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# Knowledge and practice of infection control among nurse clinicians working in tertiary health institutions in south east Nigeria

Immaculata Ijeoma Njoku [1,*] and Ngozi Eucharia Makata [2]

[1] *Department of Nursing, Imo State College of Nursing Sciences Orlu Imo State, Nigeria.*
[2] *Department of Nursing, Faculty of health sciences and technology, Nnamdi Azikiwe University, Awka Anambra State, Nigeria.*

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## Abstract

Healthcare-associated infections (HAIs) have been a significant issue for hospitals worldwide, regardless of the economic status of the countries. It has seemingly prolonged patient stays and increased the cost of health care services in different regions. This study assesses knowledge and practice of infection control among nurse clinicians working in tertiary health institutions in southeast Nigeria. A descriptive cross-sectional survey study design was utilised, and 136 nurses were employed through the census sampling method for this study. A validated, self-structured instrument with a Cronbach's alpha coefficient of 0.8 was utilised for data collection. The result revealed good knowledge (above 50%) and a very high extent (cumulative mean of 3.44) of infection control practice among nurse clinicians in the tertiary health institution in southeast Nigeria. There was no significant relationship between the nurses' educational status and practice of infection control measures. In conclusion, nurses in southeast Nigeria had good knowledge and practice of infection control measures, which should lead to reduced HAI and reduced cost of hospitalisation in southeast Nigeria.

**Keywords:** Knowledge; Practice; Infection Control; Clinician Nurse

## 1. Introduction

Nurse clinicians in tertiary health facilities should play a vital role in preventing and controlling infections, thereby ensuring patient safety and reducing healthcare-associated infections. In order to prevent hospital-acquired infections, which are defined as infections that develop in a patient while they are receiving care in a healthcare facility but were not present or developing at the time of admission, infection control measures are necessary in healthcare facilities [1]. Nosocomial infections, also known as hospital-acquired infections, are linked to higher rates of morbidity and death among hospitalised patients and put healthcare workers (HCWs) at higher risk of contracting infections.

It may interest you to know that the mortality and morbidity impact of hospital-acquired infection is not only peculiar to the underdeveloped and developing countries but also the highly developed regions of the globe [1]; hence, it is a global phenomenon. This was revealed in the study of [2], which affect 1 in 5 patients in European countries and 1 in 25 hospitalised patients in the United States, is the driving force behind the need for infection control measures in healthcare facilities [3]. High frequency of nosocomial infections is evidence of a poor quality of health care service delivery [4]. Hospitalised patients are often immunocompromised. Abuse and misuse of antibiotics have further enabled multidrug-resistant organisms to flourish, which can be transmitted as hospital-acquired infections. Insufficient application of standard and isolation precautions, invasive examinations, treatments and patient care practices further predispose patients to nosocomial infections, which resulted in low quality of life and reduced life expectancy with serious impact on the economy [3].

* Corresponding author: Immaculata Ijeoma Njoku

According to [5], an infection is said to be hospital-acquired when it presents 48 to 72 hours post-admission or 10 days post-discharge. Oni et al. [6] showed that all newborn fatalities linked to HAIs make up 4–56% of all neonatal deaths, with a 75% incident incidence in Southeast Asia and sub-Saharan Africa and a 45% incident rate in affluent countries. falls between 3.5 and 12%, with 15% prevalence among hospitalised patients and as high as 37% among those admitted to intensive care units. Studies also show that Africans with limited data have a high prevalence of nosocomial infection, with 9.8% to 14.8% [7], while the overall estimate of prevalence in Nigeria was 20.2% [6]. Some determinants of nosocomial spread are more specific to settings with limited resources, inadequate environmental hygienic conditions and waste disposal, poor infrastructure, insufficient equipment, under-staffing, overcrowding, poor knowledge and application of basic infection control measures, lack of procedure, lack of knowledge of injection and blood transfusion safety, and absence of local and national guidelines and policies. [8, 9, 10]

