INFECTION PREVENTION AND CONTROL PRACTICES AMONG HEALTHCARE WORKERS IN TERTIARY HEALTH FACILITIES IN OWERRI MUNICIPAL COUNCIL, IMO STATE, NIGERIA

Fidelis, Mary Ndubuisi, Ibhafidon, Akhere, Onwusukwu, Uchechukwu Benedict and Nwaobiala Chinenye Jennifer
Dept. of Health Education
Alvan Ikoku Federal College of Education, Owerri

Abstract
The study investigated infection prevention and control practices among workers in tertiary healthcare facilities in Owerri Municipal Council, Imo State, Nigeria. Two research objectives with corresponding two research objectives guided the study. The study adopted a descriptive cross- sectional survey research design. The population for the study comprised all the 820 nurses in Federal Medical Centre, Owerri as this is the only tertiary healthcare facility in the council. The sample size was 200 nurses drawn using simple random sampling techniques of balloting without replacement and convenience sampling technique. A validated questionnaire titled Infection Prevention and Control Practices Questionnaires (IPCPQ) was used as the instrument for data collection. Descriptive statistics frequency and percentage were used to answer and analyze the research questions respectively. Results showed that nurses at the Federal Medical Center, Owerri had poor (42.9% and 44.4%) primary and secondary infection prevention practices respectively. Researchers recommended among others that hospital administration should provide hand -washing basins at strategies points in each ward to promote hygiene, also medical screening and examination should be free for nurses on duty, especially those on emergency and infection wards; and personal protective equipment should be provide for nurses by the government.

Key words: Healthcare workers, infection, practices, prevention, tertiary healthcare facility.

Introduction
Safety is one of the most important needs of man. This is because it gives man a sense of security in both his living and working environments. This security could be job, food or health security. One of the key factors to health security is infection prevention and control which is defined by *World Health Organization WHO (2009)* as a practiced, evidence-based approach which prevents patients and health workers from being harmed by avoidable infection and as a result of antimicrobial resistance. It is also defined by Zenbaba, Sahitedengle and Bogale (2020) as all policies, procedures, and activities which aim to prevent or minimize the risk of transmission of infectious disease at healthcare facilities. The WHO definition points to a particular type of infections known as healthcare acquired infection (HAI). Healthcare acquired infection is an infection occurring in a patient during

the process of care in a hospital or other healthcare facilities which was not present or incubating at the time of admission. As revealed by Sarari, Balouchi, Masinaeinezhad and Ebrahimitabs (2014), an infection could be termed healthcare acquired infection only if it occurs within 48 -72 hours after hospitalizations or in other healthcare facilities.

Healthcare acquired infection is a global problem. It occurs in both developed and developing countries. According to *Pan American Health Organization* and *World Health Organization Regional Office for the Americans (2018)*, 1.7 million healthcare acquired infections occur every year in America and leads to 99,000 dealths. Alhumaid, *et al.* (2021) reported that the prevalence of healthcare acquired infection ranges from 5 to 15% of hospitalized patients and can affect 9 – 37% of those admitted to intensive care units. In the same vein, Allegranzi, *et al*. (2011) reported the prevalence and burden of HAI to be 20 times and significantly higher in low and medium- income countries (Nigeria inclusive) than in high-income countries (developed countries). According to *World Health Organization (2021)*, the estimated prevalence of HAI are considered as 17.6% and 10.1% in developed and developing countries respectively. Based on the foregoing, Desta, Ayenew, Stotaw, Tegegne, Diris and Getie (2018) and Zanbaba *et al*., (2020) revealed that an estimated 10% and 25% of hospitalized patients develop healthcare acquired infections in developed and developing countries respectively.

Healthcare workers are also affected by healthcare acquired infection. World Health Organization (2021) reported that 3 million out of 35 million healthcare workers worldwide encounter percutaneous exposure to blood borne pathogens each year, 2 million to hepatitis B virus; 0.9 million to hepatitis C virus; and 0.17 million to HIV. The prevalence of HAIs among healthcare workers is also higher in developing countries than in developed countries. The reasons could be attributed to lack of standardized infection prevention programme due to limited resources, poor sanitary conditions, and poor hygienic practices (Desta, *et al*. 2018). In another study, Ogoina, Pondei, Adetenji, Chima, Isichei and Gidado (2015) reported that HAIs affect patient's attendants, visitors, medical students and support staff in health care facilities. Based on the foregoing, it is evident that HAIs are of global importance because they exert both health and economic burdens. In USA alone, *Pan American Health organization* and *World Health Organization* Regional Office for the Americans (2018) reported that HAIs cost 25.0 to 31.5 million dollars yearly in America. Other global burden or impacts of HAIs include prolonged hospital stay, increased morbidity and mortality, long term disability, massive additional financial burden for health system, high cost for patients and their family, increased resistance of microorganism to antimicrobials and unnecessary death (Ogoina, *et al*. 2015; Desta, *et al*., 2018; Alhumaid, *et al*., 2021). Based on these burdens, there is need to tackle HAIs and one of the best ways to do this is through infection prevention and control practices.

