INFLUENCE OF DEMOGRAPHIC VARIABLES ON HANDWASHING PRACTICES AMONG HEALTH CARE PROVIDERS IN KANO METROPOLIS, KANO STATE

BY

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SPS/12/MHE/00007

A DISSERTATION SUBMITTED TO THE DEPARTMENT OF PHYSICAL AND HEALTH EDUCATION, FACULTY OF EDUCATION, BAYERO UNIVERSITY, KANO, IN PARTIAL FULFILMENT OF THE REQUEREMENTS FOR THE AWARD OF MASTERS OF SCIENCE DEGREE INPHYSICAL AND HEALTH EDUCATION (HEALTH EDUCATION)

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DECEMBER, 2016.

DECLARATION

I hereby declare that this research is the product of my effort undertaken under the supervision of Dr. A. M Getso. I also declare that to the best of my knowledge, this work was never presented wholly or partly for the award of degree or certificate elsewhere. All sources consulted and cited have been duly acknowledged in the reference section.

Sign……. Date ……..

CERTIFICATION

This is to certify that the research titled Influence of Socio-demographic Variables on Hand Washing Practices among Health Care Providers in Kano Metropolis, Kano State and the subsequent preparation of this dissertation by Surajo Jinjiri (SPS/12/MHE/00007) were carried out under my supervision.

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APPROVAL PAGE

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DEDICATION

This dissertation is dedicated to my late father Jinjiri Aiyu and my mother Hadiza Jinjiri

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ABSTRACT

This study investigated Influence of Socio-demographic Variables on Handwashing Practices among Health care providers in Kano metropolis, Kano state. Six research questions, two major hypotheses & six sub- hypotheses were formulated to guide the study. Descriptive survey research design was employed. The population of the study comprised of one thousand six hundred and eighty three (1683) health care providers. A total of three hundred and thirteen(313)health workers were selected through random sampling technique from Murtala Muhammad Specialist Hospital, Infectious Disease hospital and Sheikh Muhammad Jiddah hospital, Kano. The instrument for data collection was researcher's developed questionnaire named Hand Washing Practice among Health Care Providers in kano metropolis, Kano state (HWPHCP), it was validated by 5 experts in PHE department and its reliability was 0.80. Three hundred and thirteen (313) questionnaires were distributed but two hundred and fifty (250) were duly completed, returned and used for data analysis. Socio-demographic information of the respondents were organize and describe using simple frequency count and percentage.χ^2 and ANOVA were used to test the formulated hypotheses, at 0.05 level of significance. The results of the study revealead thatHealth care providers in Kano metropolis practice handwshing at the appropriate moment (χ^2 =183.184 at df 1, $p < 0.05$), heath care providers practice appropriate technique during handwashing (χ^2=121.104 at df 1, $p<0.05$). The results also indicated that significant difference exist in the moment of handwashing practices by health care providers in Kano metropolis based on their years of working experience (F-df 2,247 = 3.045, $P < 0.05$).The result also revealed no significant difference exist in the technique of handwashing practices by health care providers in Kano metropolis based on their profession (F-df 2,247 = 1.714, $P > 0.05$). Therefore, the implication of this study is that if the health care providers can sustain the handswashing practices before and after interacting with patients, the rate of nosocomial infection could be reduced. However, it was recommended among others that educational programme such as workshops/seminars onhandwashing practices in hospital should be organize regularly to sustain the practice.More effort should be made to encourage health care providers that spent few years in service to improve and sustain handwashing practices at the right moments.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

According to World Health Organization (2009), clean care is safer care programme, when working with patients, hand hygiene should be performed at five (5) key moments by using an alcohol based hand rub or by handwashing with soap and water. These five moments of hand hygiene are: before touching a patient; before clean and aseptic procedure (inserting devices such as catheters); after exposure to body fluid; after touching a patient and after touching a patient's surroundings. The strategies have been implemented so far in more than 15,700 health care settings in 168 countries worldwide.

Nura, Mekuriaw, Adebawo, Timothy, Yewureti and Kefyalew (2013) defined handwashing as an act of cleansing hands using soap and water or using antiseptic hand-rub for removal of transient micro-organism from hands and in the way of keeping the skin condition good. Nura et-al. (2013) also stated that, hand washing is the most simplest and effective measure to prevent infection, however, about 50% of hospital associated infections occurs due to hands of health care providers. Stressing further, health care workers' hands are the most usual type of vehicle for transmission of health care associated infections and pathogenic micro-organisms can stay for 20-60 minutes on health care workers' hands. Azzam and Sajd (2012) stipulated that, handwashing is an important health care issue globally and is a single most cost effective and practical measure to reduce the incidence of health care associated infection and the spread of antimicrobial resistance across all settings from advance health care systems to Primary Health Care centers.

One of the most significant, current discussions in health care delivery in hospitals is hospital acquired infection (HAI), sometimes called health care associated infection or nosocomial infection, which is any infection that a person develops as a result of treatment in the hospital (Minaar, 2008). Handwashing is therefore thought to be a key factor in reducing HAI during the initial development of health care delivery system (Akyol, 2007; Ott & French, 2009).

According to Tramfuz and Widmer (2004), the battle with HAI started when the Hungarian obstetrician, Semmelweis 1847 observed that puerperal fever was more common in a maternity ward where physician and medical students provided care to women in labour, than it was on the ward where midwives assisted deliveries. He noted that physicians and medical students were contaminating their hands while performing autopsies and later attending the examination of women without handwashing. Arguably, he was the first to recognize the importance of handwashing in controlling the transmission of infection.

Equally important was the work of Florence Nightingale during the Crimean war, when she called for basic public health in a military hospital Scutaria in 1854. Her interventions to improve personal hygiene, cleanliness in the hospital environment, living conditions and food, lead to decrease in the number of deaths. She was one of the first who identified the relationship between nursing and infection control (Meers, Jacobsen & Mcpherson 1992; Minaar, 2008; Smith & Lokhorst, 2009). According to Okanu, Onyenoro and Okegbu (2011), who assessed handwashing practices among healthcare providers in a tertiary hospital in South East Nigeria, majority of medical officers, nurses and resident doctors knew the importance of handwashing in the prevention of hospital acquired infections. More than 50% had good knowledge of hand hygiene. About 54% of them always wash their hand between direct contact with a patient and

after an invasive procedure. 92% of them wash their hands when visibly soiled and 57% after removing gloves.

Similarly, study on handwashing practices among health care providers in University of Port Harcourt Teaching Hospital, Rivers State, Nigeria by Balafama, Abinye, Alex, and Peace (2011) revealed that 76.7% health workers never wash their hands while 9.3% always wash their hands before interacting with patients; 69.7% never wash their hands while 13.6% always wash their hands before performing simple procedures such as inserting catheter, measuring blood pressure; but after interacting with patients, 51.2% always wash their hands while 24.8% sometimes wash their hands, also during daily activities workers progressively accumulate micro-organisms on their hands from direct patient contact with environmental surfaces and devices, these organisms are easily removed by handwashing with soap and failure to wash hands could pre-dispose health workers to diseases cause by these organisms. Lack of soap and water are the commonest constraints to handwashing, others were forgetfulness, lack of time, inconveniently located sinks and lack of motivation.

