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PERCEPTION AND EXPERIENCES OF INFECTION CONTROL PRACTICES AMONG PROFESSIONAL NURSES IN SECONDARY HEALTH FACILITIES IN SOUTH-SOUTH NIGERIA: A QUALITATIVE APPROACH

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ABSTRACT: *Infection control practice is a fundamental operational guiding principle in the delivery of modern health care. However, there is minimal qualitative investigation into professional nurses' perception of infection control practices and how the experiences affect compliance with recommended infection control procedures. The purpose of this study was to examine and describe professional nurses' impressions and experiences about infection control practices. A descriptive qualitative research design was used as the research framework. In-depth Interviews (IDI) and Focus Group Discussions (FGDs) were completed with a sample of 54 nurses. The findings highlight the importance of both individual and organisational factors in determining Nurses' compliance with recommended workplace safety practices. Four major themes emerged from the data, namely knowledge, infection surveillance, safety practices, and workplace policy. The findings indicate individual and organisational factors associated with compliance which are useful in developing strategies to facilitate long-term compliance with infection control practices among nurses.*

KEYWORDS: Knowledge, Infection Control, Safety Practices, Policy, Qualitative

INTRODUCTION

Infection control practice is at the root of modern health care. Infection control refers to policies and procedures used to minimize the risk of spreading infections, especially in hospitals and designated facilities for human or animal health care delivery. Infection control within a health care setting are measures practiced by healthcare workers to reduce the transmission of infectious agents from patient to patient, patient to staff member and staff member to patient. Infection control measures are determined by the mode of transmission of the infectious agent, and include standard operating procedures related to personal safety precautions, as well as those related to the avoidance of direct contact with infectious materials (fomites) and body fluids, droplet infections. (Kelemua Gulilat, Gebeyaw Tiruneh, 2014; Siegel, Rhinehart, Jackson, Chiarello, & Health Care Infection Control Practices Advisory Committee, 2007). In this study the emphasis is on transmission of blood borne infections with standard precautions as the control measure. Health care workers particularly nurses are key players in the prevention and control of infections in health care settings. Florence Nightingale established the relationship between nursing and infection control in 1854, during the Crimean war, when she served in a military hospital in Scutari, Italy (Kamisky, 2004 as cited in Smith, 2009). According to Kamisky (2004 as cited in Smith, 2009) Nightingale championed the cause of improved hygiene and living conditions for

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hospitalized soldiers, by advocating for basic public health, infection control measures, cleanliness, hygiene and education as a means of safeguarding and promoting the health of patients. She is perceived as the first infection control nurse (Elliot, 2004 as cited in Smith, 2009). In the U.K the first infection control nurse was appointed in April 1959 at Torbay, Devon in response to an increased incidence of Staphylococcal infections (Ayliffe, 2003 as cited in Cole, 2006). The practice of infection control was introduced in Nigeria in the 1970s when the Departments of Microbiology, College of Medicine, University College Hospital, Ibadan and that of College of Medicine, Lagos University Teaching Hospital, Lagos appointed infection control practitioners in their respective departments which stimulated infection control activities throughout the nation (Iwuchukwu-sobayo, 2005). The first trained infection control nurse was appointed by the University College Hospital, Ibadan during this period. She acquired her professional experience in the United States, Saudi Arabia and Nigeria (Iwuchukwu-Sobayo, 2005). Inspite of this early focus on infection control, infections in hospitals continue to be a major cause for concern in the delivery of high quality health services in both developed and developing countries (Jackson, Lowton & Griffiths, 2013).

Health care-associated infections have long been recognized as crucial factors bothering the quality and outcomes of health care delivery. Health care-associated infections (HAIs) are important cause of adverse health outcomes such as morbidity, mortality, and increased health care costs with possible attendant litigations. "An infection is considered nosocomial if it becomes evident 48 hours or more after hospital admission or within 30 days of discharge following inpatient care (Bello et al., 2011) The emergence of life threatening infectious diseases have pointed to the need for effective and efficient infection control programs in all health care settings and capacity building for HCW to prevent the transmission of pathogens within the health care setting. Workers and employers are urged to take advantage of available technologically-engineered safety control measures and work practices to prevent exposure to hospital associated infections (Samuel, et al.,Javis, 1996; Garner & Simmons, 1983). In the past 20 years, the overall incidence of health-care associated infection has increased by 36 percent. Health-care Associated Infection occurs worldwide and affects both developed and developing countries. About 5% -10% patients acquire one or more infections in health care setting worldwide. It is also estimated that more than 1.4 million people worldwide are suffering from infections acquired in hospitals. More than half of all HAIs occurred outside of the intensive care unit (Hopmans, Blok, Troelstra, & Bonten, 2007). Developing countries were reported to have up to 20 times the risk of contracting a nosocomial infection compared with developed countries (WHO, 2014)