Infection prevention is a process of placing barriers between susceptible host and the pathogenic microorganism, according to Tietjan (2011). Healthcare acquired infection control as defined by Ameriyoun, Tavakkoli and Zabou (2009) means the reduction of the infection risks by patients, hospital personnel, and patients care attendants, and the prevention of infection transmission by hospital personnel and patients family. From the two definitions, one could deduce that the process and the means for achieving infection prevention and control is simply practice. Therefore, HAIs can be prevented through infection prevention and control practices. Infection prevention and control practices are, according to Ige, *et al*. (2021) practical, proven methods that prevent the avoidable harms to patients and protect healthcare workers from contagious infections. These practices include proper hand washing, covering coughs and sneezes, staying up to date with vaccination and use of gloves.

Furthermore, Infection prevention and control practices include hand hygiene, injection safety, isolation precautions (contact, droplet and airborne precautions), and patient bathing (Priya, Hrishnan, Jayala Kkshmi and Vasanthi 2015; Saito, Inoue, Ditai, Wanume, Abeso and Weeks, 2017). Antibiotic stewardship, vaccinations, environmental cleaning, disinfection and sterilization as well as comprehensive unit based safety programme and surveillance were also recommended by Rutala (2004) and, Pittet and Allegrazin (2006). Other practices, according to Ayliffe, Fraise, Geddes and Mitchell (2000) include systematic treatment of patients, avoiding prolonged hospitalization, the use of antibiotics, use of suction catheters, hand washing by healthcare personnel and the use of sterilization techniques in therapeutic procedures. *Pan American Health Organization* and *World Health Organization Regional Office for the Americans* (2018) listed infection preventions and control practices to include: use of personal protective equipments like gloves, masks, respirators, eye protectors (safety glasses, goggles, face shields), booths, hoods and jumpsuit; prevention of sharp accidents; management of the environment (e.g cleaning, disinfection, handling of patient clothing, management of laundry); waste management; contact precautions; droplet precautions; airborne precautions; and cohort isolation.

In this study, these practices are grouped into primary and secondary infection prevention and control practices. Those practices that seek to prevent infection from occurring are termed primary infection prevention practices while secondary infection practices are those practices that will lessen, attempt to prevent an infection from progressing to disease or reduce damage caused by an infection. Such practices include early initiation of treatment, attempts to prevent reoccurrence, frequent emptying of catheter to maintain urine flow and prevent reflux, isolation, regular examination and screening to detect infection in its earliest stages, and prevention of opportunistic diseases in Human Immunodeficiency Virus (HIV) patients. The persons at the front of infection prevention whether at the primary level or secondary level, are the health workers.

Nurses in particular play a very important role in healthcare acquired infection prevention and control. Studies have revealed poor infection practices among nurses. For instance, Gashaw, Kinati, Bedada and Getahun (2020) revealed that only 46.8% of nurses in their study had a good infection prevention practices. Desta *et al* (2018) also reported that only 57.3% of their respondents demonstrated a good practice on infection prevention and control practices despite the fact that 84.7% of them had a good knowledge of infection prevention and control measures. The findings also revealed that 44% practice hand washing, 66.7% wash their hands with soap before and after patient care or after contact with blood, 72% had not worn goggle, 71.3% does not vaccinate for common pathogen, and 25% does not use available supplies for prevention of infection. Ghabari, Shamsi, Farazi, Khorsandi and Eshrati (2013) revealed that most nurses do not adhere to health care acquired infection prevention practices.

Moderate healthcare acquired infection prevention and control practice among nurses was reported by Drawad and Al-Hassami (2013) while Iliyasu, *et al*., (2016) revealed a good percentage (76%) of infection prevention and control practices among nurses. Ihiyasu, *et al*. further revealed that 76% nurses always practice hand hygiene before and after glove use, and in between patient care. On the recapping of needles, only 17.3% nurses do so most of the time. Biniyam, Azeb, Tadesse and Desta (2018) stated that practice is a key factor to effective preventive of healthcare infection prevention and control. Though several studies had been conducted in both developed and developing countries including Nigeria on infection control practices, majority of these studies where on the knowledge of infection control measures. Therefore, non to the best knowledge of the researchers had been conducted on infection prevention and control practices among healthcare workers in Federal Medical Centre, Owerri. This is the knowledge gap this study will fill.