WHO (2006) defined Health care providers as "those who promote and preserve health as well as those who diagnose and treat diseases. Also included are health management and support workers, those who help to make the health system function but who do not provide health services directly. The health provision in Kano State is strictly based on the Nigerian National Health Policy, put in place since 1986; the State Government is responsible for secondary health facilities, while the LGAs are responsible for Primary Health Care facilities. The two are linked through the 2-way referral system. There are 34 hospitals owned and managed by the Kano State Government, 13 are located within the metropolis while the remaining 21 were located in some local Government Areas. Eighty nine percent (89%) of all doctors and 73% of nurses in the

employment of the State Government are located in the metropolis (Kano State Hospitals Management Board, 2015).

As was observed by the researcher, most health care providers seem to be busy while conducting their work, many times neglecting certain safety precautions. It is therefore against this backdrop that the researcher conducted a research on the Influence of Socio-demographic Variables on Handwashing Practices among Healthcare Providers in Kano Metropolis, Kano state.

1.2 Statement of the Problem

The provision of health care worldwide is associated with a potential range of safety problems. Despite advances in health care systems, health workers and patients remain vulnerable to unintentional harm in hospitals. In many health care settings, there were occurrences of nosocomial infections which sometimes affect the health care workers, these infections include among others hepatitis, acute diarrhea, dermatitis, ebola and recently, lassa fever. The transmission of these diseases may be linked to poor handwashing practices by the health care providers. In 2002, there were cholera epidemics in Kano state whereby the researcher was among those who rendered emergency care services in Infectious Diseases Hospital (IDH) Kano, some health care workers developed the infection. In 2013, a health care worker in MMSH was infected with hepatitis and died. Similarly, in 2014, some health care workers and patient relatives were infected with the cholera while trying to treat and visit patients during the outbreak of the disease in some hospitals of Kano State. The problem could be attributed to poor handwashing practices. Ogunsola and Adesiji (2008) revealed that, the problems of HAI showed a wide range of nosocomial infections, ranging from 3-13.4% in developing nations, and most wards in Nigeria hospitals seem to lack adequate facilities for

effective hand hygiene and use the bucket and towel method as an alternative to running water which significantly affect the practice of handwashing by health care workers, in addition, the magnitude of HAI problems and importance of adherence to infection control policies, hand hygiene compliance rate in different developed countries rarely exceed 50%. They also showed that the situation is worse in developing countries, where resources and facilities are limited.

There is tendency for health care workers to transmit microorganisms to their close contacts after work as shown by Balafama, Alex and Opara (2011) who reported that, health workers wash their hands more often after interacting with patients than before. They also showed that, there is low handwashing rate following the day's work, this indicated that during daily activities, workers accumulate micro-organisms on their hands from direct patients' contacts, with environmental surfaces and medical equipment. Furthermore, World Health Organization (2009), estimated that annually, about hundreds of millions of patients have suffered from health care associated infections worldwide and majority happens due to health care providers' hands which cause prolonged hospital stay, high amount of economic cost of patients, unnecessary laboratory investigations, high cost of drugs that result to serious morbidity and mortality

Therefore the researcher deemed it important to conduct a research onInfluence of Socio-demographic Variables on handwashing practices among health care providers in Kano Metropolis, Kano state and the research answered the following questions;

- Do health care providers practice handwashing at the appropriate moment in the hospitals of Kano metropolis?
- Do health care providers practice appropriate technique during handwashing in the hospitals of Kano metropolis?

- Is there any difference in the moment of handwashing practices among health care providers based on their profession?

- Is there any difference in the moment of handwashing practices among health care providers based on their educational level?

- Is there any difference in the moment of handwashing practices among health care providers based on years of working experience?

- Is there any difference in the technique of handwashing practices among health care providers based on their profession?

- Is there any difference in the technique of handwashing practices among health care providers based on their educational level?

- Is there any difference in the technique of handwashing practices among health care providers based on their years of working experience?

1.3 Hypotheses

The following hypotheses were formulated and guided the conduct of the study:

Major Hypotheses

- Health care providers do not significantly practice handwashing at the appropriate moment in the hospitals of Kano metropolis.

- Health care providers do not significantly practice the appropriate technique of handwashing in the hospitals of Kano metropolis.

Sub-Hypotheses

- There is no significant difference in the moment of handwashing practices among health care providers in Kano metropolis based on their profession.

- There is no significant difference in the moment of handwashing practices among health care providers in Kano metropolis based on their educational level

- There is no significant difference in the moment of handwashing practices among health care providers in Kano metropolis based on their years of working experience.

- There is no significant difference in the technique of handwashing practices among health care providers in Kano metropolis based on their profession.

- There is no significant difference in the technique of handwashing practices among health care providers in Kano metropolis based on their educational level

- There is no significant difference in the technique of handwashing practices among health care providers in Kano metropolis based on their years of working experience

1.4 Purpose of the Study

This study investigated the Influence of Socio-demographic Variables on Handwashing Practices of Healthcare Providers in Kano Metropolis with a view to proffer ways of reducing the rate of nosocomial infections.

1.5 Significance of the Study

The findings of this study would be of significance in the following ways:

- The findings of this study would help the subjects to add more value to handwashing through seminar, symposium and workshops.

- The findings of this research would assist government (especially hospital management board), private hospitals and nursing homes to intensify safety issues in health care settings.

- The findings would also help intending researchers wishing to carry out study in the area of hand washing through increasing literature in the area of health education.

1.6 Delimitation of the Study

The study was delimited to the Influence of Socio-demographic Variables on Handwashing Practices in Murtala Muhammad Specialist Hospital, Infectious Disease hospital and Sheikh Muhammad Jiddah hospital, Kano State. It was also delimited to Physicians, Nurses, and Medical laboratory Scientists/Technicians working in metropolitan hospitals owned by Kano State Government and to the moments and technique of handwashing practices.