Cole in 2006 observed that the assessment of nursing and infection control has traditionally relied on quantitative research methods because they were perceived to be rigorous, credible and generalizable. This notwithstanding, it has equally been observed that qualitative methods could provide useful understanding of probable behavioural antecedents including interpersonal relationships affecting infection control practices among Nigerian Nurses (Morgan, as cited in Erasmus, Brouwer, Van Beeck, Oenema, Daha, Richardus, ... & Brug, 2009; Patton, as cited in Erasmus et al 2009; Artioli, Foà, & Taffurelli, 2016).

Qualitative research methods have seldom been used to explore infection control practices among Nigerian Nurses. Compliance with infection control precautions may be influenced by views, opinions, beliefs and standards that vary among different categories of nursing staff (Erasmus et al 2009). In this study qualitative approach was used as the first step in a series

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of steps embarked on towards developing an intervention package on the prevention of transmission of blood borne pathogens in secondary health facilities in Calabar and Uyo which is similar to its application in previous similar studies that have been conducted. (Bartholomew, Parcel, Kok, Gottlieb as cited in Erasmus et al, 2009)

HCWs have high knowledge and positive attitudes, but low compliance with standard precautions. Nurses have been reported to have higher knowledge, perceived risk susceptibility level and have demonstrated appropriate HAIs' control measures as well as applied appropriate infection control measures than physicians and other health workers following educational exposures (DeJoy, Searcy, Murphy & Gershon, 2000; Chan,Molassiotis, Eunice, Virene, Becky, Chit-Ying, & Ivy, 2002; Madan, Raafat, Hunt, Rentz, Wahle & Flint, 2002; Osborne, 2003; Mann, & Wood, 2006; Parmeggiani, Abbate, Marinelli, & Angelillo, 2010; Efstathiou, Papastavrou, Raftopoulos, & Merkouris, 2011).

However, there is minimal qualitative investigation into professional nurses' perception of infection control practices and how the experiences affect compliance with recommended infection control procedures in Nigeria. The purpose of this study was to examine and describe professional nurses' impressions and experiences of infection control practices in relation to occupational transmission of blood borne infections in secondary facilities.

METHODOLOGY

Descriptive qualitative research approach involving In-depth Interviews (IDIs) and Focus Group Discussions (FGDs) was used as the research framework to examine participants knowledge of infection control; perception of surveillance, compliance with safety precautions, workplace policy and explanations for own and others' practices (Sandelowski, 2000).

In-depth Interviews (IDI) and Focus Group Discussions (FGDs) were completed with a sample of 54 purposively selected nurses. Eight individual interviews and four focus group discussions were conducted over a 2 months period by the researcher and recruited research assistants. The research assistants were trained on use of the IDI and focus group guides. They also participated as either note takers / recorders during the FGDs. Inclusion criteria for participants included qualification as a Registered Nurse/Midwife (RN/RM) with the Nursing and Midwifery Council of Nigeria and having been in the employment of the secondary health facilities selected for the study in Calabar / Uyo for a minimum of 6 months. Ethical approval was sought and granted by the ethical committees of the two hospitals. Verbal/ written consent was also obtained from the participants before they were interviewed / engaged in the focus group discussions.

Interviews were conducted by the researchers and lasted for 45-50 minutes while FGDs were moderated by researcher with the assistance of research assistants and lasted for 1 hour. Ward managers were purposively recruited from medical-surgical wards, paediatrics wards, obstertrics and gynaecological wards. Participation was voluntary. An in-depth interview guide adapted from a previous Canadian – Nigerian study carried out in Ibadan on infection control was used. The guide had four foci namely: meaning and activities involved in infection control; concerns about management of previous infection control problems; awareness of existing and implementation of workplace policies; concerns about information

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dissemination on infection control. Participants were asked to recall how previous infection control issues were handled; whether appropriately or otherwise. The interviews were interactive, approach was open and followed that of a guided conversation. The informants were given the opportunity to state what was important to them as far as possible during the course of the interviews. FGD participants were recruited from non-managerial level but frontline nurses from the same four units as IDI participants. The FGD guide had similar foci as the IDI guide. The interviews and focus group discussions were audio recorded and transcribed verbatim immediately after the sessions by research assistants. Anonymity of texts and participants details was maintained by using pseudonyms. Confidentiality of information collected was also maintained.