Purpose of the Study

The purpose of the study is to determine the infection prevention and control among healthcare workers in Federal Medical Centre Owerri, Imo State, Nigeria. Specifically, the study is set to:

1. Determine the primary infection prevention and control practices among healthcare workers in Federal Medical Centre, Owerri.
2. Ascertain the secondary infection prevention and control practices among health care workers in Federal Medical Centre, Owerri.

Research Questions

The following research question guided the study

1. What is the primary infection prevention and control practices among healthcare workers in Federal Medical Centre, Owerri?

2. What is the secondary infection prevention and control practices among healthcare workers in Federal Medical Centre, Owerri?

Methodology

Cross-sectional facility based descriptive survey design was adopted for the study. The population for the study was 820 nurses (Source: Human Resource Department). Out of which 200 (24%) were selected through multi-stage, sampling procedures. In the first stage all the units and the total number of nurses in each unit were listed. In stage two, balloting without replacement was used to select 10 units from the 14 units. In stage three, convenience sampling was adopted in selecting the sample size of 200, from the sampled units. This is because the participants included only those on duty during the data collection period.

The instrument for data collection was researchers'-structured Infection Prevention and Control Practices Questionnaire (IPCPQ). With a reliability coefficient of the questionnaire consist of two sections A and B. Section 'A' contained 10 items on primary infection prevents and control practices while section 'B' contained 5 items on secondary infection prevention and control practices. The items were rated on 3 point scale of 3 -1 (Always = 3, sometimes =2 and rarely 1). Two hundred copies of the questionnaire were distributed on face of face basis and collected back yielding with a return rate of 100%. All the copies of the instrument distributed were correctly and completely filled and therefore were used for the study. The data collected were coded and SPSS version 23 was used for analysis. Descriptive data analysis was done and presented in frequency and percentages. Scores were labeled as poor, (0 -49%), fairly good (50 -69), good 70 – 100%.

Result

Research Question One

What is the extent of primary infection prevention and control practices among healthcare workers in Federal Medical Centre, Owerri, Imo State, Nigeria?

Table 1: Responses on the extent of Primary infection Prevention and Control Practice among Healthcare Workers in Federal Medical Centre, Owerri.

S/N	Primary infection prevention and control practices	always F %	Sometime F %	Rarely F %	Total
1.	Cover wounds on my skin before giving patient care	121(60.5)	65(32.5)	14(7)	200
2.	I adher to barrier precautions such as covering cough and sneeze when attending to patients	112(56)	81(40.5)	7(3.5)	200
3.	I use gloves before giving patient care	106(53)	67(33.5)	27(13.5)	200
4.	Sterilize of sharps before use	100(50)	84(42)	16(8)	200
5.	Wash my hands with soap before giving care to patients.	78(39)	101(52)	18(9)	200
6.	Wash my hands before and after patient care	74(37)	10(50.5)	25(12.5)	200
7.	I use other personal protective equipment such as mask when attending to patients	73 (36.5)	104(52)	23(11.5)	200
8.	I stay up to date with vaccination against pathogen	68(34)	129(64.5)	3(1.5)	200
9.	I wash my hands with soap immediately after patient	63(31.5)	96(48)	41(20.5)	200
10.	Recap needles after use before disposal	62(31)	105(52.5)	33(16.5)	200
Overall percentage		**42.9%**	**46.8%**	**10. 3%**	

Key for interpretation 0 -49% Poor, 50- 69% Fairly good, 70 -100% Good (for scores under always only).

Table 1 revealed that, only 42. 9% of the nurses always demonstrated primary infection prevention practices while 46.8% indicated sometimes and 10.3% indicated rarely. Therefore the overall showed that nurses had a poor primary infection prevention practice. The table also revealed that covering wound nurses had a fairly good practice of rarely on the skin before giving patients care (60.5%), adhering to barrier precautions (56%), use of gloves before giving patients care (53%), and sterilization of sharps before use (50%). As regards hand hygiene practices only, 39%, 31.5% and 37% of the nurses always washed their hands with soap and water before patient care, immediately after patient care, and before and after patient care respectively. This indicates poor hand hygiene practice among nurses. Nurse showed poor practices of the use of other personal protect equipment such as mask (36.5%), staying up with vaccination (34%), any recapping needles after use before disposal (31%).

Research question two
What is the secondary infection prevention and control practice among health care workers in Federal Medical Center Owerri, Imo State , Nigeria.

Table 2: responses on the extents of secondary infection prevention and control practices among healthcare workers in Federal Medical Central Owerri, Imo State, Nigeria.

