ASSESSMENT OF BASELINE KNOWLEDGE OF INJECTION SAFETY AND INJECTION-RELATED PRACTICE AMONG NURSES IN CENTRAL HOSPITAL SAPELE, DELTA STATE, NIGERIA

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ABSTRACT

Injections are one of the most common health care procedures and have been used effectively for many years in preventive and curative healthcare. The present study examined the baseline knowledge of injection safety and injection-related practice among Nurses in Central Hospital Sapele, Delta State, Nigeria. The study used descriptive research design and the target population are nurses. Sample size of 100 was determined using Taro Yamani formula and simple random sampling technique was used for the selection of the 100 respondents from the target population. Self-developed questionnaire was used as instrument, with a reliability index of 0.97. Descriptive statistics was used to analyse data. Criterion mean of 2.50 was used. The demographic characteristics of respondents revealed that majority of the respondents were within the age group of 41-45years (31%), female (89%), Christians (100%), within the ethnic group of Urhobo (53%). Result further revealed that majority of respondents had BNSc certificate (62%), with 12-15years working experience (51%). This study observed that the respondents knowledge about the baseline knowledge of injection safety and injection-related is high ($\bar{\chi}$ =3.89) and the practice level is also high ($\bar{\chi}$ =3.80). The hypotheses also showed that there is a significant relationship between knowledge and practice of injection safety (P=0.003). In conclusion, nurses have adequate baseline knowledge of injection safety, similarly, good knowledge and practice is significantly related to injection safety among nurses in the study area. There is need for continuous training and awareness creation on injection safety practice at all levels of healthcare system.

Keywords: Nurses; Injection safety; Baseline knowledge; injection-related practice.

INTRODUCTION

Injection is an aseptic process that involves piercing the skin to deliver drugs for immunization and therapy. This can be done subcutaneously, intramuscularly, intravenously, intraperitoneally or intradermal. Injections serve both therapeutic and vaccination purposes, with 95% used for medicinal purposes and 5% for vaccination (Sudesh et al., 2018). A safe injection, also known as aseptic injection practice, is a medical procedure that is administered with the proper tools, does not cause harm to the patient, does not put the healthcare worker at unnecessary risk, and does not produce waste that poses a risk to the public (World Health Organization [WHO], 2018). A qualified and well-trained individual administers a rational injection using a sterile device (such as a syringe or needle), follows sterile procedure, and disposes of used devices in a specially made container that is impervious to punctures (WHO, 2018). Additionally, the World Health Organization/Centre for Disease Control and Prevention recommends it as one of the components of infection prevention standards as guidelines for lowering the risks of acquiring or transmitting blood-borne infections and other pathogens in hospitals (Audu et al., 2018; Ofili and Ncama, 2014).

Injection-related practices worldwide and especially in low and middle-income countries, including Africa has witness unsafe practices that ultimately lead to the large-scale transmission of blood borne viruses among patients, health care providers and the community at large (WHO, 2019). Injections are used efficiently for several years in

precautionary and curative of different health ailment by healthcare providers. Also, injections are one of the most common health care measures that is been carried out on a daily basis by the Doctors, Nurses, community health extension workers, laboratory officers among others because it ensures the introduction of medication into the body system for healing or drawing samples for diagnosis purposes (WHO, 2020). Nevertheless, injection safety includes practices envisioned to prevent spread of infectious diseases between one patient and another, or between a patient and healthcare provider, and to prevent harms such as needle stick injuries. Unsafe injection practices involve a variety of actions deemed detrimental to patients, healthcare professionals, or the surrounding community, such as reusing single-use needles and syringes, recapping needles, and disposing of sharps improperly (Sudesh et al., 2018; Ofili and Nwogueze, 2024[a]).