Quality of the study

In order to ensure trustworthiness /rigor of the data credibility, transferability, dependability criteria (Polit-O'Hara & Beck, 2006; Lincoln & Guba, 1985 as cited in Efstathiou, Papastavrou, Raftopoulos & Merkouris, 2011), were adopted and applied.

Credibility denotes confidence in the truth of the data generated (Polit-O'Hara & Beck, 2006). Purposeful/theoretical sampling contributed to credibility in this study because participants were recruited on the basis that they were likely to possess and share their understanding of truth-telling. (Roberts & Burke 1989 in Tuckett, 2005; Brink 1991as cited in Tuckett, 2005). Prolonged engagement was carried out by the researcher through spending quality time with the informants separately prior to the in-depth interviews and FGDs in order to build trusting relationship with them. Method triangulation was carried out through combination of the IDIs with FGDs, observation of non-verbal responses of informants during data collection and literature review prior to the collection of data which were checked against this criterion (Holloway & Wheeler, 1996 as cited in Efstathiou, Papastavrou, Raftopoulos, & Merkouris, 2011).

Transferability refers to generalisation of findings from sample to population. This criterion was addressed through the sampling method used that facilitated obtaining the widest possible range of information on the subject matter. To ensure representativeness, the participants were drawn from all the major clinical specialties of the nursing services (Polit-O'Hara & Beck, 2006; Lincoln & Guba 1985 as cited in Efstathiou, Papastavrou, Raftopoulos, & Merkouris, 2011).

Triangulation which is aimed at increasing dependability or reliability (Baum 2002; Boyatzis 1998; Denzin 1989; Goodwin & Goodwin 1984; Miles & Huberman 1994) was used in this study. Hence data were obtained from IDIs and FGDs (Denzin 1989). Field journal was also used as another data source to improve dependability (Tuckett, 2004).

Thematic analysis was used for coding and categorization of data into themes. Data were transcribed verbatim, in order to become familiar with the data; the process of immersion in the data was engaged in (Jackson, Lowton, & Griffiths, 2014). This was followed by line-by-line coding of the entire transcript. Content analysis of the responses was carried out on daily basis, during which data relevant to each code were identified and collated. Codes were collated into potential themes; data relevant to potential themes identified were collated. Finally the major themes were identified and emerging patterns were compared with the central issue. In order to enhance credibility an independent expert qualitative researcher was co-opted to review the transcripts and identify comparable themes in the data.

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Participants

Participants mean (SD) age was 38.69 ± 5.91; 37.73 ±8.85 for Calabar and Uyo respectively. Six female Ward Charges (75.0%) and two male Ward Charges (25.0%) constituted the key informants for the In-depth Interviews (IDIs). Level of previous nursing education was mostly diploma. Mean (SD) years of working experience was 5.09 ±3.95; 7.5±5.99 for Calabar and Uyo. By rank, the key informants for In-depth Interviews (IDI) were drawn from Chief Nursing Officers (CNO) and Assistant Chief Nursing Officer (ACNO) while participants for the FGDs were drawn from Nursing Officers II (NO II) to Principal Nursing Officers (PNO).

Findings

Four major themes emerged from the data. These were: knowledge of infection control, surveillance, safety practices and workplace policy.