Several studies have shown that healthcare workers display varied knowledge and practice of standard precautions according to their professional group and duration of professional experience, among other factors; knowledge and health professionals who received training on standard precautions showed an improvement in their level of infection control practice [11]. Healthcare-acquired infections are associated with inadequate knowledge, attitude, and practice [12]. In clinical practice, the attitude of not washing hands among healthcare workers (doctors, nurses, medical laboratory scientists, and health assistants) involved in the provision of health care can increase the rate of hospital-acquired infections, but in this study the researcher's focus is on nurses. The researcher has observed in many cases where some nurses handle contaminated linen with bare hands, put needles in the patient's mattress after giving injections, do not clean the stethoscope between patients and do not wash hands regularly in the clinical environment, showing poor nursing practice with regard to adherence to infection prevention and control practices among nurses [13], increasing the rates of hospital-acquired infections. In hospitals, nurses are the most frequent health workers for the patient. Being formidable, they determine to a large extent control and prevention transmission of infection [14]. [15] noted that the environment in which a patient is nursed must be planned to reduce the risk of transmission of infection with the aim of protecting the preventing susceptible individuals from contracting an illness while undergoing medical treatment. Therefore, this study assesses the knowledge and practice of infection control measures among nurse clinicians working in tertiary health institutions in Southeast Nigeria.

### 1.1. Research Question

- To what extent do nurse clinicians working in tertiary health institutions in South East Nigeria knowledgeable about infection control measures?
- To what extent are infection control practice carried out by nurse clinicians working in tertiary health institutions in South East Nigeria?

### 1.2. Hypothesis

- There would be no significant association between nurses education qualification and their practice of infection control measures in teaching hospitals under study

## 2. Material and methods

A descriptive cross-sectional survey study design was adopted to investigate the knowledge and practice of infection control measures among nurse clinicians working in tertiary health institutions (Alex Ekwueme Federal University Teaching Hospital Abakaliki (A-E FUTHA) and Imo State University Teaching Hospital (IMSUTH) Orlu) in South East Nigeria. The sample consisted of all the one hundred and thirty-six (136) nurses working in the three surgical wards in each of the two hospitals; because of their small population, a census sampling technique was used.

A validated, self-structured instrument with a Cronbach's alpha coefficient of 0.8 was utilised for data collection. The instrument comprises a section for demographic data and an 18 Likert-like questionnaire, Section B, to elicit information to tackle the research questions. Ethical clearance was obtained from the research and ethics committee of both teaching hospitals. Administration and collection of data lasted for 28 days in the month of May 2024.

Data collected was analysed using the Statistical Package for the Social Sciences (SPSS version 24). The results were presented in tables, while the descriptive statistics – frequency, percentage, mean and standard deviation – were used to summarise questionnaire items. For the test of knowledge, 50% and above acceptance are said to be of good knowledge, and those below are termed poor knowledge. The Likert scale was used to test the practice and was coded as follows: very high extent (VHE) 4 points, high extent (HE) 3 points, low extent (LE) 2 points, very low extent (VLE) 1

point. The benchmark of 2.50 and above was the criterion for acceptance. The Chi-square test was used for inferential statistics. The significance level of the P-value was 0.5.

## 3. Results

**Table 1** To what extent do nurse clinicians working in tertiary health institutions (IMSUTH Orlu and A-E FUTHA Abakaliki) in South East Nigeria knowledgeable about infection control measures?

| The extent of knowledge of infection control measures by nurse clinicians n = 136 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **S/N** | **ITEM STATEMENT** | **IMSUTH NURSES RESP** | | | | **A-E FUTHA NURSES RESP** | | | |
| | | Yes | % | o | % | Yes | % | o | % |
| 1 | There is a manual listing of the infection prevention and control policies and guidelines for health care workers in the hospital | 36 | 54.5 | 30 | 45.5 | 53 | 75.7 | 17 | 24.3 |
| 2 | Aseptic techniques should be observed while doing wound dressing | 47 | 71.1 | 19 | 28.8 | 50 | 71.4 | 20 | 28.6 |
| 3 | Chemical sterilization technique should be used for all uipment | 50 | 75.8 | 16 | 24.2 | 59 | 84.3 | 11 | 15.7 |
| 4 | Proper handling of working equipment decrease the risk of contamination | 50 | 75.8 | 16 | 24.2 | 34 | 48.6 | 36 | 51.4 |
| 5 | Wearing of protective equipment minimize spread of hospital acquired infection | 55 | 83.3 | 11 | 16.7 | 32 | 45.7 | 38 | 54.3 |
| 6 | Shaving before surgery reduces the chance of surgical site infections, | 59 | 89.4 | 7 | 10.6 | 35 | 50.0 | 35 | 50.0 |
| 7 | Wash hands or sanitize the hands before and after each contact with patient and handling soiled linen | 47 | 71.2 | 19 | 28.8 | 38 | 54.9 | 33 | 47.1 |
| 8 | Routine hospital cleaning prevent spread of nosocomial infection | 54 | 81.8 | 12 | 18.2 | 37 | 52.9 | 33 | 47.1 |
| 9 | A non-correct application of the disinfection/sterilization procedures increases risk of infection in personnel | 52 | 78.8 | 14 | 21.2 | 37 | 52.9 | 33 | 47.1 |
| 10 | Overcrowding of the working area increases transmission of infection | 48 | 72.7 | 18 | 27.3 | 26 | 37.1 | 44 | 62.9 |
| 11 | Increased workload increases the risk of hospital acquired infections | 53 | 80.3 | 13 | 19.7 | 30 | 42.9 | 40 | 57.1 |
| | Cumulative Average | | 75.9 | | 24.1 | | 56.0 | | 44.0 |

