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Knowledge and Practices of Infection Control Interventions amongst Hospital Cleaners at Health Care Units of Capricorn District, Limpopo Province

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ABSTRACT Health care-associated infections remain a major cause of patient morbidity and mortality. The main source of nosocomial pathogens is likely the patients' endogenous flora and this can be attributed to cross infection via the hands of health care personnel, through direct or indirect contact with contaminated environmental surfaces. The aim of the study was to explore the knowledge and practices of hospital cleaners regarding infection control interventions at health care units of tertiary hospital in Limpopo Province. The study was conducted in obstetric, casualty, and neonatal. A qualitative, exploratory, descriptive and contextual research design was used. Population comprised of hospital cleaners, working in obstetric, casualty, and neonatal units. Non-probability, convenient sampling method was used to select thirteen participants and data were collected by means of unstructured face to face interviews. Data were analysed using open coding method. Two themes emerged; namely; infectious product with the following three sub-themes; infection control information, different colour codes as a precautionary measures and shortage of staff. Theme two addressed infection control practices by healthcare professionals with two sub-themes, namely; infection practices by nurses and infection control practices by medical practitioners. Recommendations to develop contextual in-service education for infection prevention and control, in collaboration with the hospital Infection Prevention and Control and Occupational Health and Safety Unit.

INTRODUCTION

Infection control in a health care unit is the prevention of the spread of microorganisms from patient to patient, patient to staff member and the staff member to patient (Centers for Disease Control and Prevention 2002). It is the discipline concerned with preventing the spread of infections within the health-care setting and most of the healthcare institutions have guidelines for infection control (Ajabe 2011). Additionally, infection control is a practical sub-discipline of epidemiology that is an essential part of the infrastructure of health-care because it should be practised within the healthcare delivery system rather than directed at the society as a whole (Gray 2015; Scheckler et al. 1998). The infection could also be acquired from the hospital environment. According to Wilks et al. (2005); Michels (2006); Hale et al. (2015) there are microorganisms that are known to survive on non-antimicrobial inanimate 'touch' surfaces, for example bedrails, over-the-bed trays, bathroom hardware and other surfaces for extended periods of time. This can be especially troublesome in hospital environments where patients with immunodeficiency are at risk for contracting nosocomial infections. Hospital cleaners play a major role in assisting to create and maintain a safe and clean environment for the prevention of this nosocomial infection. Philip et al. (2005) indicated that cleaning, disinfection and sterilization is a process intended to prevent infection which is intended to kill all microorganisms. As this is mostly the work carried out by the hospital cleaners, they should be taught how to perform the duties correctly. Hence the knowledge and practices of infection control interventions by hospital cleaners were explored.

Weber et al. (2010) point out that an estimated 20 percent to 40 percent of nosocomial infections have been attributed to cross-infection via the hands of health care workers. The authors further add that hand contamination could in turn result from either direct patient contact or indirectly from touching contaminated environmental surfaces. It was also acknowledge that less commonly; a patient could become colonized with a nosocomial pathogen by direct contact with a contaminated environment surface.

Weber et al. (2010) also estimated that at any time, more than 1.4 million people worldwide are affected by infections acquired in hospitals. Weber et al. (2010) further point that in order for environmental contamination to play an important role in the acquisition of a nosocomial pathogen, the pathogen must demonstrate certain microbiologic characteristics; namely; be able to survive for prolonged periods of time on environmental surfaces, ability to remain virulent after environmental exposure and contamination of the hospital environment and ability to colonize patients. Pathogens can survive in the environment for significant periods of time, and if surfaces are not cleaned and disinfected appropriately, these pathogens can be passed on to patients and hospital staff and cause significant, potentially fatal, health complications. Personal protective equipment is expected to be worn by the hospital workers including hospital cleaners and nurses when dealing with contaminated secretions from patients (Chami et al. 2011). Wilson et al. (2006) and Quinn and Henneberger (2015) found that cleaning reduce environmental contamination. Hayden et al. (2006) further pointed that decreasing environmental contamination may help to control the spread of some antibiotic-resistant bacteria in hospitals, specifically vancomycin-resistant enterococci.