Knowledge of Infection control

Discussants were asked about the meaning of infection control and what this entails. Varied meanings were adduced to the term by the discussants though majority agreed that it means different methods/system/policies/procedures used in the health facility to minimize the spread of infection. The dimensions of spread of infection were also captured by the participants. The view of the participants which cuts across most of the FGD groups in secondary health facilities included:

- *"As the name implies, hospital infection control are all those things we do in the hospital in order to prevent infection that can be spread to either patients or we nurses or other health workers. It is the means by which the hospital adopts a policy of controlling the infection rate in their hospital"*
- *"Hospital infection control, the way I understand it is the ways you can control infection, so that one patient does not acquire infection from another patient; or the hospital worker will not acquire infection from the patient. It is the way and manner, the procedures, measure or a system adopted in the hospital to make sure infection is not spread from one patient to the other or from patients to the nurses or nurses to patients or vice versa".*
- *Hospital infection control, just as the name implies is a method of preventing infection from hospital worker to the patient or the patient to the worker or patients to patients.* "*I want to add to what she has said; hospital infection control has to do with preventing yourself as the health provider from contacting infection from the patient and also preventing that patient from contacting infection from you the health provider. It also has to do with eh, preventing the spread of infection from one patient to another patient"*.

The activities listed by the participants included: proper hand washing, sterilisation of instruments, carbolization of bed pans and urinals, proper disposal of syringes, isolation of infectious cases, incineration of infectious materials, use of personal protective equipment, use of disinfectants, general cleanliness of the hospital environment, education of workers, standardised spacing of bed on the wards, changing of suctioning tubes and bed sheets.

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Infection Surveillance

Participants were asked their opinion about the frequency of occurrence of hospital acquired infection among patients and staff and whether they are documented as such by the health facility management when they do occur. The discussants expressed two shades of opinion with respect to the occurrence of hospital acquired infections. Some participants opined that the incidence of hospital acquired infection was generally low especially among health workers although participants could not quantify the minimal level due to lack of accurate information. Other participants from the urban located hospital held the contrary view that it occurs often. Typical responses among them included the following:

- *"Hospital acquired infections is very minimal here, we are very careful,*

  especially with the knowledge of the monster HIV, workshops and continuing education have helped to minimize and then checked hospital cross infection. Since we isolate bad cases, most of the time cross infection hardly occurs".

- *"I have not heard that any staff acquired infection as a result of working in the hospital, I have no documented record. With good practice of standards precautions, the incidence of cross infection in the hospitals has greatly reduced".*

- *"It is known that there is nosocomial infection in the hospital. For instance, like in sick baby unit. They carried out these investigations and then identified organisms. A patient was admitted, despite all the treatment, she was not responding to the medication. So they decided to take a culture of equipment in the sick baby unit and eh, discovered nosocomial infection, and I think eh, few week ago, when we had a meeting there was a report that from sick baby unit, that they noticed that children that are born outside and are brought in for treatment, they even recover fast, they respond to the antibiotic use. But those who were delivered here did not respond to the commonest, antibiotic that they are treated with".*

The general impression among discussants is that there is no regular, systematic, collection of data on hospital acquired infection among staff of the various units and patients, although when it occurs and it is brought to the notice of the hospital authority they usually take action on it. Some of the comments by participants are stated below. Typical responses of nurse managers are highlighted as follows:

- "*To be very specific; I am not aware that documentation has ever been done, I may not be very wrong to say so as I have hardly heard any staff reporting of acquiring infection while working; talk less of having something to document. I will say most times we don't have stuff like that, I have not experienced any."*

- *As earlier said there's no definite policy. However in recent past there have been some in-house seminars which actually pointed out the need for such information to be collected especially as it relates to HIV. Because eh most of the health workers eh I wouldn't want to specify – be specific to the doctors, the nurses and they… virtually almost all that get in touch with the patients and get exposed, there has not been definite report as to whether …by being exposed in such a way has resulted to transfer of infection. The only thing we know is that there has been a seminar. And in fact there were some suggestions made during the seminar that records should be opened for any staff that maybe is exposed to infection or maybe have contacted*

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infection in the course of carrying out procedures or from attending to patients. There has been suggestions that such records should be kept. So far we have not seen……I have not seen such records being kept. On the other hand I'm…also aware that there are some staff who when they sustain injury, they go and report for treatment. But there has not been any definite collection of such information"

Opinions on the aspect of documentation of hospital acquired infections were divided as earlier observed. Some discussants stated that data on the occurrence of HAI's are somehow collected while others opined that there are no formal mechanisms for the collection of such data and that usually such occurrences are detected through the nurses' report to management from the wards. In this regard, the opinions expressed by the participants which were captured indicated that the discussants were generally not satisfied with the reporting system of infection control problems. Some of the views expressed are highlighted below:

