# INVESTIGATING ADHERENCE TO UNIVERSAL INJECTION SAFETY PROTOCOLS AS MEASURE OF REDUCING NOSOCOMIAL INFECTION AMONG COMMUNITY HEALTH PRACTITIONERS IN BAYELSA STATE

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## Abstract
*Nosocomial infection are infections acquired in a health facility by a patient within 48 hours of visit. Infections that are acquired during admission, but manifest after discharge and the various occupational infections among health care workers are also categorized as nosocomial infections. One reliable way of preventing nosocomial infection among health care workers and even patients is adherence to universal injection safety protocols. These protocols entail measures aimed at administering injection through a procedure that is safe for the patients, health personnel and others in the health care setting. This study assessed the level of adherence to injection safety practices as a measure of reducing nosocomial infections among community health practitioners in Bayelsa State. It was a cross-sectional study that was carried out in March, 2021, and was guided by three research questions and one hypothesis. Two hundred and eighty eight (288) community health practitioners participated in the study. A multi-stage sampling procedure was used in selecting the respondents for the study. A self-structured questionnaire titled "Injection Safety and Prevention of Nosocomial Infection Questionnaire" (ISPNIQ) with a reliability coefficient of 0.84, was used for the study. Two hundred and eighty eight copies of questionnaire were administered and 279 copies were returned given a return rate of 96.9 percent. The data collected were coded and analyzed with Statistical Package for Social Sciences (SPSS). Frequency distribution and percentage were used in answering the research questions while the null hypothesis was tested using chi-squire statistical tool at 0.05 level of significance. The findings revealed that the level of adherence to injection safety protocols was inconsistent and it was recommended among others that, there should be continuous training of community health practitioners on injection safety practices and regular supervision.*

**Keywords:** Community health worker, Hand hygiene, Injection safety, Nosocomial infection, Unsafe injection

## Introduction
Infections can be transmitted from a carrier to a susceptible individual while in the health care facility. Patients and health care workers can often time bring pathogen to the health facility and transmit it to others unknowingly. Several infections are spread in the health facility either by the patients who are there for treatment or the health worker that are managing them. These infections that are acquired in the health facility during visits for other reasons are called nosocomial infections

(Yang, and Zhian, 2013). Nosocomial infections are group of infections that are acquired or contracted while in the health facility for health care which was not there at the time or point of admission. They are also called *Health Care Associated Infection (HCAI)* or *Hospital Associated Infections (HAI),* which also comprise of occupational infections among health care workers (*World Health Organization, 2003*). Health care workers can also acquire these infections while providing health care services to the patients and clients in the health care facility. Nosocomial infections occur during health care delivery for other diseases, even after the discharge of the patient.

The development and manifestation of nosocomial infections is greatly facilitated by the health care setting, which can easily be acquired by a patient during hospitalization and even the health care staff while given care to patients in the health facility. Nosocomial infections could be manifested in form of severe pneumonia, urinary tract infections, blood stream infection and other forms of skin infections (Hauri, Armstrong, and Hutin, 2004). These infections can be contracted in health centers, hospitals nursing homes, and rehabilitation facility, outpatient clinics, laboratory diagnostic centers, and other health care or clinic settings. Nosocomial infections are transmitted directly from staff to staff, staff to patients, patient to staff, and patient to patient. They can also be spread through contaminated health facility equipment, bed lines, or droplets. Any infection that is developed within 48 hours of visit to the health facility for the purpose of health care is considered as nosocomial infections (WHO, 2010).

Nosocomial infections are associated with invasive materials or procedures (urinary catheters, central lines, mechanical ventilation or surgery), indwelling medical devices and prosthetic devices. Although several bacteria, virus and fungi can cause nosocomial infections, the most common is the bacterium staphylococcus aureus (Graft, Chaberry, and Variberg, 2011). Other pathogens that can as well cause nosocomial infections include Escherichia coli, Enterococci and candida (Federal Ministry of Health, 2005). These pathogenic organisms are always present on the human skin and other mucus membrane.