All health care facilities should implement infection cleaning control policies, practices and procedures that incorporate standard (universal) precautions. Standard (universal) precautions involve the use of protective barriers and practices to protect patients and health care workers from parenteral, mucosal and non-intact skin exposure to blood and body substances, and to minimise the transmission of blood-borne pathogens. The healthcare workers including hospital cleaners should be encouraged to wear personal protective clothing which will minimize their exposure against infection that is sometimes overlooked (Chami et al. 2011). Therefore, the nature of their job frequently exposes them to potential infections which may result from various sources including hazardous chemicals, blood-borne pathogens and other infected body secretions. Hospital cleaners constitute a considerable portion of workers in health facilities in South Africa and in Limpopo province. During clinical accompaniment of students, researchers observed that daily routine of environmental cleaning was often incomplete and was not adequately done. Wilson et al. (2006) has documented that cleaning, disinfection and sterilization saves lives and improves patient outcomes, it is important to make sure that there is a sound cleaning approach in place to ensure that all surfaces are being effectively cleaned. The knowledge and practices of hospital cleaners with regard to infection control is critical and was explored.

The objectives of the study were to explore the hospital cleaners' knowledge and practices with regard to infection control in the healthcare units in Capricorn district, Limpopo province. Findings of the study were used to propose recommendations that can be used to improve infection control knowledge and practices amongst hospital cleaners in healthcare units.

METHODOLOGY

Research Design

A qualitative, exploratory, descriptive and contextual design was used to gain insight into the knowledge and practices of hospital cleaners on infection control at the health care units of Capricorn district of Limpopo province. Brink (2006), Burns and Grove (2009) refers to a qualitative research design as focusing on the meaning, experience and understanding of subjective meaning that is used to describe life experiences of the research participants in the context during which the action is taking place.

Sampling

The population included hospital cleaners of the health care units in the tertiary hospital, Capricorn district. Hospital cleaners who are attached to obstetrical, casualty, and neonatal units were conveniently selected participate in the study. A sample of 13 participants was selected (De Vos et al. 2006; Brink 2006). Sampling criteria for inclusion in the study were:

The hospital cleaner to be one year or more as a cleaner, this would determine the knowledge they have about infection control measures. The hospital cleaner had to agree to participate in the study.

Permission to access the health care units was obtained from the Provincial Research Committee, Hospital Chief Executive Officer, and respective unit manager and from the purposively

selected participants. Participants were provided with sufficient and understandable information about participation in the study. The right to self-determination was ensured by obtaining informed consent from the participants. Consent forms were obtained from each participant. Confidentiality and anonymity were ensured by protecting participants' identity, privacy, worth and dignity. No victimisation of participants who refused to participate in the research took place.

Data Collection Methods

Data were collected by researchers from the selected participants, who agreed to participate. Data were collected by using the unstructured interview guide in a duty room during lunch hour. The following question was asked: 'can you please tell me how you practice infection control in your everyday health care delivery?' The question was followed by probing as a communication skill which ensured that more sufficient data were provided by the participants, as postulated by De Vos et al. (2006) and Babbie and Mouton (2001). The voice recorder was used to capture more information and the field notes were recorded. Data was collected until theoretical saturation of each new category was reached (Strauss and Corbin 1990). Data were analysed by the researchers. The narrative data from the unstructured interview was analysed qualitatively by means of the open-coding method. Tesch's procedure cited in Creswell (2009) was used as the method of choice for data analysis. The following steps were followed:

The researcher carefully read through all the transcripts in order to get a sense of the all the data.

After the researcher had completed this task for all the interviews, lists of all similar topics were compiled. Data were grouped according to main categories and sub-categories. Field notes were also coded and categorised.

A literature control was carried out after the data analysis as a basis for comparing and contrasting the findings of the qualitative study (Creswell 2009). One of the main reasons for conducting a qualitative study had been that the study was exploratory, which implied that not much had been written about the topic or population being studied. The researchers also sought to listen to the participants in order to construct a picture based on their ideas (Creswell 2003).