- *"to some extent information is collected" while another remarked that "to some extent information is not collected, but when it is collected it's not obviously documented, but when it is in regard of infection the situation is strictly taken into consideration and promptly brought under control."*
- A concerned participant remarked as follows.
- *"I will suggest that the way information is collected should be improved on. There should be…… an easier way of collecting the information of what happened, let there be a way of collecting the information of any infection occurrence in the hospital"*
- As a follow up to the preceding statement another participant cautioned as stated in what follows:
- *"Whenever such information is collected, a quick action should be taken. Because sometimes we can collect information and you know, we just forget about. And there would be second occurrence and that thing will continue to repeat. I just believe that if we take eh, collect any information of any hospital infection, what we should do something about it. Either by maybe providing adequate screening in surgical ward or medical ward or any other means. But any time we collect information we must react and not to leave it like that."*
- The discussants generally agreed that as soon as information got to the authority, they swung into action. A participant emphatically said:
- *"Once a report is made through the wards to the authority, they quickly swing into action as soon as it is received". "To some extent, once a report is made like-that, the authority swings into action. It means it is received, because something is done about it."*
- Another example of the view of participants on management reaction is stated in what follows.
- *"Once the situation about surgical wounds breakdown was brought to the notice of management or reported, the searchlight beamed in the direction of the theatre, central sterile supply department and the ward. The units' authority ensured that*

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aseptic techniques were put in place and the laid down standards were adequately followed. The situation changed immediately".

- The participants suggested training and provision of materials as the way forward.

- *"Okay, number one I will say, eh, refresher course to those that have not undergone this awareness exercise because one person, those that underwent, you may not alone, you may not be on a 24hrs service alone. The awareness must be spread equally eh, level to be able to at least be able to accommodate everybody. And with the items, the things that eh, things that one used, the necessary articles or equipment must be provided. They must be there, like gloves now, you don't have gloves you go and ask for gloves they count 13, or 30 or 15 for you. That is finished, and you go to a patient, the patient may tell you I don't have money yet, then what do you do? So those things must be available, like these sharps they say we should not dispose; they brought a container, the container was too small, you cannot put eh, it cannot accommodate the sharps eh, needles through it. Then we use cartons, these cartons are very dangerous because the orderlies and the porters that are carrying the carton, something may pierce out from, because it's carton, if its wet it gets wet. You see, those things that they feel are standard things should be made available after the awareness exercise to all".*

Compliance with safety practices among Nurses

Participants were asked to discuss the benefits of safety practices. They strongly perceived the practice of standard precautions as protection from the transmission of infection to nurses and patients alike. Popular responses of participants are as follows:

"There are benefits eh, in standard precautions because the nurse is protected, and the patient is protected when all these precautions are practiced, it protects the patient and the nurse too is protected. So it prevent transmission of hospital infection from one person to another"

"The benefits of standard precautions include eh, achievement of eh, that's we have been able to protect our patients, avoid cross infection from one patient to the other and then to eh, the hospital workers themselves, the care givers are protected".

"The benefits are in two ways; benefit to the patient, benefit to you the hospital worker. The precautions you take prevent you from contacting infection; hence it is of tremendous benefit to the health worker. To the patient as well, because during the process of attending to a patient, you may transmit the infection to the patient. So the precaution is highly beneficial to both the hospital worker and the patient".

On further probing, participants were asked about their opinion on how standard precautions are practiced in their hospital and to suggest ways of bringing about improvements in the practice. The participants are of the opinion that many nurses want to practice standard precautions but are often faced with the challenge of non-availability of resources like plastic aprons, safety needles and lack of awareness of its importance, for instance a discussant said.

"Okay and I said that is not that the nurses do not want to practice it. At times you are aware of the precautions you should take, but there are no materials for you to take them. For example, in labour ward, eh you require plastic aprons. How many do we have? Maybe some

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other person is using it and there is a delivery you want to conduct, you go ahead and conduct the delivery because the woman would not wait for you to find aprons. So, is very difficult, is not that we don't know what to do. Then eh, at times too, people don't get used to using those things, they find it difficult to use like we have eh eye shields/glasses eh, here. Not all of the nurses may want to use it. You go into labour ward; you see somebody conducting delivery and is not using it. So, I think awareness or is it campaign or workshops is needed, to at least let everybody know of these precautions they should take; but as for gloves, they're using it, and proper disposing of these sharps they're properly done here. Things, like those eye shields, you don't find them in common use here".

