

Nursing students' knowledge and practice of infection control in Burns and Medical-Surgical Units at the University of Benin Teaching Hospital, Nigeria, 2019

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Abstract

Context: Nursing students form a larger percentage among the health-care team. Therefore, for any infection control policies in the hospital to be effective; they must be put into consideration.

Aims: This study sought to find out the level of knowledge and practice of infection control (KPIC) among student nurses posted to Medical-Surgical and Burns Unit, and also determine if knowledge level will statistically predict the practice of infection control.

Settings and Design: This cross-sectional study was conducted on student nurses posted to Burns and Medical-Surgical Unit of University of Benin Teaching Hospital, Nigeria, 2019.

Materials and Methods: This study was conducted among 100 student nurses who were posted to Medical-Surgical and Burn Units through census method and KPIC questionnaires were administered.

Statistical Analysis Used: Data collected were analyzed using descriptive statistics and Spearman's correlation coefficient at 0.05 significant levels.

Results: The nursing students had low knowledge and do not practice infection prevention with mean score of 15.38 (3.32) and 14.17 (2.80), respectively. The result also revealed that there is a significant relationship between KPIC among nursing students using Spearman's correlation coefficient, which showed $P < 0.001$.

Conclusion: The level of KPIC measures was poor among nursing students, and those who are knowledgeable about infection control also have high compliance to infection control; we, therefore, recommend laborious training on infection control measures of nursing students prior to clinical posting.

Keywords: Burns, Infection control, Knowledge, Nursing students, Practice, Surgical procedure

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INTRODUCTION

Infection control and prevention (ICP) was defined by the World Health Organization as a scientific approach

and practical solution designed to prevent harm caused by infection to patient and health workers.^[1] ICP is essential in

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any well-functioning health system because it is a major tool used in preventing transmission of infection in health-care environment.^[2] This requires some basic knowledge in epidemiology of diseases; predisposing or risk factors that promote susceptibility to the infection.^[3] The Centers for Disease Control and Prevention postulated that 5% of all admitted patients, will contract hospital acquired infection and the spreading of these infections can be controlled through simple practices with little or no cost implication strategies, ranging from the basic tenet of handwashing technique, use of personal protective equipment, prevention of needlestick, sharp injuries, cough etiquette, cleaning, disinfection, and effective waste disposal.^[4]

In 2011, the World Health Organization said that about 15% of all patients admitted into hospital developed hospital-acquired infection.^[1] In this modern day, it is totally unacceptable for an individual seeking medical help to be at risk of other infection.^[5] Infection controls in the hospital are, therefore a major challenge that must be considered.^[6] The incidence of hospital acquired infection is high in developing countries when compared to more industrialized countries.^[7] The practice of infection control in developing countries is low because of several influences such as knowledge deficient, government readiness, and absence of modern equipment necessary for infection control.^[7,8] In 2011, a study opined that prevalent of hospital acquired infection is high in Nigeria.^[9]

In 2014, a surveillance study was carried out about hospital-acquired infections and showed 4.9% prevalence rate of hospital-acquired infection and surgical site infection was found to be the second most prevalent of hospital-acquired infections in the hospital.^[10] A study showed an estimate total cost of \$ 7,184,000 annually for hospital infection control and also identified developing countries such as Nigeria, with the greatest occurrence, in which the highest figures comes from Medical-Surgical Unit (68%) and Burn Units (35.5%).^[11] Other study shows that the health professionals (doctors, nurses, student nurses, and other health officers) are the major carrier of infection transmission in the hospital.^[12] Attention to universal precaution on infection prevention and practice is the way out but compliance by nursing students, nurses, doctors, and other members of health team is a major challenge.^[13] There are many research works on infection control among health workers, but students in the hospital are not considered because they considered not certified member of health team, but they have regular contact with patient, in fact, their population is more than certified health worker. Nursing students in particular are often exposed to various infections when posted to high-risk unit in the

hospital to practice nursing. Therefore, for an effective control in the hospital, keen interest must be on these set of people in the hospital. Based on this identified high-risk areas and noticed gap in the literature reviewed, we aimed to determine Nursing Students' knowledge and practice of infection control in Burns and Medical-Surgical Units at the University of Benin Teaching Hospital, Nigeria, 2019.