1.7 Operational Definition of Terms

The following terms are hereby defined as they are used in this research:

- **Handwashing practice:** an act of cleansing hands with soap and water at a particular moment using soap and water.
- **Hospital Acquired Infections:**any infection that a health care provider or patient develops as a result of treatment in the hospital.
- **Health care provider**s: Doctors, Nurses, Medical laboratory Scientists/Technicians who work in the hospital.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This research assessed Influence of Socio-demographic Variables on Handwashing Practices among Healthcare Providers in Kano Metropolis, Kano State. Literature related to the topic was discussed under the following sub-headings:

= An Overview of Handwashing

= Moments, Substances and Technique of Handwashing

= Health Care Providers

= Empirical Studies on Handwashing Practices among Health Care Providers

= Benefits of Handwashing

= Problems of Handwashing

= Summary of the Review

2.1 An Overview of Handwashing

Handwashing is the removal of soil and transient micro-organisms from the hand using soap and water. It also includes removing or killing residents and transient micro-organisms on the hand using an antiseptic agent by either rubbing hands with alcohol or with an antiseptic soap (Canada, 2012). The Centre for Disease Control CDC (2010) reported that, medical handwashing pertains to the hygiene practice related to the administration of medicine and medical care that prevents or minimizes disease and the spread of diseases. The Centre stated that the main purpose of hand washing is to cleanse the hand of pathogens and chemicals which can cause personal harm or disease; this is especially for persons who work in the medical field or handle food, but it is also an important practice for the general public. Al-Busaid, Bukhari and Hussain

(2013) in their study health care workers and hand hygiene, lamented that one of the most significant current discussion in health care delivery in hospital is health care associated infection sometimes called hospital acquired infection (HAI) or nosocomial infection, which is, ‘ any infection that a person develops as a result of treatment in hospital. They further stated that despite the magnitude of HAI problem and importance of adherence to infection control policies, hand hygiene has remained an acceptably low. Hand hygiene compliance rates in different developed countries rarely exceed 50%, for instance, figures show that in the USA it is 50%, in Switzerland 42% and in the UK 32%. This poor compliance has resulted in morbidity and mortality (Takahashi & Turale, 2010).

In the USA there are between 1.7 and 2 million people who contract HAI and 88,000 to 99,000 deaths are attributed to HAI annually. Furthermore, HAI affects nearly 10% of hospitalized patient and present major challenges in health care facilities. Maxifeld and Dull (2011), shows that consequently, annual medical expenses have increased in the USA to approximately 4.5 billion US dollars due to HAI. Momen and Fernie (2010) reported that, in Canada approximately 8,000 patient die from HAI annually. Canadian hospital spends up to 100 million US dollars per year treating patients with HAI. European countries also have a high percentage of HAI; in the UK for example, each year approximately 9% of people admitted to hospital contract HAI; this is one of the highest percentage in Europe (Nazarko, 2009). The situation is even worse in developing countries where resources and facilities are limited, as revealed by Ogunsola and Adeseiji (2008) from a survey conducted across 14 developing countries to evaluate the problem size of HAI, showed a wide range of nosocomial infection, from 3-13.4% in an individual hospital. However, Devnani (2011) from another study in developing countries has reported a high rate of HAI, 6-27%. Sadly, more than 1.4 million

people worldwide become seriously ill from HAI at any time in their hospitalization (Momen & Fernie, 2010).

Handwashing practice among health care workers is considered to be the single most clinical cost effective measure to prevent HAI, a view recognized worldwide (Ott and French, 2009). Regular handwashing, particularly before and after certain activities, is one of the best ways to remove germs, avoid getting sick, and prevent the spread of germs to others (WHO, 2009). Rotter (1995) defined hand washing as an act of cleansing one's hand with or without the use of water or another liquid or with the use of soap or ash for the purpose of removing soil, dirt, and or microorganisms. Keeping hands clean through improved hand hygiene is one of the most important steps taken to avoid getting sick and spreading germs to others. Hands should be wash before, during, and after preparing food, before eating food, before and after caring for someone who is sick, before and after treating a cut or wound, after using the toilet, after changing diapers or cleaning up a child who has used the toilet, after blowing your nose, coughing, or sneezing, after touching an animal, animal feed, or animal waste, after handling pet food or pet treats, and after touching garbage (WHO, 2009).

To this regard, Canada (2012) shows that, one of the most important measures for preventing the spread of pathogens is effective handwashing, as a general rule, handwashing protects people poorly or not from droplet and airborne diseases such as measles, chickenpox, influenza and tuberculosis. It protects best against diseases transmitted through fecal-oral route such as many form of stomach flu and direct physical contact such as impetigo. Owing to its value, the United Nation (UN) set aside, a global handwashing day celebrated every 15 October. It was designed as a worldwide campaign to sensitize and mobilize people around the world to wash their hands with soap and water. According to a press release by the Association of

Pharmaceutical Council of Nigeria (ACPN, 2014), handwashing is a choice that everybody can make many times a day, when people choose to wash their hand with soap, especially after using the restroom and before touching food, they are choosing to create a healthier environment, not only for themselves but for people around them. The statement further urged people to imbibe handwashing, not only on global handwashing day but every day.

According to Mahmoud, Muhammad and Iyad (2011), handwashing refers to the professional practice of cleaning hands with reduction of infection rate reported. Simon, Bryant and Neiman (2014) reported that, handwashing refers to the use of water and soap or soap solution either non anti-microbial or applying a waterless anti-microbial hand rub to the surface of the hand e.g. alcohol based hand rub. He also stated that when perform correctly, handwashing results to reduction of micro-organisms on hands. Stressing further, he also pointed that promotion of hand washing can prevent contagious diseases, the outbreak of these diseases are threatening to tear apart cultural and traditional practices. Handshakes, fist bumps until recently have been traditional rituals that people worldwide young and adult use to share pleasantries, they have now become avenues for disease causing germs. At funerals rituals, people wash their dead before taking them to their resting place, it partly explain the rise in Ebola infection in western part of Africa. Communities have contracted the disease after coming in contact with the infected person or those that have died of Ebola. Trying to stop those rituals will prove difficult in many traditions because people are not willing to immediately change their customs. Promotion of practices that ensure avoidance of contact with suspected person in the meantime will help reduce prevalence of contagious diseases, since handshakes are not easy to stop, handwashing with soap and disinfectant must be encouraged.

In the same vein, Sreejith, Ramesh, Shashidhar, Mohammed, Siraj and Pooja (2014) indicated that, handwashing is recognized as the leading measure to prevent cross-contamination of micro- organisms and to reduce the incidence of health care associated infections, despite the relative simplicity of its procedure, compliance with handwashing technique among health care workers is as low as 40%. WHO (2009) showed that, good hand hygiene practice is the simplest and most valuable method of infection control in the hospitals. It also clarifies that hospital acquired infection through the hands of health care workers is mostly due to poor hand hygiene of the health care providers.

2.2 Moments, Technique and substances of Handwashing

The WHO strongly emphasizes the essential need for hand hygiene during health care delivery, to avoid possible infection and subsequent implications; hence, 'the clean care is safe care programme, was launched by WHO in 2005 as part of the first global patient safety challenge. This programme offers new guidelines on hand hygiene training, observation and performance in health care settings. Basurrah and madanni (2006) reported that, adherence to hand hygiene was seen in 70% of medical students, 18.8% in of nurses and 9.1% of senior medical staff but the technique was suboptimal in all. Handwashing is like a "do-it-yourself" vaccine-it involves five simple and effective steps (think Wet, Leather, Scrub, Rinse, Dry) you can take to reduce the spread of diarrheal and respiratory illness so you can stay healthy. Sreejith et-al (2014) revealed that, efforts are being made to by the World Health Organization (WHO) to identify effective and sustainable strategies. One of such efforts is the introduction of evidence based concept of my five moments of hand hygiene. These five moments that called for hand hygiene include the moment before touching a patient, before performing aseptic and cleaning

procedures, after being at risk of exposure to body fluids, after touching a patient and after touching patients' surroundings.