Another participant emphatically stated that:

"Retractable needles should be used if they're provided, but they are still supplying that old needle that we're used to; the worst part is that at times even though we're told not to recap, but at times you see people trying to recap the needles. Anyway when it comes to giving of insulin injection, we are compelled to recap because patients cannot afford to provide a new syringe and needle for each dose. So I feel we should be given these materials, apart from providing the materials, they should create that awareness. It is not everybody that knows about these precautions".

It was generally stressed by many participants that facilities should be improved and effective monitoring should be put in place. The opinion is captured in a typical statement made in what follows by a discussant.

"There should be constant replenishing of those materials that are exhausted so that a situation would not be created that affects the system adversely. e.g. gloves, apron, boots, masks, goggles, needles etc. The number of toilets/bathrooms available to patients should be increased to reduce the spread of infection; right now we have HIV patients and non HIV patients sharing the same toilets. Yes we should have monitoring teams that goes about checking how we are working on the wards and also checking on the welfare of the patient."

Hospital workplace policy on Blood Borne Infections

Participants were asked about their impressions about the national workplace policy on blood borne infections. Although none of the participants admitted they have sighted a written policy for their protection in this regard in their health facility, the groups' concern was about the implementation of such policies rather than just knowing that it exists.

Although the institution of hospital workplace policy is desirable as opined by the participants, they wished that when available, it should be implemented. A participant pointed out that:

"If anything is to be changed, it is just to call stake-holders probably the heads of all units to dialogue or formulate a policy or review the existing one if it is not in order. We do not have problems with making policies in Nigeria, but implementation is a problem…. our policies should be implemented."

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DISCUSSION

Using a qualitative descriptive design the researchers examined infection control practices among professional practising nurses in secondary health facilities in Calabar and Uyo, in the South-South geopolitical zone of Nigeria.

The participants in this study were younger when compared to the key informants, who participated in a previous study on clinical decision making process among Nurse Managers in Ibadan, Oyo State, Nigeria who were above 50 years of age (Edet & Olarerin, 2007) but older as expected when compared with respondents from a previous study in Calabar among nursing students on health and safety (Edet, Edet, Akpan-Idiok, & Bassey, 2017). The participants mostly belong to the Christian religion and were Efiks and Ibibios by tribe. This is not surprising since the study was conducted in Christian dominated Southern part of Nigeria.

Participants' knowledge about infection control

The views expressed by the nurses about the meaning of infection control is in consonance with the definition of infection control by WHO (WHO, 2017; Gulilat, & Tiruneh, 2014) as measures aimed at protecting the health of persons vulnerable to acquiring an infection while receiving care as a result of health problems. The participants' view of infection control was limited to the hospital setting, and was not extended to the community level. The vulnerable persons in the view of the participants were patients and health workers specifically the nurse. Vulverability of patients and health care workers to nosocomial infection has been well documented in literature (Eriksen, Iversen & Aavitsland,2005; Pittet, Allegranzi, Sax, Bertinato, Concia, Cookson & Ganter,2005; Hopmans, Blok, Troelstra & Bonten, 2007; Klevens, Edwards, Richards, Horan, Gaynes, Pollock, & Cardo, 2007; Pittet, Allegranzi, Storr, Nejad, Dziekan, Leotsakos, & Donaldson, 2008). Health-care Associated Infection occurs worldwide and affect both developed and developing countries. About 5% -10% patients acquire one or more infections in health care settings worldwide. It is also estimated that more than 1.4 million people worldwide are suffering from infections acquired in hospitals (Hopmans, Blok, Troelstra, & Bonten, 2007). Health care workers experience between 600,000 and 800,000 exposures to blood annually (OSHA, 2001). Majority of these exposures are sustained by registered nurses working at the patients' bedside (EPINET, 2001). The exposures carry the risk of infection with HBV, HCV and HIV/AIDS (CDC, 1988). The UK Health Safety and Environment management proposes infection rate of 30/100,000 annually among nurses (Roberts, 2014). The activities mentioned by participants fall mainly within two of the three main strategies used in controlling transmission of health care associated infections namely control/elimination of reservoir of infection and control of transmission (Damani, 2003). From the responses received Nurses appear to be knowledgeable about the meaning of infection control in the hospital setting and key activities within two infection control strategies. This finding is consistent with the findings of a study carried out in Northern Nigeria in which 421 HCWs were interviewed and 77.9% correctly described universal precautions and infection control (Amoran & Onwube, 2013). This finding differs from results of a previous study among undergraduate nurses which showed that only 7.1% and 6.7% of respondents demonstrated adequate knowledge of standard precautions and universal precautions pre intervention (Edet, Edet & Samson-Akpan, 2010). In addition, previous quantitative study showed that 97.4% and 88.8% of the professional nurses studied in Calabar and Uyo had inadequate knowledge of standard precautions pre-intervention (Edet & Asuzu, 2008). In contrast another study in North East