MATERIALS AND METHODS

A descriptive study conducted at University of Benin Teaching Hospital, Benin City, Nigeria, in 2019. Census method was used for sampling. The sample size is one hundred participants which comprises of all student nurses posted to Medical-Surgical and Burn Unit. The sample size was calculated using Taro Yamane formula, $N = 133$, error 5%, and 95% confidence interval, based on similar study.^[14] The students were recruited based on the inclusion and exclusion rules. The nursing students, currently undergoing training in school of nursing, University of Benin Teaching Hospital and Department of Nursing, University of Benin, were included in the study, while those students who were in their preclinical training and also fill out the questionnaire incompletely were excluded from the study. The ethical approval was obtained from the University of Benin Teaching Hospital Research and Ethical Committee, with approval reference Number: ADM/E22/A/VOL.V11/14568 on December 30, 2018, the hospital where the study was conducted. Principle of voluntary participation was applied, and proper explanation of the purpose of the research was ensured. Consent form was given to the participants to seek verbal and written consent before data collection. Students who declined inclusion were not penalized.

Data were collected through KPIC questionnaires to assess knowledge and practice of nursing students at various aspects of infection prevention and control. Content validity of KPIC questionnaire was assessed by some experts. Cronbach alpha statistics was used to determine the extent to which the instrument consistently measures what it is supposed to measure. This was carried out by administering the test to ten respondents and thereafter, the instrument was subjected to Cronbach's alpha test, to determine the reliability coefficient of the instrument.

The questionnaire consists of three sections: Section A – This contains four questions with options on demographic characteristics of the respondents; Section B – This contains eight questions with option on the knowledge of infection control that was analyzed using score rate answers (Yes or No). A score of 2 was given to right answer and 1 for wrong answer. A total score ranges

from 0 to 11 was rated as bad, scores below 12–15 as low knowledge while score 16 rated as borderline knowledge, scores from 17 to 19 was rated as good knowledge, and score 20–23 as excellent knowledge; Section C – This contains seven questions with options on practice of infection control through four-point Likert scale was used to grade the practice: “Not available/No, “Sometimes,” “most times” and “always.” A score of 4 was given for always 3 for most time, 2 for some time, and 1 for NO or NOT available,” this was rated as follows: A total score of 0–7 was rated very bad scores, 8–17 rated low practice, 18–22 scores rated good, and score of 23–28 were rated as excellence.

The researcher was assisted by three research assistants, who helped in the data collection and administration of the research instruments in the followings units: Burn ward, women and men medical and surgical wards of the University of Benin Teaching Hospital, Benin City. They also helped in supervision of the participants to avoid any interruption from the nonparticipating nursing students. The researcher and the assistants were present during the filling of the questionnaire for correction as well as to ensure high percentage of return of questionnaire. The data obtained were analyzed on computer through the use of Statistical Package for the Social Sciences (SPSS) version 21.00 statistical software (IBM Corp., released 2012, IBM SPSS Statistics for Windows, version 21.0 Armonk, NY, USA: IBM Corp.). The statistical techniques used were: mean, standard deviation, frequency, and Spearman’s correlation coefficient.

RESULTS

Demographic characteristics of nursing students in total from the three wards were reported in Table 1. The sample was characterized by only few in middle-age adult. More than two-third of the student was female, and more than two-third of the student was Christian and about two-third were in year 3.

Knowledge about infection prevention is reported in Table 2. It shows that the respondents had poor knowledge about the isolation precaution of pulmonary tuberculosis infection; Methicillin-resistant *Staphylococcus aureus* and meningococcal meningitis but have excellent knowledge about HIV’s isolation precaution. It also shows that the respondents had excellent knowledge of infection control but was poor for use of immunoglobulin.