Sushitra and Lakhshimi (2007) showed that, there was significant difference in the moment of handwashing responses according to educational level education and the first post-education responses. However, the improvement in answers declined among graduates, and still further dropped in the third post- graduate education assessment. He recommended that attending continuing education courses about hospital infection had a positive effect on infection control procedures and compliance with barrier techniques, they have suggested that yearly educational modules will help in retention of knowledge in the area of nosocomial infections and the prevention of infections. It would also translate in a behavioural change of attitudes and practices that would help in reducing the incidence of nosocomial infections. Also years of experience in the hospital significantly correlated to increased knowledge, attitudes and practices among the various categories of staff but this did not translate into good clinical practice in the ward. They further showed that the compliance was maximum among nurses, intermediate for technicians and the least for doctors.

Observational study on hand washing practices by Victor, Rita, Sandra, Claudia, and Pablo (2003) revealed that in spite of the educational program and the significant increase in the scores in the post-education period; doctors were less compliant. The ward aides who were more under direct supervision of a hospital supervisor complied the best. All the categories responded uniformly that institutions should have written guidelines. There were no suitable rewards offered for those who complied in the form of either incentives or verbal acceptance, seniors did not comply and therefore it was quite natural that the new recruits did not feel the importance to comply and also that the institution had not made hand hygiene agents available.

Regular handwashing, particularly before and after certain activities, is one of the best ways to remove germs, avoid getting sick, and prevent the spread of germs to others (WHO, 2009). Hands should be washed before, during, and after preparing food, before eating food, before and after caring for someone who is sick, before and after treating a cut or wound, after using the toilet, after changing diapers or cleaning up a child who has used the toilet, after blowing your nose, coughing, or sneezing, after touching an animal, animal feed, or animal waste, after handling pet food or pet treats, and after touching garbage (WHO, 2009).

Many substances were found to be used for handwashing. For instance, Rotter (1995) stated that, removal of micro-organisms from skin is enhanced by the addition of soap or detergent to water, the main action of soap and detergent are to reduce barriers to solution and increase solubility. Canada (2012) pointed out that, soaps are detergent based products that contain esterified fatty acids and sodium or potassium hydroxide, handwashing with soap is necessary to remove visible soil or organic material on the hands, the detergent properties of soaps result in the removal of lipid and adhering dirt, soil and various organic substances from the hands.

Sartor, Jacomo and Duvivier (2005) shows that, soaps are available in various forms including bar, tissue, leaf and liquid preparations. Hand washing with soap and water remove loosely adherent transient flora. Refillable soap dispensers are prone to bacterial contamination and handwashing with contaminated soap is a recognized risk in health care settings, bar soap can also become contaminated while in use; however, there have been no reports of bar soap being associated with transmission of micro-organisms. Water is an efficient skin cleanser because fats and proteins which are components of organic oil are not easily dissolve in water, cleansing is however aided by reasonable flow of water. Water temperature is vital for effective

handwashing, Larson, Cimiotti and Haas (2005) indicated that, hot water that is comfortable may not be enough to kill bacteria as it grows much faster at body temperature (37'c). However, warm soapy water is more effective than cold soapy water at removing the natural oil on hands which hold soil and bacteria. Contrary to the popular belief, they also pointed that, using warm water has no effect on reducing microbial load on hands. Antimicrobial soap have been heavily promoted to health conscious of the public, antimicrobial soap contains common antibacterial agents which has an extensive resistant strains of micro-organisms is also found to be a good substance for hand washing. Hand sanitizers are effectively been used for handwashing as indicated by CDC (2010) that, hand sanitizers containing a minimum 60-95% alcohol are efficient germ killers, alcohol rub sanitizers kill multi resistant bacteria, some viruses and fungus on hands.

WHO (2010) reported that, ash or mud are widely been used by many people most especially in low income communities who cannot afford soap used ash or soil instead, ash or soil may be more effective than water alone and may be less effective than soap. One concern is that if the soil or ash is contaminated with micro- organisms it may increase the spread of disease rather than decrease it. Like soap ash is also a disinfectant agent (alkaline) as such WHO recommended ash when soap is not available. At this point Larson (1987) postulated that, Hand hygiene may be ineffective if an inadequate amount of product is used. He assessed the effect of two quantities of four different handwashing products on reduction of in log CFU from the hands and found that 3ml of antimicrobial soap had significantly greater reduction in log CFU than 1ml. Many diseases and conditions are spread by not washing hands with soap and clean, running water. If clean, running water is not accessible, as is common in many parts of the world, use soap and available water. If soap and water are unavailable, use an alcohol-based

hand sanitizer that contains at least 60% alcohol to clean hands. Liquid soap is good for home and day to day care, regardless of if you are using it at home or work, liquid soap is considered a good choice for a normal handwash (though you must make sure the type you use in the hospital has been approved for hospital use).

Hattula and Stevens (2007) shows that, washing hands with soap and water for 15 seconds (about the time it takes to sing one chorus of "Happy Birthday to You") reduces bacterial counts by about 90%. But even people who are conscientious about washing their hands often make the mistake of not drying them properly. Wet hands are more likely to spread germs than dry ones. Today, almost half of the hand soaps on the market have an antibacterial additive. The big question has been whether use of antibacterial soaps will worsen the problem of antibiotic resistance. Even if antibiotic resistance weren't an issue, results from studies suggest that antibacterial soaps available to consumers don't add much to hand hygiene. The findings are a useful reminder that antibacterial soaps aren't the all-purpose germ fighters that many people think they are.

The technique and duration of handwashing is important to ensure the removal of micro-organism. For instance, Noskin (1995) studied the removal of micro-organisms by handwashing with water alone or with two different soap preparation (regular soap and antibacterial soap), they determined that a five second wash with water alone had no effect on contamination and that a five second wash with either soap fail to remove the micro-organism completely from the fingernails. They reported that a thirty second hand wash with either soap preparation was necessary to completely remove bacteria from hands. There are so many techniques of handwashing. For instance, WHO (2009) shows that, one hand should be rinse with warm water, keeping hands below wrist and forearms to prevent contaminated water from moving from the

hands to the wrist and arms. Five millimeter of liquid soap is pour to completely cover the hands and the wet soapy hands together outside the running water for at least 20 seconds. The most commonly missed areas are the thumb, the wrist, the areas between the fingers and under finger nails, therefore one should rinse thoroughly from the wrist to the finger nails to ensure that any micro-organism fall off the skin rather than fall onto skin. Then a paper towel is use to turn off the water and the hands are then dry up with a clean towel.