The most common nosocomial infections caused by viruses include influenza and respiratory syncytial virus (Pneumonia, bronchiolitis). Those at risk of nosocomial infections include health care personnel working in intensive care unit, accident and emergency (A and E), patient in prolong hospitalization, patient that excessively or improperly use broad-spectrum antibiotics, patient in constant use of invasive devices and procedures. Adams, Stokovic and Leveson (2010), also added patient with underlying health conditions like diabetes, chronic lungs disease, renal insufficiency or malnutrition. The etiology of nosocomial infection shows that viruses like influenza, HIV, rotavirus, herpe-simplex virus, hepatitis; cytomegalovirus, fungi (*Aspergillus spp*, *Candida spp*, and Cryptococcus neoforms) and bacteria (*Klebsiella spp*, Clostridium ditticile, *Enterobacter spp*) are the major pathogens that responsible for nosocomial infection (Harsh, 2018).

According to WHO (2004), about 15% of all hospitalize patients suffer from nosocomial infections. They accounted for more than 56% of all neonate deaths, with the highest incidence rate at 75% in south-East Asia and sub-Sharan Africa. According to Adejumo and Dada (2013), nosocomial infections are regarded an undesirable out-come, and are mostly preventable if the health care system can prioritize patient safety as a major health care issue. They are considered as indicator of the quality of patient care, an adverse event and a patient safety issue. According to WHO (2008), risk factors that determine the occurrence of nosocomial infections include (1) Unhygienic health care environment (2) Improper use of infection procedure (unawareness) and (3) Immune compromised susceptible hosts (susceptibility). Preventing nosocomial infection from the base line in order to control their spread will involve the following measure; (1) breaking the chain of transmission from the environment (2) breaking the chain of transmission from staff and finally (3) proper management of health care setting waste.

Studies carried out by Vincent, Vivian and Alphonsus (2012) and Yajie, Lingun and Jihony (2019) on nosocomial infections revealed an evidence based truth that more than 60% of nosocomial infections are attributable to health personnel-related or instigated causes. The professional activities of health care workers aimed at safety and infection control in the health setting can reduce nosocomial infections by more than 70%, if comprehensively implemented (WHO, 2006). Prevention of nosocomial infection requires health-care-facility-wide adaptation of stringent infection control programme that include surveillance to identify out breaks. Infection control programme adherence by health care worker in the health care facilities can certainly reduce the infection rate. An essential and effective infection control programme includes surveillance and control activities, provision and adherence to injection safety protocols. As revealed by Adaraw (2003), it is the responsibility of the health facility management and health care workers to demonstrate effectiveness in implementing these control measures designed and instituted to control nosocomial infection. ‘

Considering their specialty as community health care providers and frontline public health practitioners, community health practitioners are at risk of contracting and possibly spreading nosocomial infections in the health centers (WHO, 2004). Community health practitioners have the unique opportunity to directly reduce the prevalent of nosocomial infection through holistic adherence to universal injection safety protocols. Community health practitioners can limit nosocomial infection by comprehensively implementing protocols that improve the management and care of patients in the health facility.

Community health practitioners are frontline public health personnel trained with the proficiency and capacity to provide curative, preventive, promotive and rehabilitative services to the entire community through an organized community effort. They are professionally trained to work in the community as

primary health care workers in the primary health care centers, primary health clinics and health post (Olademeja, Adekunle, Sunday, Omoso, and Taminole, 2012). In Nigeria community health practitioners are basically trained in conventional colleges of health technology and in some specified universities. They are trained as community health officers (CHO), community health extension workers (CHEW) and Junior Community Health Extension Workers (JCHEW), with some percentages of their work load or schedule in the community and the rest in the health facilities. These three cadres of community health practitioners are trained professionality to perform the fundamental services of primary health care in the health care center, where they manage patients with varied health problems prevailing in that geographical area. One of the basic functions of the community health practitioners is the treatment of locally endemic diseases and injuries, which will require admission of patients in the health center for monitoring and observation (Johnson, Asuzu, and Adebiyi, 2012). They are also responsible for immunization against the major infectious diseases that affect both the children and adults especially the pregnant mothers.

Effective nosocomial infection control programme that can conveniently reduce the incidence of nosocomial infection will include the following areas (WHO, 2010).

*Standard Precaution*: This encapsulate the following areas; hand hygiene, injection safety, medication storage and handling respiratory hygiene, personal protective equipment, cleaning and disinfection (devices, environmental surfaces), waste management.

*Transmission based Precaution*: This include contact precaution, droplet precaution and airborne precaution, Immunization / Vaccination and Education and training of health care staff.