The practice of safe injection does not harm the receiver or put the injector at unnecessary danger. Injecting patients in an unsafe manner puts healthcare personnel at serious risk for health problems as well (WHO, 2018). By spreading blood-borne infections, unsafe injection behaviours such as using sterile needles again and throwing away used syringes contribute significantly to the worldwide burden (Pepin et al., 2018; Ofili *et al.,* 2015). Statistics documented by WHO, (2020) has revealed that the problem of diseases arising from accidental injection needle-stick injuries among healthcare workers accounts for approximately 3 million accidental needle-stick injuries annually, which has led to new hepatitis B virus (HBV) infection cases (37%), new hepatitis C virus (HCV) infection (39%) and new human immunodeficiency virus (HIV) infection (5.5%). The World Health Organization equally reported that up to 1.7 million people were infected with hepatitis B virus, up to 315,000 with hepatitis C virus and as many as 33,800 with HIV through an unsafe injection (WHO, 2018). Hospital related infection is becoming a momentous threat to health care providers (WHO, 2020, Nwogueze *et al.,* 2023). Hence, there is need to limit the number of unnecessary injections as a precarious way of reducing the risk of exposure (Desta *et al.*, 2018; Burnnet, 2020).

Patients are exposed to the vulnerabilities of unsafe injection practices like; manipulating used sharps, recapping of needles, carelessly passing of used sharps from one health care worker to another to discard, carelessly discarding used needles in unexpected places such as dirty linen possess enormous dangers for health care workers occurs due to extreme use of injectable medications especially when there are other appropriate alternatives, reuse of injection equipment, and where hygienic technique is not observed by healthcare workers (Kolude *et al.*, 2020, Nwogueze *et al.,* 2024[a]). Furthermore, it was revealed that although health personnel had a high degree of understanding regarding injection safety procedures, their commitment to the practice of care did not match this awareness (Eyam et al., 2019). Despite the existence of the policy document and training of the healthcare providers' high burden of injections related-health risk and unsafe practices has been reported in parts of Nigeria (Sowande *et al.*, 2018). Hence, it becomes pertinent to examine the baseline knowledge and injection-related practice of injection safety among nurses working in Central Hospital Sapele, Delta State, Nigeria.

METHODOLOGY

Research Design: Descriptive research design method was employed to investigate the baseline knowledge of injection safety and injection-related practice among nurses in Central Hospital Sapele, Delta State, Nigeria. This design was considered appropriate in eliciting suitable information about the characteristics within a particular field of study and provides a picture of situations as they naturally happen within a specific population or setting; without manipulating variables (Nwogueze *et al.,* 2024[b]). Hence, for the present

study, the design is valuable for characterizing populations, identifying patterns, and informing future research or interventions on the baseline knowledge and injection-related practice of injection safety among nurses.

Target Population of the Study: The target population for this study comprised of all the male and female nurses currently in services of Central Hospital Sapele, Delta State. A total of 133 registered nurses according to the report from the administrative Department of Central Hospital Sapele, Delta State, Nigeria was recruited for this study.

Sample size determination: The sample size for this study was determined by using Taro Yamani's formula**.** Using a level of precision of 5% and the population size of 133. A sample size of 100 nurses working at Central Hospital Sapele, Delta State, Nigeria were selected for the study.

Sampling technique: The simple random sampling technique was used in this study to select 100 respondents from the total population.

Instrument for data collection: The instrument for data collection was self-developed semi-structured questionnaire. The items in the questionnaire were generated from the literatures reviewed with reference to objectives generated in the study so as identify gaps and provide comprehensive overview of existing researches on the baseline knowledge and injection-related practice of injection safety among nurses. The instrument has sections, A to C. Section A, comprises the respondents' demographic characteristics. Section B addresses nurses baseline knowledge of injection safety and section C focused on injection-related practice of injection safety among nurses

Validity of the Instrument: The face and content validity of the questionnaire was carried out by two experts in the Department of Nursing Science, Delta State University Abraka. They examined the items in line with objectives set for the study. They also assessed the language used in developing the instrument, made necessary modifications and her input and suggestions prior to the administration of the instrument to the study subjects.

Reliability of the Instrument: In order to establish the reliability of the instrument, 40 Copies of questionnaires were administered to 40 registered nurses at Eku Baptist Government Hospital, Delta State, Nigeria who were not involved in the main study, using test-retest method within 2 days interval. The instrument was re-administered to the same group of nurses after 2 days. The two sets of scores were correlated using Pearson Product Moment Correlation statistics and the coefficient of reliability of 0.97 was obtained which showed a high value. This made the instrument reliable for data collection.