Canada (2012) outline the effective handwashing technique as follows: long sleeve should be rolled up and wrist watch pushed up; running water of a comfortable temperature should be used to wet hands; enough soap should be used to leather all surfaces of the hands, including fingers, finger tips, between fingers, palms, back of hands and thumbs, base of thumb, and if a ring is worn, on and under the ring; the palm and back of each hand should be rubbed vigorously , interlocking and interfacing fingers to ensure finger and thumbs are rubbed to remove visible soil and/or organic material (this task should take 15-30 seconds); hands should be rinsed thoroughly in a downward position under running water; hands should be dried thoroughly by patting with a single use towel , electric hand driers should not be used in clinical areas; manual faucets should be turned off with paper towels, ensuring that hands are not re-contaminated in the process; skin products should be applied regularly to maintain healthy skin; the complete handwashing procedure (going to sink, wetting hands, applying soap, lathering, rinsing and drying) should take 40-80 seconds.

Balafama et al. (2011) who conducted research on handwashing practice among health care workers in teaching hospital reported that, the components of handwashing technique included ; use of soapy water in a basin, use of cold running water, use of warm running water and rubbing soap on wet hands for about 20 seconds before rinsing. They further indicate that the

most practice handwashing technique is use of soapy water in the basin (55.8%) followed by washing front and back of hands including under the nails (41.0%) and use of cold running water (36.4%). Simmons and Bryant (2014) cited a technique of handwashing by starting with wetting hands with water followed by applying enough soap to cover all hand surfaces , then rub hands palm to palm: right palm over left dorsum with interlaced fingers and vice versa; palm to palm with fingers interlaced; back of fingers to opposing palms with fingers interlocked, then rotationally rub off left thumb clasped in right palm and vice versa; rotationally rub backwards and forwards with clasp fingers of right hand in left palm and vice versa; rinse hands with water; dry hands thoroughly with a single use towel. Removing all dirt and contaminants from the skin is extremely important. Hands and other soiled parts of the body should be cleaned at least at the end of each work period, prior to breaks, or when visiting the toilet.

Patients admitted to hospitals are at risk of acquiring nosocomial infections. Many peer-reviewed studies show that handwashing (HW) significantly reduces hospital infections and mortality. An observational study of HCW to measure the effect education alone and education plus performance feedback in 3 hospitals for adherence to a HW protocol by Victor, Rita, Sandra, Claudia and Pablo (2003) revealed that, the baseline rate of Handwashing protocol before contact with patients was 17%. With higher level education, HW before contact with the patients increased to 44%. Using education and performance feedback HW further increased to 58%. In the private hospitals where administrative support for the HW program was significantly greater, HW compliance was significantly higher. Therefore HW policies and education of HCW significantly improved HCW adherence to the HW protocol.

Developing a good handwashing technique is imperative to ensure hands are thoroughly clean. Particular attention should be paid to the backs of the hands and fingertips as these are

frequently missed. It is usual to wet hands before dispensing a dose of soap into a cupped hand; however for heavily soiled hands it is advisable to apply the appropriate specialist hand cleanser directly to the skin before wetting (Werner, 2007). He stressed that; skin should always be properly dried to avoid risk of chapping particularly during cold weather. Clean towels should be available at all times – dirty towels mean exposing the skin to more dirt and the risk of infection. Ideally, 'single issue' disposable towels should be used, as the use of 'communal' towels can lead to pathogens transmission. In 17 observational studies conducted by Karaaslan (2014) reported that, the duration of hand cleansing episodes by HCWs ranged on average between as little as 6.6 seconds and 30 seconds, in addition to washing their hands for very short time periods, HCWs often failed to cover all surfaces of their hands and fingers. In summary, the frequency of hand hygiene opportunities per hour of care may be very high, and despite the hand hygiene compliance rate, the applied technique failed by Laboratory staff.

2.3 Health Care Providers

WHO (2006) define Health care providers as "those who promote and preserve health as well as those who diagnose and treat diseases. Also included is health management and support workers, those who help to make the health system function but who do not provide health services directly. Human resources are the heartbeat of health service delivery.

Health care providers include physicians, dentists, pharmacists, physician assistants, nurses (including advanced practice registered nurses), surgeons, surgeon's assistant, surgical technologist, midwives (obstetrics), dietitians, psychologists, clinical officers, social workers, paramedics, medical laboratory scientists, radiographers and a wide variety of other human resources trained to provide some type of health care service. They often work in hospitals, health care centres, and other service delivery points, but also in academic training, research, and

administration. Some provide care and treatment services for patients in private homes. Many countries have a large number of community health workers who work outside of formal health care institutions. Managers of health care services, health information technicians, and other assistive personnel and support workers are also considered a vital part of health care workers (WHO, 2006).

Gupta (2011) reported that, “Health professionals” are highly skilled workers, in professions that usually require extensive knowledge including university-level study leading to the award of a first degree or higher qualification. This category includes physicians, physician assistants, dentists, midwives, registered nurses, pharmacists, physiotherapists, optometrists, and others. Allied health professionals, also referred to as "health associate professionals" in the support implementation of health care, treatment and referral plans usually established by medical, nursing, and other health professionals, and usually require formal qualifications to practice their profession. In addition**, unlicensed assistive personnel** assist with providing health care services as permitted. Ottawa (2012) asserted that, Health providers are professionals primarily concerned with diagnosing and treating health problems in humans and animals and providing related services such as pharmacy, nutrition, speech therapy, physiotherapy and occupational therapy.

According to WHO (2010) health care practitioners are commonly grouped into a number of professions: Medical (including generalist practitioners and specialists); Nursing (including various professional title Midwifery, Dentistry, Other Health Professions, including occupational therapy, pharmacy, physical therapy, Para medicine, respiratory therapy, radiographer and many others health specialists. Within each field of expertise, health providers are often classified according to skill level and skill specialization. Rockers (2011) also pointed that, another way

to categorize health care providers is according to the sub-field in which they practice, such as mental health care, pregnancy and childbirth care, surgical care, rehabilitation care, or public health.A public health practitioner focuses on improving health among individuals, families and communities through the prevention and treatment of diseases and injuries, surveillance of cases, and promotion of healthy behaviors. This category includes community and preventive medicine specialists, public health nurses, clinical nurse specialists, dietitians, environmental health officers, paramedics, epidemiologists, health inspectors, and others.

Similarly Gupta (2011) indicated that, in many societies, practitioners of traditional medicine or alternative medicine are important primary health care providers, either as integrated within or remaining outside of the formal health care system. These include practitioners in acupuncture, herbalist, homeopathy, naturopathy, Siddha medicine, traditional Chinese medicine, traditional Korean medicine, etc. He further pointed that geriatric care practitioner is health care provider who plans and coordinates the care of the elderly and/or disabled to promote their health, improve their quality of life, and maintain their independence for as long as possible. They include geriatricians, adult-gerontology nurse practitioners, clinical nurse specialists, geriatric clinical pharmacists, geriatric nurses, geriatric care managers, geriatric aides, and others who focus on the health and psychological care needs of older adults. The World Health Organization estimates a shortage of almost 4.3 million doctors, midwives, nurses, and support workers worldwide to meet target coverage levels of essential primary health care interventions. The shortage is reported most severe in 57 of the poorest countries, especially in sub-Saharan Africa (WHO, 2006).