Practice of infection control among nursing student is reported in Table 3. It shows that the respondents had a low level of practice in the areas such as, wearing of eye shield when there is any risk of blood splash, wearing

Table 1: Demographic characteristics of student nurses posted to Burns and Medical-Surgical Units at the University of Benin Teaching Hospital, Nigeria, 2019

Variables	Attributes	Frequency, n (%)
Age group (years)	21-30	95 (95)
	31-40	5 (5)
Gender	Male	25 (25)
	Female	75 (75)
Religion	Islam	17 (17)
	Christianity	83 (83)
Level of training	Year 2	30 (30)
	Year 3	60 (60)
	Postbasic	10 (10)

Table 2: Knowledge of infection control among student nurses posted to Burns and Medical-Surgical Units at the University of Benin Teaching Hospital, Nigeria, 2019

Infection	Knowledge statement	Correct Responses		Frequency, n (%)
		Isolation	answers	
Pulmonary TB	Droplet	No	Yes	86 (86)
			No	14 (14)
MRSA	Airborne	No	Yes	92 (92)
			No	8 (8)
HIV	Airborne	No	Yes	14 (14)
			No	86 (86)
Meningococcal meningitis	Contact	No	Yes	90 (90)
			No	10 (10)
Immunoglobulin should be given to workers who sustain needlestick injury contaminated		No	Yes	97 (97)
			No	3 (3)
Needle should always be recapped before discarding		No	Yes	15 (15)
			No	85 (85)
Hand should be washed after examining each patient		Yes	Yes	91 (91)
			No	9 (9)
Hand should be washed after removing glove		Yes	Yes	96 (96)
			No	4 (4)
Medical records and blood specimens from patient with HIV infection should be clearly labeled as infectious		No	Yes	82 (82)
			No	18 (18)
Standard precautions include wearing gloves for contact with patient’s skin		No	Yes	81 (81)
			No	19 (19)
Airborne precaution includes wearing a high filtration mask		Yes	Yes	84 (84)
			No	16 (16)

MRSA: Methicillin-resistant *Staphylococcus aureus*, TB: Tuberculosis

of glove for touching mucous membrane, and wearing of the glove when given an injection to the patient. The mean score for knowledge and practice of infection is reported in Table 4. It shows the mean score of practice of infection control falls within the stated scores for low practice of infection control. The table also shows that the mean score of knowledge of infection control is below the stated borderline scores of knowledge of infection control. Spearman’s correlation statistics shows that there is significant relationship ($r = -0.123, P < 0.001$) between the KPIC.

DISCUSSION

Knowledge has come to be recognized as a factor of production. Students’ attitude or practices do change, but

Table 3: Practice of infection control among student nurses posted to Burns and Medical-Surgical Units at the University of Benin Teaching Hospital, Nigeria, 2019

Practice of infection control	Variables	Frequency, n (%)
I wash my hand after examining every patient	No	0
	Sometime	10 (10)
	Most time	25 (25)
	Always	65 (65)
I wear glove when I expect contact with blood or body fluid	No	0
	Sometime	4 (4)
	Most time	6 (6)
	Always	90 (90)
I wear glove when given injection to my patient	No	15 (15)
	Sometime	65 (65)
	Most time	8 (8)
	Always	12 (12)
I wear glove for touching mucous membrane	No	22 (22)
	Sometime	64 (64)
	Most time	10 (10)
	Always	4 (4)
I wear a mask to prevent infections transmitted by droplets	No	5 (5)
	Sometime	15 (15)
	Most time	37 (37)
	Always	43 (43)
I wear eye shield when there is any risk of blood splash	No	35 (35)
	Sometime	58 (58)
	Most time	4 (4)
	Always	3 (3)
I wear gown when there is any risk of blood splash	No	3 (3)
	Sometime	5 (5)
	Most time	30 (30)
	Always	62 (62)