Data Collection Procedure: A face-to-face method of data administration of the self-structured questionnaire was used for this study. The researcher went to the hospital, met with the respondents and distributed the questionnaires to them after informing them about the study and obtaining consent to participate. A trained research assistant helped in the process of data collection and respondents were allowed a period of 30 minutes to 1hour to fill the questionnaires before same will be retrieved from them. The process of data collection lasted for two weeks to enable the researcher to cover all the participating subjects.

Methods of Data Analysis: Data was coded, entered and analyzed using Statistical Package for Social Sciences (SPSS version 23). Descriptive which includes frequency, percentages, and means was used to analyze and answer the research questions. Level of significance was set at $p<0.05$. Results were presented in tables.

Ethical Consideration: A signed letter of introduction was obtained from the department of nursing science Delta State University, Abraka with permission no: REC/FBMS/DELSU/24/306. This was used to obtain approval from the participating health facility and the 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 at any time from the study.

RESULTS

The demographic characteristics of the participants are presented in Table 1 above. As shown from the table, the age group of the respondents revealed that 31% of the respondents were between the ages of 41 to 45 years, whereas, 27% were between 36 to 40 years, 26% were between the ages of 46 to 50 years, 6% were between the age of 50 years and above, while 5% were between the ages of 25 to 30 years and 31 to 35 years, respectively. Majority (89%) were female while only 11% were male. 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 response on educational qualification; majority (62%) had BNSc certificate, 14% each had their RN and Post Basic certificate, while only 10% had MNSc certificates. With regards to the years of working experience; 51% had 12 to 15 years 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. The demographic characteristics of respondents revealed that majority of the respondents were within the age group of 41-45years (31%), female (89%), Christians (100%), within the ethnic group of Urhobo (53%). Result further revealed that majority of respondents had BNSc certificate (62%), with 12-15years working experience (51%).

Table 1: Demographic Characteristics of the Respondents

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	51
16 years and above	22	22

Table 2 showed nurse's knowledge of injection safety. As shown from the results of this study, 97% of the respondents knew that injection safety involves administration of rational injection by a qualified and well-trained person using a sterile device and adopting sterile technique compared to 3% that holds contrary opinion. 99% of the respondents accepted that a safe injection poses no danger to the patient, providers and the community compared to only 1% of the respondents with a different view. It was observed that all the respondents accepted with a frequency of 100% the views in item 3, 4, 6, 7, 8, 9 and 10 respectively, that injection safety practices serves as a means of preventing infections ($\bar{\chi}$ =3.94), ensuring safe injection practices is by applying the 'nine rights' of injection safety measures ($\bar{\chi}$ = 3.97), aseptic technique is required for injection safety practices that involves some medical procedure ($\bar{\chi}$ =3.92), observation of proper storage conditions, such as temperature as per manufactures instructions is safe injection practice ($\bar{\chi}$ = 3.70), correct injection device is necessary for the patient ($\bar{\chi}$ =3.80), managing sharps waste is important for the safety of the health facility, patients and the community ($\bar{\chi}$ =3.90) and hand washing prior to and after administration of injection is considered a safe injection practice ($\bar{\chi}$ =3.95). To determine the overall knowledge level, a criterion (cut-off) mean of 2.50 was used. The calculation of the grade was done in this format; [SA is 4, A is 3, S is 2 and SD is 1]. Thus, from the results in the table 2 above, the grand mean value of 3.89 which was greater than the criterion (cut-off) mean of 2.50 indicated that the respondents had high level of knowledge of injection safety.

Table 2: Nurses Baseline Knowledge of Injection Safety

S/N	Nurses Baseline Knowledge of Injection Safety (n= 100)	YES *f*(%)	NO *f*(%)	Mean value
1	Injection safety involves administration of rational injection by a qualified and well trained person using a sterile device and adopting sterile technique	97(94)	3(3)	3.91
2	A safe injection poses no danger to the patient, providers and the community	99(99)	1(1)	3.90
3	Injection safety practices serves as a means of preventing infections	100(100)	0(0)	3.94
4	Ensuring safe injection practices is by applying the 'nine rights' of injection safety measures	100(100)	0(0)	3.97
5	The 'nine rights' of injection safety ensures include; right patient, right drug, right dosage, right formulation, right injection and equipment, right time, right route, right storage and right method of disposal	99(99)	1(1)	3.94
6	Aseptic technique is required for injection safety practices that involves some medical procedure	100(100)	0(0)	3.92
7	Observation of proper storage conditions, such as temperature as per manufactures instructions is safe injection practice	100(100)	0(0)	3.70
8	Correct injection device is necessary for the patient	100(100)	0(0)	3.80
9	Managing sharps waste is important for the safety of the health facility, patients and the community	100(100)	0(0)	3.90
10	Hand washing prior to and after administering an injection is a safe injection practice	100(100)	0(0)	3.95
	Grand Mean			**3.89**