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Nigeria involving 276 HCWs in the primary care setting, reported poor knowledge of universal precautions among 50.0% of respondents, moderate knowledge by 37.0%, and good knowledge by only 17.0% with Nurses and Midwives being more knowledgeable than others (Abdulraheem, Amodu, Saka, Bolarinwa, & Uthman, 2012). An earlier cross sectional study of 155 nurses in Benin, South-South Nigeria, also reported poor awareness and knowledge of universal precautions as only 32.4% of the nurses were aware (Ofili, Asuzu & Okojie, 2003).

Infection surveillance

The type of surveillance adduced by participants in this study is passive surveillance in contrast to active surveillance (Public Health Ontario, 2014; Iwuchukwu-Sobayo, 2005) in which health care workers like in this instance, Ward-based Nurses, not part of the Infection Control Team (ICT), identify and report cases of HAIs. This should be differentiated from active surveillance involving trained health workers who are members of the ICT and employed in that role (CDC, 2007). The process described by the participants is mostly ward-based excluding other sources of data. Infection surveillance which is the core of the hospital infection control programme has been defined as an on-going systematic method for monitoring diseases on a continuous basis in a population **(**Dickinson, 2014). It involves close observation of the incidence, distribution and trend of a disease in a population (Iwuchukwu-Sobayo, 2005). It is comprised of routine data collection on infections among patients and staff of a health facility. The data is analysed and findings disseminated to management to facilitate action (CDC, 2007). Participants in this study expressed dissatisfaction with the ward-based process in use and advocated for improvement in the ways information about HAIs is collected and disseminated.

Compliance with standard precautions

The participants overwhelmingly demonstrated good understanding of the benefits of observing standard precautions in the workplace, during the focus group discussions. Their view was that it protects the workers and patients from acquiring nosocomial infections. This is in contrast to the findings of a study carried out in the United Arab Emirates among 101 nurses which showed that only 45.9% agreed that standard precations (SP) is protective of the health of HCWs and patients (Sreedharan, Muttappillymyalil & Venkatramana, 2011). A Brazilian study also reported that only 52.4% of respondents agreed that SP protect both professionals and patients (Melo, Souza, Tipple, Neves & Pereira 2006).

Nevertheless, they emphasized that appropriate practice was hindered by non-availability/provision of personal protective equipment. They indicated that even when nurses are conversant with the know-how, lack of supplies makes it difficult to practice standard precautions. This finding is corroborated by Amoran & Onwube (2013) who reported that 98.6% of the respondents in their study attributed non-compliance with universal precautions to non-availability of equipment as a major reason. Ofili, Asuzu & Okojie (2003) also reported poor observance of universal precautions among nurses in Benin, South-South, Nigeria. Gammon, Morgan-Samuel & Gould (2008) in their study appraised 37 studies from 1994 to 2006, 24 of which measured practitioners' compliance and concluded that compliance to infection control precautions was internationally below what can be considered as the optimal level.

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Hospital workplace policy on Infections

The study participants were not familiar with the policies on infections in their respective workplace. They stressed more on the implementation of the provisions of such policies. It is important to note that in compliance with the International Labour Standard, Nigeria in 2003 and 2005 respectively had formulated policies which are complimentary to the existing laws of Nigeria (The Nigerian Constitution and the Labour Act). These policies which are with particular reference to HIV/AIDS are the National policy on HIV/AIDS (FGN, 2003) and the National workplace policy (NWPP) (FGN, 2005). The two policies have exhaustively highlighted the rights of nurses in their workplace with regards to their protection against blood borne infections with emphasis on HIV/AIDS.