Table 4: Means of scores of knowledge and practice of infection control among student nurses posted to Burns and Medical-Surgical Units at the University of Benin Teaching Hospital, Nigeria, 2019

Variables	Mean (SD)
Knowledge of infection control	15.38 (3.32)
Practice of infection control	14.17 (2.79)

SD: Standard deviation

you can't make someone change. Instead, the person has to realize for themselves that the way they are acting is not effective and decide that they want to do something better; therefore, knowledge is pertinent in decision-making. The findings from this study show that nursing students have poor knowledge on infection prevention which agrees with a study, which stated that adherence to standard precautions is poor in public health facilities in resource-limited settings due to higher disease prevalence and limited organizational support.^[15] However, this disagree with a study which revealed that nurses have adequate knowledge of universal precautions and high compliance with the use of sterile gloves, handling and disposal of needles and other sharp objects was higher, especially among those with experience of 10 years and above.^[16] This disagreement between results may be due to difference in content of education or some differences between studies' population. Knowledge of universal precautions was highest among nurses compared

to other health-care workers.^[17] The result may be due to the fact that the students are less experienced in health care management of patients.

The result of the analysis also shows that practice of infection control among the respondents is low. This agreed with the research carried out among 245 dental students and found out that the level of KPIC measures was poor among dental students.^[18] This further corroborates with a research regarding standard precautions among Iranian midwifery instructors, nursing instructors, auxiliary nursing instructors, and their students were found to be poor.^[19] Finally, the study also shows that the level of knowledge about infection control can be used to predict the practice of infection control. This means that, the knowledge level among student nurses will statistically predict the practice of infection prevention and control among them. This is in agreement with a study that identified theoretical-based predictors of condom use in a sample of 253 sexually active African-American college students and found that the knowledge of HIV is a predictor to the use of condom.^[20,21] This is also validated by study who found that there is a significant relationship between the extent to which the nurses' practice is evidence-based practice and nurses' knowledge of the practice.^[14]

Nevertheless, this study was faced with some limitation such as the research only covered one school of nursing, probably; there is a peculiarity in the school that affected the outcome of the study. Furthermore, not achieving the complete sample size due to the limitation of number of students is another major factor. The study will be better if extended to different school of nursing, from different state of the country.

CONCLUSION

The overall level of knowledge of ICP in this study indicates that majority of nursing students have poor knowledge on infection prevention and practice of infection control; we, therefore, recommend laborious training on infection control measures of nursing students prior to clinical posting. This will equip the student nurses with the knowledge and skills of infection prevention and control. Moreover, the hospital management is also expected to provide the necessary personal protective equipment, such as gowns, face masks, and gloves, for student nurses posted to various wards.

Conflicts of interest

There are no conflicts of interest.

Authors' contribution

All authors contributed to this research.