One basic area of priority in the control of nosocomial infection is the effective implementation of injection safety guide lines in the health care setting (Occelli, Blaire, Sanchez, Dumartin, Parneix, and Venier, 2007). Injection safety guides (Injection Safety Protocols) are set of measures taken to administer injections in an optimally safe manner for the patients, health care personnel and others (WHO, 2006). They provide the maximum standards required for the health care worker to follow in order to prevent the spread of nosocomial infection. These measures include practices intended to prevent the transmission of infectious disease between one patient and another or between patient and health care workers. They are also intended to prevent harms like needle stick injuries.

Every injection given by the health care worker must be safe. A safe injection is an injection that does not harm the patient/client, does not expose the health care worker to any risk and does not also harm the community. An injection is simply a medium to administer a drug into the body for prophylactic and curative

purposes (FMOH, 2005). Suffice it to say at this juncture that health care worker should not compromise safe injection practices in an effort to save time or money. This will lead to unsafe injection practice. The health worker should avoid unsafe injection practices. An unsafe injection is any such practices that cause harm to patients, health care providers or the community. As averred by Mantel, Khamassi, Baradel, Nasri, and Mohsni, (2007), unsafe injections will result to the transmission of blood-borne pathogens from patient to patient through re-use of syringe and patient to health care worker from needle-stick injuries. Unsafe injection practices include, re-use of syringes, lack of clean workspace, overuse of injections for illness, unhygienic sharps collections and waste management. The health care worker administrating injection must always adopt an aseptic technique for injections. Aseptic technique refers to the manner of handling, preparing and storing of medication and injection equipment/supplies in order to prevent microbial contamination. The outcomes of unsafe or septic injection procedure will be the formation of abscess, skin rashes, irritation, pain, disabilities, HBV, HCV and HIV infections (Ernest, 2002).

The WHO new policy on objection safety globally, is designed to achieve two basic objectives; reduction of frequency of injection use and promotion of safety sharps waste management. WHO guidelines on injection safety recommends two major dimensions to enhance injection safety globally. These dimensions include (1) switching to syringes that have *Sharps Injury Protection* features (SIP Devices), (2) switching to syringe that has *Re-Use Protection* features (RUP). The first is to protect the health care worker and the second is to protect patient from infection. The safe injection practices as included in the WHO universal injection safety protocols encapsulates these seven steps. The use of safe equipment and proper injection procedures as symphonized in these seven steps will reduce the risk of injury and potential spread of nosocomial infections. According to WHO (2006), these seven steps or strategies for injection safety include (1) A clean work space (2) hand hygiene (3) stance, safety-engaging syringe (4) stance medication vial and diluents (5) Disinfecting skin (6) Appropriate shape disposal (7) Appropriate waste management.

The health care worker is the main focus in the prevention of nosocomial infection. They must be conscious of the fact that exposure to blood and other blood products in the health care setting is a possibility. The health care workers must put in place effective measures that can prevent infectious that result from occupational exposure of health worker to blood. Some of these measures include (1) rational use of injection (2) Immunization against HBV (3) Implementing universal precautions (4) Eliciting needle recapping.

About 15 million injections are given globally each year with more than 40% unsafe involving reuse of syringe and needles (Kaur, Kaur, and Lal, 2010). This exposes the patient and the health care workers to blood borne infections like HIV/AIDS, Hepatitis and so on. Unsafe injection practices place at risk not only

patient but also the health care workers. The incidence and undesirable complication of nosocomial infections is an indication of the comprised quality of patient care and a serious patient care issue in the health care settings especially in the developing world. The occurrence of nosocomial infections is favoured by four variables, which include patient variable, administrative variable, patient care variable and variable of aseptic technique by health staff. The health care workers form the frontline defense nosocomial infections by adopting daily, infection control practices when performing their professional duties in compliant with aseptic protocols in the health care setting. However, as revealed in studies, health care workers in developing countries especially in the sub-Saharan Africa, inconsistently practice universal injection precautions and are frequently expressed to blood, in the course of their work via needle stick injuries, splash incidents and direct contact (WHO, 2008). It has been severally reported that, out breaks of nosocomial infections in the developing world are majorly attributed to unsafe injection practices by health care workers.