The criteria for ensuring trustworthiness as outlined in Lincoln and Guba (1985), De Vos et al. (2006); Babbie and Mouton (2001) were observed. Credibility was ensured by prolonged engagement in order to build trusting relationships with the participants. The researchers had contact with participants, during the session of making appointment, information session and during data collection. Referential adequacy was achieved by taking notes to record findings that provided a suitable record and the use of voice recorder. Transferability was ensured by thick description of research methodology. Member check was also conducted in order to validate the truth and to confirm the results.

RESULTS

Research findings that are presented in Table 1 outline the themes and sub-themes that emerged during data analysis. Tech's Open coding method was used to analyse data obtained from thirteen hospital cleaners of the three units of the tertiary hospital. In discussing the themes and sub-themes, quotations and relevant literature was used to emphasise the results.

DISCUSSION

Theme 1: Knowledge on Infection Control Practices

Health care-associated infections remain a major cause of patient morbidity and mortality.

Table 1: Themes and sub-themes

Themes	*Sub-themes*
1. Knowledge on Infection Control Practices	1.1 Cleaning agents, disinfectants and practices
	1.2 Knowledge on use of different colour codes as infection control precaution
	1.3 Shortage of staff versus spread of infection
2. Infection Control Practices by Healthcare Professionals	2.1 Infection control practices by nurses as perceived by hospital cleaners
	2.2 Infection control practices by medical practitioners as perceived by hospital cleaners

The main source of nosocomial pathogens is likely the patient's endogenous flora and this can be attributed to cross infection via the hands of health care personnel, who have become contaminated from direct contact with the patient or indirectly by touching contaminated environmental surfaces. The role of hospital cleaners on environmental cleaning is important because it reduces the number and amount of infectious agents that may be present and may also eliminate routes of transfer of microorganisms from one person/object to another, thereby reducing the risk of infection (Quinn and Henneberger 2015).

Sub-theme 1.1: Cleaning Agents, Disinfectants and Practices

Hospital cleaners from the three units of the same hospital displayed different information on infection control. This was evident when they explain how they use biocide disinfectant on bed pans in the unit. They displayed knowledge deficit on manufacturer's instruction on dilution. The amount of water that they use to dilute one sachet of biocide was too much. This was supported by one participant who said that, *"it is a risky environment that we find ourselves in but we try to control the spread of infections, for example we soak bed pans used by patients with 20 liters of water and 4 sachets of biocides for 8 hours."* The other participant said, *"We soak bed pans with 15 liters of water and 1 sachet of biocide for 24 hours"*.

It is important to follow the manufacturer's instructions when using these cleaning agents. The manufacturers' recommendations may focus to; dilution, temperature, water hardness and use of the product (Alfa 2015; Dettenkofer 2004). Disinfectant solution should be changed frequently.

Disinfection is a process used on inanimate objects and surfaces to kill microorganisms. Disinfection will kill most disease-causing microorganisms but may not kill all bacterial spores. Only sterilization will kill all forms of microbial life. Disinfectants are only to be used to disinfect and must not be used as general cleaning agents, unless combined with a cleaning agent as a cleaner-disinfector (Department of Health 1996). A variety of cleaning agents and disinfectants from a number of suppliers can be used to achieve effective cleaning.

Hospital cleaners are faced with a challenge of being in contact with spills in the units. Spills of blood and other body substances, such as urine, faeces and emesis, must be contained, cleaned and the area disinfected immediately (Canadian Standards Association 2009). Some participants displayed knowledge on protecting themselves against contracting microorganisms. Participants mentioned that within the units, there are special kits that are used for the purpose. Items that are included in the kit were said to be gloves, a mask, trash tray and a stick. The stick and tray are used to collect the emesis from the floor. It was also indicated that they also pour biocides on the emesis to prevent infection from spreading. The above information was supported by one participant who said *"for a patient who has infectious disease we take the plate that has been used by the patient and soak it in biocide, if the patient has vomited there is a kit that we use to clean the vomitus. We wear gloves, musk, and gown and use a brush to try to remove the vomit"*. To protect the hospital cleaners from contracting and spreading the infection, the health care setting should have written policies and procedures for dealing with biological spills (Canadian Standards Association 2009). High risk areas should be pre-cleaned properly with soap and water to remove extraneous organic matter and then disinfect with biocide.