An important recommendation of the workplace policy is that employers shall ensure a safe and healthy work environment including the application of universal precautions and measures such as the provision and maintenance of protective equipment and First Aid. If nurses become aware of this provision, it becomes a strong basis to request for facilities and equipment that will enable them provide safe care to their clients in a safe manner.

Implication to Research and Practice

Nurses are advocates of patients' well-being, are closest to the patients, spend more time with the patients rendering them more vulnerable to HIAs and may transmit same to the patients. Nurses are also in a unique position to proactively effect required changes to improve the quality of patient care. This study on the perception and experiences of infection control practices among Professional Nurses in Secondary Health Facilities in South-South Nigeria has brought to the fore the fact that instead of being proactive, nurses could lapse into a state of complacency by merely following the routines of the job. On the issue of infection surveillance the study participants in their response portrayed that their disposition to infection control was more passive that active.

Another issue brought to the fore by this research is the fact that most of the participants in the study were not abreast with the policies on the prevention and control of HIAs. Considering the fact that nurses play a pivotal role in preventing hospital-acquired infections (HAI), it is imperative that all aspects of nursing practice should be based on current knowledge and evidence. Therefore access to and use of information is crucial especially with regards to standard operating procedures and practice guidelines for patient care.

The nursing training equips the nurse with an array of requisite tools for creating a safe environment for patients among which are "Standard Precautions (SPs)" These are the cornerstones for securing first and foremost own personal safety and that of patients as well as engendering an infection free environment. Hand washing which is one of the components of SPs is another effective intervention that is considered the single most important nursing intervention to prevent infection. Injection safety is also another important milestone evidence-based practice that is fundamental to good nursing practice. All these evidence-based practices have well documented practice guidelines or standard operating procedures which should be rehearsed and enforced on an ongoing basis. The onus is therefore on Professional Nurses to be proactive in ensuring their own safety and that of their patients.

In this regard, the findings of this study will be fed back to the hospital administrators in the two states to sensitize them on the need for them to provide periodic in-house training at the

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health-facility level to update nursing staff and indeed all who are involved with patients care on existing and new safety policies. The scope of the training can be expanded to the state-level where nurses can be re-orientated on emerging diseases and how they can take proactive actions to safeguard their health and that of patients. Therefore, irrespective of the settings in which they work or the roles they play, the Professional Nurse should be guided by the highest sense of responsibility by demonstrating leadership in infection prevention and control through the application of knowledge, skill and judgment to initiate appropriate and immediate infection control procedures at all times.

CONCLUSION

The findings indicate that individual and organisational factors combine to determine compliance with recommended workplace safety practices. Factors such as gap in infection control knowledge, non-availability of PPE, non-institution of active surveillance, non-implementation of provisions of workplace policy and non-familiarity of nurses with infection control policies could hinder long-term compliance with infection control practices among nurses. Noncompliance with standard precautions place Nigerian Nurses and their patients at significant health risks. The study highlights the importance of implementing a training programme and other relevant measures to enhance Nurses knowledge and skills on infection control. Institution of active surveillance involving direct and vigorous search for information on the occurrence of Health Care Associated Infections for the purpose of discovering a change or trend in the incidence of infections is advocated in secondary health facilities in Cross River and Akwa Ibom States.

Future Research

The need for a follow up research to this study cannot be over-emphasized. There is need for research on the assessment of the mechanism and procedures for reporting hospital acquired infections. The study has highlighted the fact that the existing system for the detection and reporting of HIAs in secondary health facilities in the two states is weak and needs to be strengthened. However the determining factors should be empirically explored to enable the development of targeted evidence-based interventions to address the systemic operational deficiencies observed. Other aspects of the subject matter that would need to be explored include the nature of the HIAs as well as the frequency of occurrence and its magnitude. The cost of hospital related infections, its effect on the length of patients' stay, extended patient care and cost to the health care delivery system would require investigating. Future studies will be critical in identifying gaps in knowledge and practice of healthcare workers and factors militating against effective practice so as to provide perspectives on possible intervention options that can be both effective and efficacious. This study was delimited to secondary health facilities and nurses, future studies could be extended to other healthcare workers, other settings and managers of facilities in other to have a comprehensive view of the factors affecting compliance with safety practices and infection surveillance. This will further enhance policy implementation on infection prevention and control in Cross River and Akwa Ibom States.

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