Several injection safety measures are put in place by the ministries of health in various countries so as to improve the quality of medical care and reduce the incidence of nosocomial infections (FMOH, 2005). In 2015 the World Health Organization developed and launched a new policy for safer therapeutics injection at an international meeting on injection safety in Geneva, Switzerland (Ijachi, Audu and Araoye, 2016). This new universal injection safety protocol was recommended for health care workers to promote injection safety and improve the quality of patient care globally. Reports revealed that, unsafe injection practices among health care workers are still common among health care workers in the developing world especially Nigeria in sub-Saharan African, despite these protocols. A greater percentage of nosocomial infection incidence still results from health care workers' failure to adhere to universal injection safety precaution that are basically instituted to control infections. Unsafe injection practices are still very prevalent in Nigeria leading to various terms of nosocomial infections (FMOH, 2005). It was the foregoing and the lack of empirical studies linking nosocomial infections to unsafe injections among community health practitioner that prompted the researcher to investigate the adherence of community health practitioners to universal injection safety protocols as measures of reducing nosocomial infection.

The study was guided by the following research questions;

1. What is the knowledge of injection safety protocols among community health practitioners in Bayelsa State based on cadre?
2. What is the knowledge of nosocomial infections among community health practitioners in Bayelsa State based on cadre?
3. To what extent do community health practitioners practice injection safety protocols in Bayelsa State?

The following hypothesis was formulated to guide the study and was tested at 0.05 level of significance.

1. There is no significant difference in the practice of injection safety protocols by community health practitioners in Bayelsa State based on cadre.

**Methodology**

The cross sectional descriptive survey design was used for this study, which was carried out in March, 2021. This is a type of observational study that is concerned with the studying of the respondents at the same point in time based on the inclusion and exclusion criteria set for the study (Kothari, 2014). The population of study comprised of all registered community health workers in both public and private health facilities in Bayelsa State, which according to the National Association of Community Health practitioners of Nigeria, Bayelsa State chapter was 720 practitioners. A sample size of 288 respondents representing 40 percent of the entire population was used for the study. A multi-stage sampling procedure was adopted for the study. Three research questions and one hypothesis guided the study. A 33-item self-structured questionnaire, Adherence to Injection Safety Protocols and Nosocomial Infections Prevention among Community Health Workers Questionnaire, was used for the collection of data. The questionnaire comprised of sections on sociodemographic, knowledge and practice of injection safety protocols. Nine items were structured to assess respondents' knowledge of injection safety protocols while 12 items were structured to assess knowledge of nosocomial infections among community health practitioners in Bayelsa State. The score for each question was "zero to one". Items with correct responses were assigned one point while incorrect responses were assigned zero point. The total score for knowledge of injection safety was classified as poor (0-3), fair (4-6) and good (7-9) while the total score for knowledge of nosocomial infections was classified as poor (0-5), fair (6-8) and good (9-12). The questionnaire on practice of injection safety protocols were structured in accordance with the new WHO strategies on injection safety for health care workers in health care setting. Respondents' practice level was assessed with a 3-point scale of "Always, Occasionally and Never". The face and content validity of the instrument was established by three research experts in the field of public health. The reliability of the instrument was ascertained with the use of test-rested method. Twenty copies of the instrument was administered to 20 community health workers in Ahoada West Local Government Area of Rivers State, which were retrieved after few minutes. After two weeks internal, this process was repeated again and the scores from the two administrations were analyzed using Pearson product moment correlation and a reliability coefficient of 0.84 was established.

Two hundred and eighty-eight (288) copies of the questionnaire were administered to the respondents and 279 copies were correctly filled and returned, given a return rate of 96.9 percent. The 288 copies of the questionnaire were administered to the

respondents by the researcher with the help of eight trained research assistants in the venues of one of the series of training on COVID-19 prevention at the headquarters of the eight Local Government Areas of Bayelsa State. The data collected were coded and analyzed with Statistical Package for Social Sciences (SPSS). Frequency distribution and percentage were used in answering the research questions while the null hypothesis was tested using chi-squire statistics tools at 0.05 level of significance.

