) were Christians. Their ethnicity showed that 53% were Urhobo, 16% each were Itsekiri and Isoko, respectively, while 5% each were Ijaw, Igbo and Ukwuani, respectively. According to their educational qualification; majority (62%) had a B.NSc certificate, 14% each had a Post-Basic and RN certificate while only 10% had an M.NSc certificate. With regards to the years of working experience; 51% had 12 to 15 years of working experience, 22% had 16 years and above of working experience, 13% each had 1 to 3 years, 3 to 7 years and 8 to 11 years of working experience, respectively.

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Table 2: Knowledge of Infection Prevention and Control Among Nurses (n= 100)

S/N	Variables	Yes *f*(%)	No *f*(%)	Mean value	Remarks
1	Infection prevention and control is the approach to prevent, control and minimize harm caused by infection in patients and health workers	96 (96)	4 (4)	1.96	Accepted
2	Healthcare-acquired infections can be caused by microorganisms that can be transmitted between patients by healthcare workers	80 (80)	20 (20)	1.80	Accepted
3	Invasive devices, such as urinary catheterization, and other instruments can increase the risk of hospital infection	90 (90)	10 (10)	1.90	Accepted
4	Gloves should always be used when coming in contact with patients, especially during invasive procedure	95 (95)	5 (5)	1.95	Accepted
5	Disposal of all the contaminated medical waste in water proof container	70 (70)	30 (30)	1.70	Accepted
6	Contaminated surfaces (labor cot, procedure table, spilled floor) should be cleaned with soaked cloth in 0.5% chlorine solution	80 (80)	20 (20)	1.80	Accepted
7	Hands should be washed before and after examining the patient	81 (81)	19 (19)	1.81	Accepted
8	Compliance with infection control programmes can prevent the Healthcare-associated infection	90 (90)	10 (10)	1.90	Accepted
9	Gloves should be changed between patients	87 (87)	13 (13)	1.87	Accepted
10	The use of gloves, mask and apron reduces the risk of infection	91 (91)	9 (9)	1.91	Accepted
Grand Mean				1.86	Adopted

Criterion (cut-off) mean= 1.50

Table 2 showed the knowledge of infection prevention and control among nurses. From the results collected, in item 1, 96% of the participants knew that infection prevention and control is the sustainable approach to prevent, control and minimize harm caused by infection in patients and health workers, 80% accepted that HAI can be caused by microorganisms that possibly transmits infections between patients and healthcare workers, 90% of the participants in item 3, knew that invasive devices, such as urinary catheterization, and other instruments can increase the risk of hospital infection, whereas, 95% of the participants accepted that gloves should always be used when coming in contact with patients, especially during invasive procedure, while, 70% of the participants in item 5 knew that disposal of all the contaminated medical waste in water proof container. In item 6, 80% of the participants knew that contaminated surfaces should be cleaned with a soaked cloth in a 0.5% chlorine solution. More so, 81% of the participants in item 7, knew that hands should be washed before and after examining the patient, 90% knew that compliance with infection control programmes can prevent the healthcare-associated infection, 87% knew that gloves should be changed between patients, and 91% knew that the use of gloves, mask, and apron reduces the risk of infection. For the overall level of knowledge, a criterion (cut-off) mean of 1.50 was used to assess the 10 items formulated (1-10). The calculation of the grade was done in this format; [Yes is 2 and No is 1]. The grand mean value greater than the criterion (cut-off) mean of 1.50 indicated high knowledge, the grand mean value equal to the criterion (cutoff) mean of 1.50 indicated average knowledge, while the grand mean value smaller than the criterion (cutoff) mean of 1.50 indicated low knowledge. Therefore, from the results showed that in Table 2, the grand mean value of 1.86 which was higher than the criterion (cutoff) mean of 1.50 indicated that the respondents had a high level of knowledge of infection prevention and control.

Table 3: Factors that Hinder Compliance with Infection Prevention and Control (n= 100)

Factors Hindering Compliance with Infection Prevention and Control Measures	Frequency (*f*)	Percentage (%)
The inadequate provision of infection prevention and control (IPC) supply	44	44
Increased workload	17	17
Healthcare workers attitudes and perceptions	6	6
Inadequate knowledge on infection prevention and control	2	2
Inadequate support from the hospital management	6	6
Poor maintenance of medical equipment	25	25

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Table 3 showed the factors hindering compliance with infection prevention and control among nurses. As revealed from the results of this study, the identified factors were as follow; the inadequate provision of infection prevention and control (IPC) supply (44%), poor maintenance of medical equipment (25%), increased workload (17%), healthcare workers attitudes and perceptions (6%), inadequate support from the hospital management (6%), and inadequate knowledge on infection prevention and control (2%).

Table 4: Factors that Promote Compliance with Infection Prevention and Control (**n= 100)**

Factors that Promote Compliance with Infection Prevention and Control Measures	**Frequency (*f*)**	**Percentage (%)**
Training of healthcare workers in infection prevention and control (IPC)	6	6
Existence of an infection prevention and control (IPC) committee	10	10
Provision of adequate infection prevention supplies	45	45
Supportive supervision	7	7
Supportive leadership	9	9
Availability of policies and guidelines	23	23

Table 4 showed the factors that promote compliance with infection prevention and control among nurses. The identified factors were as follow; provision of adequate infection prevention supplies (45%), availability of policies and guidelines (23%), existence of an infection prevention and control (IPC) committee (10%), supportive leadership (9%), supportive supervision (7%), and training of healthcare workers in infection prevention and control (IPC) (6%).