Gupta (2011) further stated that, healthcare assistants are important health care providers who work in hospital or community settings, such as surgeries, under the guidance of a qualified

healthcare professional. The role can be varied depending upon the healthcare setting. Most commonly, health care assistants work alongside nurses and are sometimes known as nursing auxiliaries or auxiliary nurses, they also work alongside qualified midwives in maternity services. The types of duties include washing and dressing, serving patients meals and assisting with feeding when necessary, helping people to mobilize, toileting, bed making, generally assisting with patients' overall comfort, monitoring patients' conditions by taking temperatures, pulse, respirations and weight. Nursing health care assistants usually work a 37.5 hour week on a shift or rotation system, typically including nights and weekends. Part-time and flexible working is often available. Allied health professions, Clinical support workers (sometimes known as therapy assistants or therapy helpers) work alongside allied health professionals such as: physiotherapists, radiographers etc. their duties will depend on the form of therapy but are likely to include: preparing patients for their therapy setting up equipment to use in the session/treatment assisting the therapist in the treatment itself and contributing to record keeping.

Nigeria has one of the largest stocks of human resources for health in Africa comparable only to Egypt and South Africa. There are about 39,210 doctors and 124,629 nurses registered in the country, which translates into about 30 doctors and 100 nurses per 100,000 populations. This compares to a Sub-Sahara African average of 15 doctors and 72 nurses per 100,000 populations, they include health workers in both the private and public health sectors, and, very likely, health professionals who are not practicing in the country or may not be practicing health care at all. Health service provision in Nigeria includes a wide range of providers in both the public and private sectors, such as public facilities managed by federal, state, and local governments, private for-profit providers, NGOs, community-based and faith-based organizations, and traditional care givers (WHO, 2006).

National Human Resources for Health Strategic Plan (2007) reported that, Nigeria is a federation with three tiers of government - federal, state, and local, and responsibility for health service provision in the public sector is based on these three tiers. The levels of care in the public sector are:

Primary**:** Facilities at this level form the entry point of the community into the health care system. They include health centers and clinics, dispensaries, and health posts, providing general preventive, curative, promotive, and pre-referral care to the population as the entry point of the health care system. Primary facilities are typically staffed by nurses, community health workers, community health extension workers (CHEWs), junior CHEWs, and environmental health officers. LGAs are mandated by the constitution to finance and manage primary health care. The national health policy regards primary health care as the framework to achieve improved health for the population. The national health policy document requires that a comprehensive health care system delivered through the primary health centers should include maternal and child health care, including family planning services (National Human Resources for Health Strategic Plan, 2007).

Secondary**:** These facilities including general hospitals and they provide general medical and laboratory services, as well as specialized health services, such as surgery, pediatrics, obstetrics and gynecology to patients referred from the primary health care level. Medical officers, nurses, midwives, laboratory and pharmacy specialists, and community health officers typically staff general hospitals. Primary and secondary level of care is also provided by the largely unregulated private health sector.

Tertiary: Tertiary level facilities form the highest level of health care in the country and include specialist and teaching hospitals and federal medical centers (FMCs)**.** They treat patients referred from the primary and secondary level and have special expertise and full-fledged technological capacity that enable them to serve as resource centers for knowledge generation and diffusion. Each state has at least one tertiary facility (NHRHSP, 2007).

The health provision in Kano State is strictly based on the Nigerian National Health Policy, put in place since 1986, which is based on the concept and practice of Intrgrated Health Care System. According to the National Health Policy, the State Government is responsible for secondary health facilities, while the LGAs are responsible for primary health care facilities. The two are linked through the 2-way referral system. Health services in the State are more concentrated in the urban areas as opposed to the rural areas where most of the health problems exist. Eighty nine percent (89%) of all doctors and 73% of nurses in the employment of State Government are located in the metropolis (Kano State Hospitals Management Board, 2015).

2.4 Empirical Studies on Handwashing Practices among Health Care Providers

Health care providers are expected to adopt and sustain any practice that will promote health and prevent diseases. According to Al-Busaidi (2013), since nurses are present 24 hours a day, 7 days a week in the health care settings, it is essential to comply with hand hygiene policy and maintain patient safety. Cambell (2010) pointed that, Nurses are professionally and ethically accountable for their action, the MNC code of conduct and standard requires nurses and midwives to a high standard of practice and care at all times, yet despite the momentum of hand hygiene, some nurses are still presenting with low compliance because they perceive it as not their problem, that it is something to do with infection control staff and they have to deal with it.

Collins & Hampton (2005) and Nazarko (2009) claim that, physicians generally have excellent hand hygiene skills compared to nurses. Okanu, Onyenoro and Okegbu (2011) report that, majority of medical officers, nurses and resident doctors knew the importance of handwashing in the prevention of hospital acquired infection. More than 50% had good knowledge of hand hygiene. About 54% of them always wash their hand between direct contact with a patient and after an invasive procedure. 92% of them wash their hands when visibly soiled and 57% after removing gloves.

Similarly research on practice of handwashing for the prevention of nosocomial infection among nurses in general hospital Ikot Ekpene, Akwa Ibom State, Nigeria conducted by Idang, Mfon, Faith, and Margaret (2014) revealed that, majority of health workers had good knowledge of handwashing and few doesn't have the knowledge, but despite the good knowledge possessed by the health workers some always wash their hands, some do so occasionally and others never wash their hands at all, factors such as inadequate knowledge of handwashing techniques, long nails, wearing of rings and water related problems affect the practice of handwashing.

Nazarko (2009) indicates that, nurses often fail to practice hand hygiene because they are busy and they feel hand hygiene takes up precious time. In addition, nurses often perceive that gloves can be used as an alternative to handwashing. They usually tend to remove the gloves without washing their hands or use the same gloves to deliver intended care to multiple patients. Even when they remove their gloves, only 20% of nurses wash their hands. Canham (2011) and Campf and Loffler (2010) claimed that, nurses avoid handwashing because they are frightened that skin problems such as dermatitis could develop.

WHO stressed those 5 stages of hand washing should be adhered to by health care workers. These stages are referred to my five moment of hand hygiene thus: before touching a

patient; before clean/aseptic procedures; after body fluid exposure; after touching a patient and after touching patient surroundings. Collins and Hampton (2005) shows that, hand hygiene should be considered before invasive procedures, after contaminated devices or materials, and with high risk, infectious patients. Hand hygiene should be advocated before beginning the work and after visiting the rest room (Campf & Loffler, 2010). However, Canham (2011) argues that, hygiene requirements depend on the type of procedure, the degree of contamination and the persistence of antimicrobial action on the skin. Even when nurses spend a longer time on hand hygiene, their technique is often poor compared to other health care workers in terms of leaving large areas unwashed effectively, i.e. wrists, thumbs, nail beds and between fingers.