**Results and discussion**

Table 1: Socio-demographic characteristics of respondents (N=279)

| S/N | Demographic variables | Group | Frequency | Percentage |
|---|---|---|---|---|
| 1 | Gender | Male | 121 | 43.4 |
| | | Female | 158 | 56.6 |
| 2 | Years of experience | Less than 20 years | 119 | 42.7 |
| | | Above 20 years | 160 | 57.3 |
| 3 | Location | Urban | 100 | 35.8 |
| | | Rural | 179 | 64.2 |
| 4 | Marital status | Married | 110 | 39.4 |
| | | Single | 169 | 60.6 |
| 5 | Cadre | CHO | 76 | 27.2 |
| | | CHEW | 111 | 39.8 |
| | | JCHEW | 92 | 33.0 |

Table shows the demographic characteristics of respondents and it was revealed that, 121 (43.4%) of respondents were male, while 158 (56.6%) were females. One hundred and nineteen of the respondents (42.7%) have practiced for less than 20 years while 160(57.3%) have practiced for more than 20 years, 100 (35.8%) work in urban locations while 179 (64.2%) work in rural location, 110 (39.4%) are married and 169 (60.6%) are single. From the table, it was also revealed that, 76 (27.2%) of respondents were CHOs, 111(39.8%) were CHEWs and JCHEWs were 92(33.0%).

**Research Question 1:** What is the knowledge of injection safety protocols among community health practitioners in Bayelsa State based on cadre?

**Table 2: Association between cadre of community health practitioners and knowledge of injection safety protocols (N=279)**

| S/N | Cadre of CHW | Knowledge of Injection Safety Protocols | | | Total |
|---|---|---|---|---|---|
| | | Poor | Fair | Good | |
| 1 | CHO | 26(34.2%) | 30(39.5%) | 20(26.3%) | 76(100%) |
| 2 | CHEW | 91(81.0%) | 11(9.9%) | 9(8.1%) | 111(100%) |
| 3 | JCHEW | 76(82.6%) | 10(10.9%) | 6(6.5%) | 92(100%) |

*CHO=community health officer; CHEW=community health extension worker, JCHEW=junior community health extension worker

Table 2 revealed the percentage scores on knowledge of injection safety of CHOs, CHEWs and JCHEWs. The table showed that 26 (34.2%) of CHOs have poor knowledge, while 30 (39.5%) have fair knowledge and 20 (20.3%) good knowledge. The percentage scores CHEWs in the table indicates that 91 (81.0%) have poor knowledge, 11 (9.9%) have fair knowledge and 9 (8.1%) have good knowledge. The table also showed the percentage scores for JCHEWs as 76 (82.6%) for poor knowledge, 10 (10.9%) for fair knowledge and 6 (6.5%) for good knowledge. From the table, it was also revealed that majority of the CHOs have fair knowledge (39.5%=fair) of injection safety protocols while the knowledge of injection safety protocols of majority of both the CHEWs (81.0%=poor) and the JCHEWs (82.6%=poor) was poor in Bayelsa State.

**Research Question 2:** What is the knowledge of nosocomial infections among community health practitioners in Bayelsa State based on cadre?

**Table 3: Association between cadre of community health practitioners and knowledge of nosocomial infections (N=279)**

| S/N | Cadre of CHW | Knowledge of nosocomial infections | | | Total |
|---|---|---|---|---|---|
| | | Poor | Fair | Good | |
| 1 | CHO | 54(71.0%) | 12(15.8%) | 10(13.2%) | 76(100%) |
| 2 | CHEW | 89(80.2%) | 14(12.6%) | 8(7.2%) | 111(100%) |
| 3 | JCHEW | 78(84.8%) | 9(9.8%) | 5(5.4%) | 92(100%) |

*CHO=community health officer; CHEW=community health extension worker, JCHEW=junior community health extension worker

Table 3 showed respondents' percentage scores on knowledge of nosocomial infections in Bayelsa State based on cadre. A painstaking analysis on percentage scores for both CHOs, (71.0%=poor), CHEWs (80.2%=poor) and JCHEWs (78.8%=poor) revealed that their knowledge on nosocomial infections was poor.

As revealed in the table, the scores for CHOs included 54 (71.0%) =poor, 12 (15.8%) =fair and 10 (13.2%) =good, while the percentage scores of CHEWs were 89 (80.2%) =poor, 14 (12.6%) =fair and 8 (7.2%) = good. The percentage scores for JCHEWs as revealed in the table included 78 (84.8%) =poor, 9 (9.8%) =fair and 5 (5.4%) =good.

**Research Question Three.** To what extent do community health practitioners practice injection safety protocols in Bayelsa State?