S/N	Secondary infection prevention and control strategies	Always F %	Sometime F %	Rarely F %	Total
1.	Early initiation of treatment whenever infection	133 (66.5)	58(29)	09(4.5)	200
2.	I practice personal preventive strategies like adhering to prescription to prevent reoccurrence.	97(48.5	84(42)	19(09.5)	200
3.	Early medical examinational screening to defect infection at its earlier stage.	81 (40.5)	105(52.5)	14(07)	200
4.	Frequent emptying of catheters to maintain urine flow and prevent reflux	74(37)	109(54.5)	17(8.5)	200
5.	Self- isolation whenever I develop sign of infection	59(29.5)	116(58)	25(12.5)	200
Overall percentage		**44.4%**	**47.2%**	**8.4%**	

The result in table 2 revealed that overall; nurses had a poor practice (44.4%) of secondary infection prevention and control. The table also revealed that nurses showed a fairly good practice of early initiation of treatment (66.5%) but demonstrated poor practices of personal preventive strategies like adhering to prescription to prevent reoccurrence (48.5%), early medical examination and screening to detect infection at its earlier stage (40.5%), frequent emptying of calhethers (37%) and self- isolation (29.5%).

Discussion
The findings in table 1 showed that less than half (42.9%) of nurses in Federal Medical Centre Owerri, Imo State, Nigeria always demonstrated primary infection prevention and control practices. They had a fairly good practice of: covering of wound on the skin before giving patient care, adhering to barrier precaution when sneezing and coughing, use of glove before giving patient care, and sterilization of sharps for use. The table also revealed that nurses had a poor practice of hand hygiene, use of mask, staying up with vaccination, recapping of needles before disposal. In conclusion the table revealed that nurses in Federal Medical Centre, Owerri, had poor primary infection prevention and control practices. The finding

was not expected and therefore surprising because nurses are among the frontliners of disease prevention and control and therefore expected to have a very good primary infection prevention and control practices. The finding is in consonant with the findings of. Gashaw, *et al*., (2020) who reported that only 46.8% of nurses in their study had good primary infection prevention practices. The findings also agreed with the finding of Desta, *et al*, (2018) who reported that despite the high knowledge of the primary infection prevention practices among the nurses in their study, only 44% practiced hand washing. The findings on hand hygiene disagreed with the findings of Ilisayu *et al*., (2016) who reported that 76% of nurses in their study practice hand hygiene before and after glove use and in between patient care. Furthermore, the findings on the use of personal protective equipment and staying up with vaccination is in conoboratey with the findings of Desta who reported that 72% and 71.3% of the nurse in their study do not wear goggle and vaccinate for common pathongen respectively. this finding is also surprising one expects that the emergence of coronavirus pandemic should have spur the nurse to demonstrate primary infection prevention practices such as meaning googles and vaccination against infection but the reverse was the case. There is therefore, a need on studies to determine the attitude of nurses towards infection less than half prevention. The findings on table 2 revealed that 47.2% of the nurses always secondary infection prevention and control practices, 44.4% sometime practice while only 8.4% rarely practice. The findings were surprising and therefore not expected. The findings agreed with the findings of Ghabari *et al*., (2013) who reported that most nurses do not adhere to healthcare acquired infection prevention and control practices. The finding also corroborated the findings of Drawad and Ai-Hassami (2013) reported moderate secondary infection prevention and control practice. Moreover, the finding contradict the finding of Iliyasu *et al*, (2016) who reported that 76% of nurses in their study showed a good (76%) secondary infection prevention and control practices. This disparity may be due to the difference the area of the study and sample size discrepancy.

Conclusion and recommendations

Based on the findings, the nurses in tertiary health facility in Owerri Municipal Council had a poor primary infection prevention practice and had a poor secondary infection prevention practice. Based on the findings and conclusion of the study, the following recommendations were made.

1. Since hand washing is a key factor to healthcare infection prevention and control, wash basins with running water and soap should be placed at strategies points in each ward by hospital management board to encourage hand washing among nurses before, in between and after patient care.
2. Patients should insist that nurses wash their hands before giving them healthcare services.

3. Personal protective equipment such as gloves, face shield, nose mask, aprons, booths and goggles should be made readily available for nurses by the government as this will help in the reduction of hospital acquired infection and its associated economic burdens.
4. Medical screening and examination should be free for nurses on duty and at least on weekly basis especially for nurses at emergency and infection wards. This will promote early medical screening and examination among nurses
5. Policy makers should develop a policy on stay at home when signs and symptoms of infection develop to encourage self- isolation among nurses.

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