*Good Knowledge = 50% and above, Poor Knowledge = below 50%,

Table 1 Shows that nurses from IMSUTH Orlu and A-E FUTHA Abakaliki both expressed more than 50% acceptance for 6 items (1, 3, 6, 7, 8, 9) and were at variance with other items. The cumulative acceptance of the research items by both institutions was 75.9% and 56.0%, respectively, showing good knowledge of infection control measures among nurses in both teaching hospitals.

**Table 2** To what extent are infection control practices adopted by nurse clinicians working in tertiary health institutions (IMSUTH Orlu and A-E FUTHA Abakaliki) in South East Nigeria.

| The Extent of infection control practices in the selected hospitals n =136 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **S/N** | **ITEM STATEMENT** | **IMSUTH NURSES RESP** | | | **A-E FUTHA NURSES RESP** | | | **AV** | **AV** | **REMAR** |
| | | N | X | SD | N | X | SD | X | SD | |
| 12 | We always observe guidelines necessary for a correct application of disinfection/sterilization procedures | 66 | 3.28 | 0.771 | 70 | 3.54 | 0.582 | 3.40 | 0.693 | VHE |
| 13 | I always wash hands before and after taking care of a surgical wound | 66 | 3.42 | 0.766 | 70 | 3.71 | 0.568 | 3.57 | 0.685 | VHE |
| 14 | Use sterile technique while changing incision wound increases nurse stress | 66 | 2.61 | 1.065 | 70 | 2.59 | 1.245 | 2.60 | 1.157 | HE |
| 15 | Wash your hands immediately when you come in contact with blood, body fluid or contaminated items | 66 | 3.47 | 0.863 | 70 | 3.86 | 0.353 | 3.67 | 0.678 | VHE |
| 16 | Discard sharp materials and needles in a punctured resistant container | 66 | 3.33 | 0.934 | 70 | 3.81 | 0.392 | 3.58 | 0.746 | VHE |
| 17 | Wear of personal protective equipment to protect oneself during procedures that generate spray of blood or body fluids | 66 | 3.35 | 0.936 | 70 | 3.79 | 0.478 | 3.57 | 0.766 | VHE |
| 18 | Cover wound and cuts on your skin before you start your work | 66 | 3.53 | 0.863 | 70 | 3.80 | 0.403 | 3.67 | 0.678 | VHE |
| | Cumulative Average | 66 | 3.28 | 0.828 | 70 | 3.59 | 0.499 | 3.44 | 0.694 | VHE |

Mean score below 1.0 = VLE, 1.0 -2.4 = LE, 2.5 -3.0 = HE, above 3.0 = VHE

**Table 2** Reveals the following mean scores: 3.40, 3.57, 2.60, 3.67, 3.58, 3.57 and 3.67 with respect to item statement of the research question 2, with a cumulative average mean score 3.44 depicting respondent practices infection control measures in their respective tertiary health institutions in South East

### 3.1. Research Hypothesis

Ho: There would be no significant association between nurses educational qualification and infection control measures practice in both teaching hospitals under study.