Criterion (cut-off) mean = 2.50; f = frequency; % = Percentage

Table 3 shows nurses' injection-related practice. As revealed from the results presented in the table above, 91% strongly agreed and 4% agreed, with ($\bar{\chi}$ = 2.50) of the respondents practiced injection safety with aseptic technique. For the overall extent of practice, a criterion (cut-off) ($\bar{\chi}$ = 2.50) was used. The calculation of the grade was done in this format; [SA is 4, A is 3, S is 2 and SD is 1]. Grand mean value greater than the criterion (cut-off) ($\bar{\chi}$ = 2.50) indicated good or adequate practice, while grand mean value smaller than the criterion (cut-off) ($\bar{\chi}$ = 2.50) indicated poor or inadequate practice. Therefore, as shown from the results in the table 3 above, the grand mean value of 3.80 which was greater than the criterion (cut-off) ($\bar{\chi}$ = 2.50) indicated that the respondents' practice level of injection safety is high. *($\bar{\chi}$ = 3.80)*

Table 3: Injection-related Practice among Nurses

S/N	Nurses Practice of Injection Safety (n= 100)	SA *f*(%)	A *f*(%)	D *f*(%)	SD *f*(%)	Mean value
1	Acceptable practices of injection safety with aseptic technique	91 (91)	4 (4)	5 (5)	0 (0)	3.91
2	Performing hand hygiene at appropriate times during medication preparation and administration	85 (85)	15 (15)	0 (0)	0 (0)	3.85
3	Preparing and withdrawing medications in clean areas that do not have other biological materials, used equipment or food present	70 (70)	30 (30)	0 (0)	0 (0)	3.70
4	Wearing disposable gloves according to the f acility policy	60 (60)	35 (35)	5 (5)	0 (0)	3.55
5	Preparing skin at the injection/insertion site with an appropriate antiseptic which is allowed to dry for the recommended period of time	80 (80)	20 (20)	0 (0)	0 (0)	3.80
6	Not touching the injection/insertion site after skin antisepsis occurs	90 (90)	10 (10)	0 (0)	0 (0)	3.90
7	Discarding needles immediately after use and not recapping from the syringe	84 (84)	16 (16)	0 (0)	0 (0)	3.84
8	Not administering medications from the same syringe or needle to more than one patient	90 (90)	10 (10)	0 (0)	0 (0)	3.90
9	Ensuring needles, cannulas, and syringes are always used as single use items and are never re -used on other patients	93 (93)	7 (7)	0 (0)	0 (0)	3.93
10	Ensuring that needles are never left inserted in any vial septum for multiple withdrawals	70 (70)	25 (25)	5 (5)	0 (0)	3.65
	Grand Mean					3.80

Criterion (cut-off) mean= 2.50; SA _ Strongly Agreed; A _ Agreed; D _ Disagreed; SD _ Strongly Disagreed

Nurse's knowledge and practice of injection safety

Table 4 showed that, there was a significant relationship between knowledge and practice of injection safety among nurses (p=0.003). Since p 0.003 < 0.05, the H0 was therefore rejected and H1 was accepted. It could then be concluded that nurse's knowledge and practice is significantly related to injection safety. Therefore, the hypothesis earlier stated was accepted, thus, there is a significant association between knowledge and practice of injection safety among nurses.