**Table 4: Practice of injection safety protocols among community practitioners in Bayelsa State (N=279)**

| S/N | Practice of injection safety protocols | Occasionally | | Always | | Never | |
|---|---|---|---|---|---|---|---|
| | | Freq | % | Freq | % | Freq | % |
| 1 | Maintain clean work place | 87 | 31.2 | 101 | 36.2 | 91 | 32.6 |
| 2 | Observe hand hygiene | 114 | 40.9 | 122 | 43.7 | 43 | 15.4 |
| 3 | Use of sterile/new syringes and needle | 133 | 47.7 | 32 | 11.5 | 114 | 40.8 |
| 4 | Use of sterile medication and diluent | 155 | 55.6 | 100 | 35.8 | 24 | 8.6 |
| 5 | Disinfestation of skin | 200 | 71.7 | 56 | 20.1 | 23 | 8.2 |
| 6 | Appropriate collection of sharps | 96 | 34.4 | 97 | 34.8 | 86 | 30.8 |
| 7 | Appropriate management of waste | 82 | 29.4 | 105 | 37.6 | 92 | 33.0 |
| | Cluster Percentage | | 44.4 | | 31.4 | | 24.2 |

Table 4 shows the extent of practice of injection safety protocols among community health practitioners in Bayelsa State. The table revealed the respondents' percentage score on maintenance of clean work place as (occasionally=31.2%, always =36.2%, never=32.6%), observance of hand hygiene as (occasionally =40.9%, always=43.7%, never=15.4%), use of sterile/new syringe and needles as (occasionally=47.7%, always=11.5%, 40.8%), use of sterile medication and diluent as (occasionally=55.6%, always=35.8, never=8.6%), disinfestation of skin as (occasionally=71.7%, always=20.1%, never=8.2%), appropriate collection of sharps as (occasionally=34.4%, always=37.8%, never=30.8%) and appropriate management of waste as (occasionally=29.4%, always=37.6%, never=33.0%). With a cluster percentage score of 44.5 for occasionally, it was concluded that, there was an intermittent pattern of practice of injection safety protocols among community health practitioners in Bayelsa State.

**Testing of Hypothesis**

**Hypothesis 1:** There is no significant difference in the practice of injection safety protocols by community health practitioners in Bayelsa State based on cadre.

**Table 5: Chi-square analysis on practice of injection safety protocols among community health practitioners in Bayelsa State based on cadre (279)**

| Responses | Frequency | Percentage | X-cal | df | X-crit | Decision |
|---|---|---|---|---|---|---|
| Occasionally | 124 | 44.4 | 9.523 | 4 | 9.49 | Significant |
| Always | 88 | 31.4 | | | | |
| Never | 67 | 24.2 | | | | |
| Total | 279 | 100 | | | | |

The data in table 5 reveals that, the calculated chi-squared value of 9.523 was more than the critical chi-squared value of 9.49 with degree of freedom of 4 at 0.05 level of significance. This means that, the null hypothesis of no significant difference in the practice of injection safety protocols among community health practitioners in Bayelsa State based on cadre was rejected. This implies that the practice of injection safety protocols by the various cadres of community health practitioners are not the same in Bayelsa State.

Adherence to the universal injection protocols is the sure way of curtailing the spread of nosocomial infections among patients and health care personnel in the health care facility. Giving priority attention to these injection safety protocols by every community health practitioner will lead to a drastic reduction in the rate of nosocomial infections and fatalities. The finding of the study revealed that majority of the CHOs have fair knowledge (39.5%=fair) of injection safety protocols while the knowledge of injection safety protocols of majority of both the CHEWs (81.0%=poor) and the JCHEWs (82.6%=poor) was poor in Bayelsa State. This finding was surprising and was not expected considering their professional background as public health care workers whose job description also include administration of injection should have massively known the significance of injection safety. Their responses were a significant contraction to their professional background as public health personnel working within the primary health care system at the grass root. This finding is in agreement with Yajie, Lingun, and Jihony (2019) whose study also revealed a low level of knowledge of injection safety protocols among some selected health care workers. The finding of Yang and Zhon (2013), also supported this finding. He also concluded that, the level of knowledge of injection safety precautions among health care workers was fair in a rural Bangladeshi community. The findings of Ismail, Aboul and Mahaba (2007) equally supported this finding. They also observed a low level of knowledge in their study on injection safety practices among nursing students. This finding was contradicted by Adams, Stokovic, and Leveson (2010), whose study revealed a high level of knowledge about injection guidelines among female nursing in an urban city in Egypt. The findings Xu, Liary, and Jiary (2006) were also in variance with this finding, who in his study concluded the knowledge about injection safety was poor.