Similarly, Balafama et- al. (2011) reported that, 76.7% health workers never wash their hands while 9.3% always wash their hands before interacting with patients; 69.7% never wash their hands while 13.6% always wash their hands before performing simple procedures; but after interacting with patients, 51.2% always wash their hands while 24.8% sometimes wash their hands, also during daily activities workers progressively accumulate micro-organisms on their hands from direct patient contact with environmental surfaces and devices, these organisms are easily removed by handwashing with soap and failure to wash hands could pre-dispose health workers to diseases cause by these organisms. This shows that health workers wash their hands more often after interacting with patients than before. An imported finding by this work is that there is low hand washing rate following the day's work.

Karabay, Sencan , Alpeterker and Oksuz (2005) noted that, hand washing practices is seen more in junior nurses and newly recruited staff, and Akyol (2007) claims that, hand hygiene compliance is higher among nurses compared to physicians and other health care workers. Ott and French (2009) opined that, the attitudes and behavior towards hand hygiene is complex

issue, involving the perception of its effectiveness, staff's values and beliefs and existing barriers. In order to achieve high compliance rates with hand hygiene, Cambell (2010) suggests that, the defaulters should be discipline as though they have violated hospital policy, starting with personnel counseling to verbal warning and eventually to a written placed in their file. Hand hygiene is shared responsibility between hospital administration, key leaders and other stakeholders. Collins and Hampton (2005) report that, on average, patient involvement actually increases hand washing practices by 50% if, for example, a simple question is asked of the health care provider such as: did you wash your hands?'.

Duncan and Dealey (2007) observed that, majority of patient feel confident to ask health care workers to wash their hands. However, some feels that asking HCWs to wash their hands before health care delivery is a betrayal of trust, and some of them feel that they might be labeled as trouble maker and so prefer not to ask. According to Penzias (2010), the patient usually feels reassured if he/she observes HCW practice proper hand hygiene in the hospital environment.

Abdul-Aziz and Bakr (2009) observed hand washing practice among health care workers in various departments in Ain Shams University Hospital in Cairo. They revealed that the most practiced type of handwashing among HCW was the routine hand washing 64.2% and the least was the antiseptic hand wash 3.9%. The prevalence of handwashing was higher after doing the difference procedures or interventions than before doing them, yet handwashing was done in a more appropriate way before doing the different interventions except for the non-invasive procedures where it is nearly similar before and after. They further show that the most common form of inappropriate handwashing was in the improper drying and having short contact time. But nurses believed that administrative orders and continuous observation can improve handwashing practices. Furthermore, Mahmud, Muhammad and Iyad (2011) found that,

handwashing technique is poor among health care professionals because they fail to wash their hands as thorough or as frequently as they should do, They further showed that gender, level of education and marital status had no influence on professionals' handwashing compliance, age and their years of experience are positively correlated with self-reported handwashing.

In addition, Abdul'aziz and Bakr (2009) show that, most nosocomial infections are thought to be transmitted by the hands of health care workers, they also pointed that handwashing among health care workers plays a central role in preventing the transmission of infectious agents. But despite requirements by the CDC to implement handwashing guidelines in the hospitals, practice among health care workers remains low. The study indicated that the reasons for low compliance to handwashing are attributed to such factors as: lack of awareness and knowledge among health care workers as regard the importance, techniques, methods and quality of hand hygiene. Also human factors that lead to low compliance to handwashing are busyness, forgetfulness, low staff to patient ratio and attitudes among staff toward bio-safety.

Similarly, Boyce and Ptitter (2002) cited that, handwashing is considered to be the most important recommended practice to combat hospital associated infections. It is now recognized as the do it yourself that all health care professional are encourage to perform due to its ability to interrupt the transmission of infectious disease pathogens. However, compliance rate with handwashing practice remains low. They also pointed that handwashing is the most important approach in preventing hospital associated infections but compliance rate is very low among health care providers. The reasons behind these low rates include: lack of practicing handwashing as a behavioral pattern by health care professionals; decreased interest in their practical applications with increased educational status; heavy workload; lack of sufficient sinks

for hand washing in clinical areas and lack of knowledge of health care providers regarding handwashing.

2.5 Benefits of Handwashing

The purpose of handwashing is to remove dirt, contaminants and microorganisms that can cause harm or transmit diseases. Handwashing practices by health care workers significantly reduced the risk of nosocomial infections. The efficacy of hand disinfection in reducing hospital acquired infections was initially recognized by Semmelweiss in 1847 and reaffirm by Larson (Pittet and Boyce, 2001). Martimar (1962) reported that, handwashing with soap and water(antiseptic agent) between patients contacts reduces transmission of micro-organisms, in the same vein, he shows that, infant cared for by nurses who did not wash their hands after handling an index infants colonized with s. aureus acquired the micro-organisms significantly more often and more rapidly, than did infants cared for by nurses who wash their hands between infants contacts.

Several observational studies have demonstrated a reduction in HAI rates, for instance, Lam (2014), reported that improved handwashing was found more prominent among medical staff in which HAI rate decreased from 17.29% per 100 patients admission to 9.1%, also there was reduction in bloodstream infection, and ventilator associated pneumonia. Zerr (2005), ascertained that regular handwashing decrease rate of Rota virus from 5.9 episodes per 1000 discharged patients in 2001 to 2.2 episodes in 2004. Handwashing have signicant impact in other settings other than hospitals. Freeman (2014) stated that, handwashing with soap reduces the risk of diarrhea by 40%. He further opined that, regular handwashing the children's episode of diarrhea, acute respiratory infections, eye infections helminth infections and school absenteeism.

Stressing further, he shows that good handwashing interventions in schools reduces school absenteeism and episode of diarrhea in pre-school age siblings.

2.6 Problems of Handwashing

Many problems were recognized to affect handwashing practices, they could be organizational or individual as such both organizations and HCWs have a responsibility to address these problems. According to Pittet (2008), some of the problems affecting handwashing practices include lack of support for handwashing programmes (lack of organizational priority, lack of active participation at organizational level and/or lack of role model) and lack of infrastructure to support hand hygiene for instance, ABHR not organizational preferred method of hand hygiene, insufficient number of handwashing sinks or inconvenient access, insufficient handwashing products and lack of time to wash hand due to overcrowding or workload. He further opined that health care workers have reported barriers to their ability to handwashing, examples include lack of time, inaccessibility to designated handwashing sinks, inadequate supplies for handwashing (such as ABHR, hand towels, soap), handwashing products not accepted by users and concern over the deleterious effects of frequent handwashing or use of particular product. Other problems of hand washing were attributed to natural factors such as finger nails, disease on the hand.