Table 4: Association between nurse's knowledge and practice of injection safety

Baseline Knowledge of injection safety	Injection-related Practice		N	Chi-square	df	P-value
	Good	Poor				
High	93(93%)	4(4%)	97	1.601	1	0.003
Low	2(0%)	1(0%)	3			
Total	95	5	100			

p<0.05 is considered statistically significant

DISCUSSION

Safe injection practice is one of the standard precautions that helps to maintain basic levels of patient safety and provider protection. However, with the increase in the rate of infections that are related to unsafe injection practices, this prompted this study to investigate the baseline knowledge of injection safety and injection-related practice, focusing on nurses working at Central Hospital Sapele, Delta State, Nigeria. The demographic characteristics of respondents revealed that the majority were within the age group of 41-45 years, female, Christian, and within the ethnic group of Urhobo. Results further revealed that the majority of respondents had a B.NSc degree and 12-15 years of working experience.

This study reveals that nurses' baseline knowledge of injection safety is high. This therefore depicted that the respondents exhibited adequate knowledge of injection safety. In support of our findings, the study carried out by Onyemocho *et al.,* (2018) reveal that the level of knowledge among nurses and doctors about injection safety is high. Our findings is also, in line with the study of Adejumo and Dada, (2018) who observed that the knowledge level of nurses in two hospitals in Ibadan, Nigeria was high. They further stated that all the respondents (100%) have heard about injection safety, 70.4% had knowledge associated to un-safe injection with blood borne infection, 55.9% had information that recapping with both hands was not a safe injection practice, 84.4% claimed that contaminated sharps predisposed the community to bio-hazards and 76.1% had information that used syringes and needles should be discarded in a sharp waste box. However, they reported that the high knowledge did not translate to practice as about half of the participants (50.4%) were seen to have sustained needle stick injury through intra-muscular and subcutaneous injections. This study contradict Omorogbe et al. (2018) who found that nurses in mission hospitals in Benin City had poor injection safety knowledge, but their injection safety practices were encouraging. This study is in contrast to Omondi (2018), who noted that only minority of his respondents thought that safe injection did not expose the population to biohazards.

This study indicated that the respondents' practice level of injection safety is high. The results of this study were corroborated by a study by Sudesh et al. (2018), who found that nurses employed by Primary Health Care in Baglung district, Western Nepal, continued to follow injection safety procedures, including injecting curative medications using auto-disable syringes, sufficient safety boxes were also supplied to dispose the used syringes. This study

result is similar to Ogundijo and Okafor (2021) who observed that there was a relatively high number of health workers that carry out safe injection practices. This study is not consistent with Paul *et al.*, (2019) who reported that out of 80 nurses used for the study in a tertiary hospital of Kolkata, West Benegal, India, only 12.5% of the respondents washed their hands with soap and water before administering injection. Sterile gloves were used by only in 3.7%. Hub cutters were used in disposing of needles in 57.5% of all procedures carried out during the study; needles were recapped in 42.5% of all procedures while used syringes were disposed of correctly in 41.2% of all procedures.

The authors concluded that there was a need to continuously educate, train, and motivate service providers, especially nurses, in the proper method of handling injection equipment, and that a local policy and surveillance program based on the WHO guidelines might be helpful in this situation. This study is inconsistent with Enwere and Diwe (2019), who showed that 84 (67.2%) of the respondents had previously had some form of training on injection safety. Only 81 (54%) had heard of or seen color-coded bins. Few of the health workers (45%) still recapped needles after use. Half (50%) of the respondents had had previous needlestick injuries. Only 25.6% of those with previous needlestick injuries had received post-exposure prophylaxis. All doctors and laboratory scientists always used gloves, as compared to 94.8% of nurses who did not while handling patients or materials. They concluded that there was a need for healthcare workers, particularly nurses, to be regularly updated on injection safety standards in their practice.

CONCLUSION

Injections are one of the most common healthcare procedures and have been used effectively for many years in preventive and curative healthcare. From the findings of this study, it was concluded that the majority of the respondents demonstrated good baseline knowledge of injection safety. Also, nurses' knowledge and practice are significantly related to injection safety. Therefore, there is a need for continuous training and awareness creation on injection safety practice, and this should be the norm at all levels of the healthcare system. The study suggested regular training workshops on injection safety to improve nurses' injection safety knowledge and practice. Hence, there is a need for continuous training and awareness creation on injection safety practice at all levels of the healthcare system with critical implications for nursing practice, policy, and education.

Conflict of Interest

No conflict of interest is related to the manuscript.

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