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REFERENCES

- World Health Organization. Global Technical Strategy for Malaria 2016-2030. World Health Organization; 2015. p. 4-8. Available from: <https://www.who.int/malaria/publications/atoz/9789241564991/en/>. [Last accessed on 2019 Aug 16].
- Khan HA, Baig FK, Mehboob R. Nosocomial infections: Epidemiology, prevention, control and surveillance. *Asian Pac J Trop Biomed* 2017;7:478-82.
- Gerstman BB. *Epidemiology Kept Simple: An Introduction to Traditional and Modern Epidemiology*. Hoboken, NJ: John Wiley & Sons; 2013. p. 21-5.
- Alice TE, Akhere AD, Ikponwonsa O, Grace E. Knowledge and practice of infection control among health workers in a tertiary hospital in Edo state, Nigeria. *J Health Pharm* 2013;1:20-7.
- Allegranzi B, Gayet-Ageron A, Damani N, Bengaly L, McLaws ML, Moro ML, *et al.* Global implementation of WHO's multimodal strategy for improvement of hand hygiene: A quasi-experimental study. *Lancet Infect Dis* 2013;13:843-51.
- Baines R, Langelaan M, de Bruijne M, Spreuwenberg P, Wagner C. How effective are patient safety initiatives? A retrospective patient record review study of changes to patient safety over time. *BMJ Qual Saf* 2015;24:561-71.
- Oli AN, Ekejindu CC, Ejiogor OS, Oli AH, Ezeobi I, Ibeh CC. The knowledge of and attitude to hospital-acquired infections among public and private healthcare workers in South-East, Nigeria. *Br J Med Med Res* 2016;11:1-10.
- Akujobi CN, Ilo IA, Egwuatu CC, Ezeanya CC. Prevalence of Methicillin-Resistant *Staphylococcus aureus* (MRSA) among healthcare workers in a tertiary institution in Nigeria. *Orient J Med* 2013;25:82-7.
- Nakamura I, Fukushima S, Hayakawa T, Sekiya K, Matsumoto T. The additional costs of catheter-related bloodstream infections in intensive care units. *Am J Infect Control* 2015;43:1046-9.
- Fan Y, Wei Z, Wang W, Tan L, Jiang H, Tian L, *et al.* The incidence and distribution of surgical site infection in mainland China: A meta-analysis of 84 prospective observational studies. *Sci Rep* 2014;4:6783.
- Raza MW, Kazi BM, Mustafa M, Gould FK. Developing countries have their own characteristic problems with infection control. *J Hosp Infect* 2004;57:294-9.
- Zubair KO, Iregbu KC. Resistance pattern and detection of metallo-beta-lactamase genes in clinical isolates of *Pseudomonas aeruginosa* in a central Nigeria tertiary hospital. *Niger J Clin Pract* 2018;21:176-82.
- Thapa S, Sapkota LB. Bacteriological assessment of stethoscopes used by healthcare workers in a tertiary care centre of Nepal. *BMC Res Notes* 2017;10:353.
- Okpala PU, Uwak R, Nwaneri AC, Onyapat JL, Emesowun A, Osuala EO, *et al.* Nurses' knowledge and attitude to the care of HIV/AIDS patients in South East, Nigeria. *Int J Community Med Public Health* 2017;4:547-53.
- Okechukwu EF, Motshedisi C. Knowledge and practice of standard precautions in public health facilities in Abuja, Nigeria. *Int J Infect Control* 2012;8:1-7.
- Abdulraheem IS, Amodu MO, Saka MJ, Bolarinwa OA, Uthman MM. Knowledge, awareness and compliance with standard precautions among health workers in North Eastern Nigeria. *J Community Med Health Educ* 2012;2:1-5.
- Amoran O, Onwube O. Infection control and practice of standard precautions among healthcare workers in Northern Nigeria. *J Glob Infect Dis* 2013;5:156-63.
- Halboub ES, Al-Maweri SA, Al-Jamaei AA, Tarakji B, Al-Soneidar WA. Knowledge, attitudes, and practice of infection control among dental students at Sana'a university, Yemen. *J Int Oral Health* 2015;7:15-9.
- Murray A, Huang MJ, Hardnett F, Sutton MY. Strengthening HIV knowledge and awareness among undergraduate students at historically black colleges and universities. *J Health Disparities Res Pract* 2014;7:33-45.
- Alnoumas SR, Enezi FA, Isaed MM, Makhoul G, El-Shazly MK. Knowledge, attitude and behavior of primary health care workers regarding health care-associated infections in Kuwait. *Greener J Med Sci* 2012;2:92-8.
- Joy IE, Eghighe FA, Nwobu RA, Paul ON. Prevalence and multidrug antimicrobial susceptibility of bacteria isolates obtained from surgical site in Nigeria. *Int J Curr Microbiol App Sci* 2016;5:708-15.