Table 5: Association between the Level of Knowledge about Infection Prevention and Control and Factors Influencing Compliance

Factors	**Knowledge of Infection Prevention and Control (Good Knowledge as Base Outcome)**					
	Poor	**Good**	**Unadjusted odds ratio**		**Adjusted odds ratio**	
	n=4%	**n=96%**	**OR (95% CI)**	**p-value**	**OR (95% CI)**	**p-value**
The inadequate provision of infection prevention and control (IPC) supply	24 (54.5)	20 (45.5)	1.04 (0.52 – 2.08)	0.901	0.39 (0.13 – 1.14)	0.086
Existence of an infection prevention and control (IPC) committee	6 (60)	4 (40)	1.21 (0.50 – 2.91)	0.669	0.15 (0.04 – 0.64)	0.061
Provision of adequate infection prevention supplies	25 (55.6)	20 (44.4)	0.73 (0.16 – 3.28)	0.679	2.12 (0.88 – 5.11)	0.097
Poor maintenance of medical equipment	13 (52)	12 (48)	1.29 (0.39 – 4.24)	0.680	0.13 (0.02 – 0.76)	0.074
Supportive leadership	5 (55.6)	4 (44.4)	1.17 (0.29 – 4.63)	0.826	3.17 (1.20 – 8.33)	0.093
Availability of policies and guidelines	12 (52.2)	11 (47.8)	0.98 (0.27 – 3.57)	0.76	0.54 (0.19 – 1.53)	0.244

$p<0.05$ is considered statistically significant.

Table 5 showed the relationship between the level of knowledge of infection prevention and control and factors influencing compliance with infection prevention and control measures. From the results of this study, it was shown that at the adjusted odds ratio, the inadequate provision of infection prevention and control (IPC) supplies ($p = 0.086$), existence of an infection prevention and control (IPC) committee ($p = 0.061$), provision of adequate infection prevention supplies ($p = 0.097$), poor maintenance of medical equipment ($p = 0.074$), supportive leadership ($p=0.093$), and availability of policies and guidelines ($p = 0.244$) were not statistically associated with the level of knowledge of infection prevention and control at 95% CI. Since there was no statistical relationship between the level of knowledge and the factors, H0 was accepted and H1 was rejected. It could then be concluded that there was no significant relationship between the level of knowledge and the factors influencing compliance with infection prevention and control. Thus, the hypothesis that stated that "there was no significant relationship between their level of knowledge of infection prevention and control and factors influencing the compliance" was accepted.

IV. DISCUSSION

This study was carried out to evaluate the factors influencing the compliance with infection prevention and control measures among nurses in Central Hospital Sapele, Delta State. Featured in the findings of this study on knowledge of infection prevention and control among nurses, considering that the grand mean value obtained was 1.86

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which was higher than the criterion (cut-off) mean of 1.50, it indicated that respondents had a high level of knowledge of infection prevention and control. These findings were in correlation with the findings of the study conducted by Hussen *et al*. (2019) on knowledge, attitude, and practice (KAP) of infection prevention measures among 282 healthcare workers in a teaching and referral hospital in Ethiopia. Healthcare workers were found to have adequate knowledge of IPC. They reported that male healthcare workers had better knowledge of IPC and those in surgical units had better IPC practices. This is also supported by the study by Alrubaiee *et al*. (2019) on the knowledge and practices of nurses regarding nosocomial infection control measures in private hospitals in Sana'a City. The study found that 64.7% of nurses had received training in infection prevention and control (IPC) and 78.8% had IPC work experience, but the majority only had a fair understanding of IPC.

Findings from this study revealed that the inadequate provision of infection prevention and control (IPC) supply (44%), poor maintenance of medical equipment (25%), increased workload (17%), etc. were identified factors hindering compliance with infection prevention and control, while provision of adequate infection prevention supplies (45%), availability of policies and guidelines (23%), existence of an infection prevention and control (IPC) committee (10%), etc were factors promoting compliance with infection prevention and control. The results were in line with the research carried out by Kisaka (2021) regarding "factors influencing adherence to infection prevention and control protocols among frontline healthcare workers at Kitale County Referral Hospital, Kenya." The study revealed that compliance rates were 53.2% for hand hygiene, 52.3% for PPE usage, and 59.5% for injection safety, which fell short of expectations despite worldwide initiatives to enhance IPC practices during the COVID-19 pandemic. The degree of adherence to hand hygiene, PPE use, and injection safety was also correlated with the presence of an IPC committee, the availability of policies and guidelines, management support, and injection safety boxes and their ease of accessibility. Additionally, Okello et al. (2017) investigated the obstacles and variables influencing PPE use at St. Mary's Medical center in Northern Uganda's Lacor, and reported lack of proper PPE, ill-fitting gloves, poor quality, and inadequate training on PPE use as some of the obstacles to compliance with infection prevention and control measures.

V. CONCLUSIONS

This study concludes that most of the participants had adequate knowledge of infection prevention and control measures. Inappropriate provision of infection prevention and control (IPC) supply was the highest factor hindering compliance with infection prevention and control, while the provision of adequate infection prevention supplies was the highest factor that promote compliance with infection prevention and control. However, there was no significant relationship between the level of knowledge and the factors influencing compliance to infection prevention and control. Hence, it is recommended that there should be established policies and guidelines on infection control practices and this should be strictly followed. In addition, nurses must improve their baseline knowledge about infection practices and control measures in order to further improve nursing practice in this area.

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