As indicated in table 2, the knowledge of the various cadres of community health practitioners on nosocomial infections was poor. A close look on their percentage scores showed that CHOs, (71.0%=poor), CHEWs (80.2%=poor) and JCHEWs (78.8%=poor). This finding was also very surprising and was not expected because of their professional background as primary health care clinicians it was professionally very right to expect that the community health practitioners have a very good knowledge about nosocomial infections. This have a strong implication on how these hospital related infections could be control and prevented. According to Graft, Chaberry and Vonberg (2011), it is only when the health care workers have a basic knowledge about nosocomial infections, that interventions designed to prevent them in the health care setting could be appreciated by them. Their response could also be attributed to the fact that the respondents who are public health personnel may some professionally deficiencies that have significantly affected their proficiency understand, prevent and manage infectious diseases in the health care setting. This finding is aligned with the finding of Occelli, Blaire, Sanchez, V., Dumartin, Parneix and Venier (2007); Mantel, Khamassi, Baradel, Nasri, and Mohsni, (2007), who in their separate studies affirmed that health personnel have low level knowledge on preventive measures that could curtail the channel of transmission of infectious diseases. However this present finding was undermined by the results of Hauri, Armstrong, and Hutin, (2004), who reported a high level knowledge nosocomial infections among residents in a rural Chinese community. Adejumo, and Dada, (2013) also reported findings in their study that, the knowledge of nosocomial infection among nurses in two major hospital in southern part of Nigeria.

Results in table 3 showed that, the adherence to injection safety protocols was intermittent among community health practitioners in Bayelsa State, as revealed in the cluster percentage score of 44.5 for occasionally responses. This finding was not expected and was surprising because as health care workers who are expected to be very much conversant with not just the injection safety protocols, but also the importance of these protocols in curtailing the spread of nosocomial infections. It is quiet surprising that, despite the fact a greater percentage of blood borne infections that occur the health care setting is attributed unsafe injection practices by health care workers, an intermittent practice injection safety protocols was still observed among community health care practitioners in Bayelsa State. This has a profound implication on the fight against nosocomial infections such as Hepatitis B virus, HIV/AIDS, COVID-19 and so on. However, this present finding was in contradiction with the findings of Ijachi, Audu, and Araoye, (2016), Hari, Shanti, Sudarshan, Neena, and Varidmala, (2014), Kaur, Kaur and Lal (2010) and Aderaw, (2003) who concluded in their separate studies, reported a good practice of injection safety precautions among various categories of health care workers. The findings of Johnson, Asuzu, and Adebiyi, (2012), Vincent, Vivian, and Alphonsus, (2012), Ofili, Azuzu and Okojie, (2002), and

Ernest, (2002) lent credence to this finding. They all in their separate studies, identified a negative adherence to injection safety protocols among health care workers.

The data in table 5 indicated that, there was significant difference in the practice of injection safety protocols among community health practitioners in Bayelsa State based on cadre. This implies that the practice of injection safety protocols by the various cadres of community health practitioners are not the same in Bayelsa State. This finding is in line with the finding of Olademeja, Adekunle, Sunday, Omoso, and Taminole, (2012), Maralidir, Singh, Jain, Malhotra and Bala, (2010) and Odeyemi, Onifade, and Onifade, (2005) who also recorded no significant difference in the practice of injection safety protocols among health care workers in rural and urban population in their studies. This result was in disagreement with the result of Kermode, Jolley, Lang-Khan, Mathew, and Croft, (2014) and Michelle (2004) who concluded in their study that, there was significant difference in the practice of injection safety protocols among different categories of health care workers.

## Conclusion and recommendations

Based on the findings of the study, it was concluded that community health practitioners in Bayelsa State have no sound and basic knowledge on injection safety protocols and nosocomial infections. Their practice on injection safety was not consistent. The following recommendation were made

1. The state ministry of health in collaboration with partners like WHO and UNICEF should organize regular training programmes on injection safety for community health practitioners in the state.
2. The ministry of health should also supervise and monitor the activities of community health practitioners in their various health facilities in order to ensure comprehensive adherence to injection safety protocols.

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