**Table 3** Frequency and Chi-square analysis of significant association of nurse clinicians of different educational qualifications on their practice of infection control measures

| **Frequency on Educational Qualification** | | | | | |
|---|---|---|---|---|---|
| | | **Frequency** | **Percent** | **Valid Percent** | **Cumulative Percent** |
| Valid | DIPLOMA | 26 | 19.1 | 19.1 | 19.1 |
| | BSC | 49 | 36.0 | 36.0 | 55.1 |
| | MSC | 41 | 30.1 | 30.1 | 85.3 |
| | PHD | 20 | 14.7 | 14.7 | 100.0 |
| | Total | 136 | 100.0 | 100.0 | |
| **Chi-Square Tests** | | | | | |

| | Value | Df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 48.090[a] | 48 | 0.469 |
| Likelihood Ratio | 55.457 | 48 | 0.214 |
| Linear-by-Linear Association | 2.158 | 1 | 0.142 |
| N of Valid Cases | 136 | | |
| a. 58 cells (85.3%) have expected count less than 5. The minimum expected count is .15. | | | |

Table 3 showed that there is no association between nurses educational qualifications and infection control measures practice in the selected institutions under study. Hence, The null hypothesis is thereby upheld

## 4. Discussions

The findings of the study are hereby discussed based on the research questions and hypotheses that follow.

### 4.1. To what extent are nurse clinicians working in tertiary health institutions (IMSUTH Orlu and A-E FUTHA Abakaliki) in South East Nigeria knowledgeable about infection control measures?

The findings of this study reveal good knowledge of infection control measures among nurse clinicians in the South East tertiary health institutions. Perhaps the hospital management exposed the nurse to infection control and prevention protocol during orientations or at a particular period of the year as a standard as a expected of a teaching hospital. This finding corroborates [16, 17, 18] whose study on knowledge of infection control measures depicted good knowledge of infection control among nurses in Yendi, Ghana; Aksum, Ethiopia; and Ilorin, Nigeria, independently. However, [19, 20] discovered that nurses in Benue and Ibadan, Nigeria, respectively, have poor knowledge of infection management.
The study also revealed that respondents from the selected teaching hospitals had a good knowledge of the manual list for infection prevention control policies and guidelines for workers in their respective hospitals. This might be due to the fact that both institutions are training grounds for healthcare workers from the colleges and universities; hence, they should be up to date on information concerning infection control and prevention with the protocols and guidelines made available to the nurses and other healthcare workers in that institution to prevent hospital-acquired infections (HAIs). Such a manual provides a comprehensive outline to practice and manage infection [21] in their respective hospitals. However, being knowledgeable about this manual may not determine practice.
4.2. To what extent are infection control practices adopted by nurse clinicians working in tertiary health institutions (IMSUTH Orlu and A-E FUTHA Abakaliki) in South East Nigeria?

The study revealed that nurses in the southeastern Nigerian tertiary institutions carry out infection control practices to a very high extent. The reason for this result could be attributed to the fact that in the clinical area, nurses teach by demonstrating the need for students in the clinical area to learn. This finding was consistent with a similar study in Palestine by [22] and inconsistent with [19, 23] [20], whose studies revealed poor infection control measure practices in North Central, South East, and South West Nigeria, respectively, among nurses.

The most important mechanism of spreading health association infections is through the contaminated hands of healthcare workers, and these include nurses, doctor and other staff [24]. On evaluating respondents on hand washing, this study revealed that nurses in the southeast practice at a very high extent hand washing before and after taking care of surgical wounds and immediately when they come in contact with blood , body fluid and contaminated items, which is consistent with [25] findings in Saudi Arabia, whereas [23] study in Enugu was inconsistent. In addition , the participant of this study expressed infection control practices to a very high extent by always observing guidelines necessary for a correct application of disinfection/sterilisation procedures, discarding sharp materials and needles in a puncture-resistant container, and wearing personal protective equipment to protect oneself during procedures that generate sprays of blood and body fluid.

### 4.2. Ho Association between nurses' education qualifications and infection control measures practice in both teaching hospitals under study.

Despite the very high extent of knowledge and practice of infection control measures among nurses, the null hypothesis is that there is no significant association between nurses' education qualifications and infection control measures practice in both teaching hospitals under study. The hypothesis reveals that there is no significant association between nurse clinicians of different educational qualifications and their practice of infection control measures in the tertiary

health institutions under study. The above finding runs contrary to the finding of [17, 25] in similar studies in Saudi Arabia and Ethiopia, respectively. Perhaps the respondent's experience in this study plays a significant role in their practice related to infection control in the southeast tertiary hospitals.

## 5. Conclusion

This study provides valuable insight into the knowledge and practice of infection control measures among nurse clinicians working in tertiary health institutions in southeast Nigeria. The study reveals good knowledge and a very high extent of infection control practice among nurse clinicians working in tertiary health institutions in southeast Nigeria without any attachment to the educational status of the nurses.

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from each participant before responding to the questionnaire

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