According to Chami et al. (2011) basic hygienic cleaning should be practiced when dealing with spilled patients' body secretions and or fluids. It was indicated that little mild liquid detergent should be used to blot the spilled secretions. This was confirmed by the following statement *"Always when there is a spill what I do is I take biocide which is strong to kill germs then I spread it around and remove the secretions in order to discard them appropriately. I then pour the biocide in the water and disinfect the area by cleaning thoroughly so that infection must not spread"*. Hospital cleaners must adhere to infection control practices. Hand hygiene using water and soap is most important and effective infection control measure to prevent the spread of health care associated infections. Hospital cleaners should be encourage to wash hands after handling the soiled linen, after activities that do not result in visible soiling of the hands, such as cleaning the bathrooms dusting, mopping, even after removing the gloves.

Sub-theme 1.2: Knowledge on Use of Different Colour Codes as Infection Control Precaution

Colour coding is used as infection precaution. According to the South African Occupational Health and Safety Act of No 81 of 1993 as amended, infection control precautions should be implemented for all cleaning materials like cloths, mops, buckets, aprons and gloves. Hospital cleaners displayed satisfactory level of knowledge on the use of different color codes for mops in the units. It was highlighted that these different color codes for mops helps in reducing the spread of infection from one area to the next like from side wards where patients with infectious diseases are nursed to general cubicles where patients without an infectious disease are nursed. This was confirmed by one participant who said, "*we use different colours on types mops, that is, white mop when cleaning the kitchen, yellow mop in isolation wards, red mops for cleaning blood and toilets, blue mop for the wards, green mop for passage.* The other participant said "w*e have two types of plastics that we use red plastic for products from the patient, black plastic for papers."* Chami et al. (2011) confirm that cleaning should be done with highly effective antiseptic solutions. It was further emphasized that different solutions and cleaning materials should be used to help reduce the potential for cross-contamination. Tools used to clean high-risk areas were said to be ensured that it stays in those areas and that other tools for low risk areas should not enter high risk areas (Mafuru et al. 2015).

Sub-theme 1.3: Shortage of Staff Versus Spread of Infection

In all units hospital cleaners complained about shortage of staff. They explained how they were expected to do different duties in a day, which according to them can lead to spread of infections. They gave an example of where they are expected to clean the floors and at the same time feed the patients. One participant said, *"by saying we have shortage of staff, in the morning I have to count linen, go to the kitchen and give patient food. The counting of linen then go to the kitchen may contribute to the spread of infection"*. Transmission of microorganisms within a health care setting is intricate and very different from transmission outside health care settings and the consequences of transmission may be more severe. High-touch environmental surfaces of the health care setting hold a greater risk than do public areas of non-health care organizations, due to the nature of activity performed in the health care setting and the transient behaviour of employees, patients and visitors within the health care setting, which increases the likelihood of direct and indirect contact with contaminated surfaces. According to Aiken et al. (2002) working in the medical field can be demanding and stressful. It is not for everyone. Being a hospital cleaner requires a great deal of compassion, patience and tolerance.

Theme 2: Infection Control Practices by Healthcare Professionals

These experiences of hospital cleaners in relation to practices of health care professional were both positive and negative. Out of this theme the following sub-themes emerged: Infection control practices by nurses and infection control practices by medical practitioners.

Sub-theme 2.1: Infection Control Practices by Nurses as Perceived by Hospital Cleaners

Hospital cleaners expressed a positive experience related to infection control by nurses in the unit. They described that most nurses comply with the policies of waste disposal. Participants also acknowledged that sometimes few mistakes do happen where they would dispose waste in wrong container and the nurses would correct them. They perceived nurses as practitioners who are informed and conscious about with infection control practices in their units. They further acknowledged that nurses continuously raise awareness on risks that they face. One participant said, *"we do not have problems with nurses, they know infection control very well and sometimes they teach us, nurses know where dispose needles, waste from the patients and other waste"*. Another participant confirmed this by saying, *"Nurses comply with infection control because they do not mix waste"*. This was further elaborated by the other participant who said *''we use a red plastic to put infectious waste from patients; black plastic is for paper waste and food which is burned after wards. We pick up needles found on the floor and we put them in sharp container"*.

According to Needleman et al. (2002) there are also a number of items that can be worn by medical professionals including long-lasting items such as coats and overalls along with disposable items such as masks and foot coverings.

Sub-Theme 2.2: Infection Control Practices by Medical Practitioners as Perceived by Hospital Cleaners

Hospital cleaners described their negative experience in relation to infection control practices by most of the medical practitioners. They explained that some medical practitioners adhere to the principles of infection control during waste disposal.

However, they also expressed negative experience in relation to waste disposal by other medical practitioners specially the newly qualified. Hospital cleaners indicated that newly qualified medical practitioners do not adhere to waste disposal principles and protocols. They would dispose waste in any accessible plastic to them, for example, disposing waste from the patient in the in black plastic refuse instead of the red plastic. They would at times dispose sharps in the plastics. Biomedical waste should be segregated, at the point of generation (Canadian Standards Association 2009). Hospital cleaners indicated that this practice put them at risks of needle prick or touching the infectious waste because in some instances they will be expected to separate the disposed waste to its correct container. According to Lamb (2008) thousands of needles and larger toxic materials are used in hospitals regularly. Sharps containers that are made from durable plastics come in a number of sizes and shape that can easily accommodate all contaminated items.

This was confirmed by the participant who said, *"doctors sometimes mix needles with gloves and this put our lives in danger because we have to correct it, they sometimes throw needles on the floor, mostly those who are newly employed in casualty."* According to Chami et al. (2011) multiple products of healthcare activities such as cultures, stocks, infectious agents, anatomic wastes and radioactive diagnostic material should be handled carefully. In addition in these are the used up medical consumables like gloves, bandages, medical tapes, sanitary products which should be disposed in the controlled waste management plant.

Centre for Disease Control (2002) recommended that standards, policies and procedure for infection control should be maintained and staff compliance with all components should be monitored. Needles and scalpel blades (sharps) should be kept in sharp containers, and should be collected and disposed by Waste Management people.

CONCLUSION

Hospital cleaners play a major role in assisting to create and maintain a safe and clean environment for the prevention of nosocomial infection. Findings of the study indicate that hospital cleaners are aware of infection control policies and practices. Some displayed lack of accurate knowledge on correct practices. Health care professionals, especially medical practitioners expose hospital cleaners to risk of acquiring infection.

Infection control practices by general assistants is of vital importance as they are the people more exposed to cross infection and transferring infection in the unit. The low level of knowledge displayed in their responses calls for more effective frequent educational sessions to assist them in applying the infection control principles effectively**.** Continuing in-service education programs on infection control measures for hospital cleaners and professionals are also recommended. The findings should also alert professional nurses and nurse educators about the importance of educating their students clearly and comprehensively about infection control measures.

RECOMMENDATIONS

All aspects of environmental cleaning must be supervised and performed by continuously in-serviced hospital cleaners. The health care units should have written policies and procedures for dealing with biological spills. Infection prevention and control education provided to hospital cleaners working in health care units should be developed in collaboration with the hospital Infection Prevention and Control and Occupational Health and Safety Unit and must include:

The correct and consistent use of Routine Practices; hand hygiene and basic personal hygiene; the appropriate use of personal protec-

tive equipment and prevention of blood and body fluid exposure, including sharps safety.

Motivation to the Human Resource Manager should be written to hired extra hospital cleaners to prevent over working and spread of infections when doing multiple jobs at the same time, for example, cleaning and getting patients' food from the kitchen. Hospital cleaners should be trained yearly so as to be informed about infection control measures in their units of work.

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