For example, McNeil and Foster (2001) reported that, sublungual areas (beneath the finger nails) of the hand harbor high concentration of micro-organisms, substantial number of these pathogens remains even after careful handwashing. They also ascertained that longer finger nails (weather artificial or natural) harbor more microbes or viruses than short nails. Effective handwashing may be prevented by the presence of bracelet and wristwatches. Skin underneath

rings has been reported to be more heavily colonized than comparable areas of skin on fingers without rings (352).

Abdul'aziz and Bakr (2009) indicated that, the reasons for low compliance to handwashing are attributed to such factors as: lack of awareness and knowledge among health care workers as regard the importance, techniques, methods and quality of hand hygiene. Also human factors that lead to low compliance to handwashing are busyness, forgetfulness, low staff to patient ratio and attitudes among staff toward bio-safety. Similarly, Boyce and Ptitter (2002) cited that, handwashing is considered to be the most important recommended practice to combat hospital associated infections, problems leading to low compliance rates include: lack of practicing handwashing as a behavioral pattern by health care professionals; decreased interest in their practical applications with increased educational status; heavy workload; lack of sufficient sinks for hand washing in clinical areas and lack of knowledge of health care providers regarding handwashing.

2.7 Summary

Handwashing entails removal of soil and transient micro-organisms from the hand using soap and water. It also includes removing or killing residents and transient micro-organisms on the hand using an antiseptic agent by either rubbing hands with alcohol or with an antiseptic soap. Medical handwashing pertains to the hygiene practice related to the administration of medicine and medical care that prevents or minimizes disease and the spread of diseases. The main purpose of handwashing is to cleanse the hand, remove pathogens and chemicals which can cause personal harm or disease; this is especially for persons who work in the medical field or handle food, but it is also an important practice for the general public. In health care settings, five moments that called for hand hygiene include the moment before touching a patient, before

performing aseptic and cleaning procedures, after being at risk of exposure to body fluids, after touching a patient and after touching patients' surroundings.

Many substances were found to be used for handwashing. For instance, removal of micro-organisms from skin is enhanced by the addition of soap or detergent to water. Developing a good handwashing technique is imperative to ensure hands are thoroughly clean. Particular attention should be paid to the backs of the hands and fingertips as these are frequently missed. Health care providers include physicians, psychologists, clinical officers, social workers, paramedics, medical laboratory scientists, radiographers and a wide variety of other human resources trained to provide some type of health care service. They often work in hospitals, health care centers, and other service delivery points, but also in academic training, research, and administration. They are commonly grouped into a number of professions: including Medical, Nursing and Other Health Professions. Health service provision in Nigeria includes a wide range of providers in both the public and private sectors, such as public facilities managed by federal, state, and local governments, private for-profit providers, NGOs, community-based and faith-based organizations, and traditional care givers. However, Nigeria is a federation with three tiers of government - federal, state, and local – and responsibility for health service provision in the public sector is based on these three tiers. Primary facilities are typically staffed by nurses, community health workers, community health extension workers (CHEWs), junior CHEWs, and Environmental Health Officers (EHOs). Health care providers are expected to adopt and sustain any practice that will promote health and prevent diseases. Majority of health workers always wash their hands, some do so occasionally and others never wash their hands at all. Factors such as inadequate knowledge of handwashing techniques, long nails, wearing of rings and water related problems affect the practice of hand washing.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This study investigated Influence of Socio-demographic Variables on Handwashing Practices among Healthcare Providers in Kano metropolis, Kano state. This chapter discussed research design, population of the study, sample and sampling technique, data collection instrument, validation of the instrument, reliability of the instrument, data collection procedure and data analysis.

3.1 Research Design

The design used for this study was descriptive survey. Sunusi (2008) stated that, descriptive survey design is a kind of research design which a person is able to find the feeling of others about something. Stressing further, he mentioned that descriptive design is a systematic description of event in a very factual and accurate manner. Therefore descriptive survey was found to be suitable for this study on Influence of Socio-demographic Variables on Handwashing Practices among Healthcare providers in the study area.

3.2 Population of the Study

The population of the study comprised all Physicians, Nurses and laboratory Sicentists/Technicians working in metropolitan hospitals owned by Kano State Government with a population of 1,683 (Kano State Hospitals Management Board, 2015).

Table 3.1 Distribution of Population based on the Hospital

S/N	SELECTED HOSPITALS	POPULAION DISTRIBUTION			
		PHYSICIAN	**NURSES**	**LAB. SCI./TEC**	**TOTAL**
1	Murtala Muhammad Specialist Hospital	238	441	51	730
2	Sheikh Muhammad Jidda General Hospital	09	68	19	96
3	Infectious Disease Hospital (IDH)	12	36	18	66
4	Hasiya Bayero Paediatric Hospital	11	62	09	82
5	Sir Muhammad Sunusi Hospital	19	66	20	105
6	Waziri Shehu Gidado Hospital	09	64	17	90
7	Muhammad Abdullahi Wase Hospital	67	144	30	241
8	Dental Hospital	15	-	07	22
9	Mariya Sunusi Hospital	05	28	06	39
10	Nuhu Bamalli Hospital	07	41	08	56
11	Sabo Bakinzuwo maternity hospital	07	28	15	50
12	Psychiatric Hospital Dawanau	06	17	09	32
13	Abubakar Imam Urology	21	41	12	74
	Total	**426**	**1036**	**221**	**1683**

Source: Kano state Hospitals Management Board (2015).

3.3 Sample and Sampling Technique

The sample size of this study was three hundred and thirteen (313) participants out of a total population of one thousand three hundred and eighty three (1,683). Krejcie and Morgan (1970) suggested that, for a population of 1700, 313 will be sufficient to be used as sample. The researcher used multi stage sampling procedure to select the sample of the study. The stages used were as follows:

Stage 1: Hospitals were selected through random sampling technique. The researcher used pieces of paper to write the names of the hospitals, a student was assigned to pick one paper thrice and those hospitals whose names appeared on the picked paper were the sampled hospitals.

Stage 2: For the selection of professionals, the researcher used stratified sampling technique whereby Physicians, Nurses and Medical laboratory Scientists/Technicians were selected and stratified into three stratum.

Stage 3: For the selection of sample size, proportionate sampling technique of equal allocation (35%) in each stratum was employed as suggested by Singha (1996) who stated that, this technique can be used when the population is composed of several groups that are vastly different in number in which the number of participants from each sub-group is determined by their number relative to the entire population. Therefore, the participants selected as sample were distributed according to the total population of the selected health care providers in the selected hospitals.

Stage 4: Random sampling technique was also used to select three hundred and thirteen (313) health care providers with the help of research assistants.

Table 3.2 Distribution of Population of the selected Hospital for the study and their sample

S/N	SELECTED HOSPITALS	PHYSICIAN (35%)		NURSES (35%)		L. SCI/TECH (35%)		TOTAL
		Pop	Sample	Pop	Sample	Pop	Sample	
1	MURTALA MUHAMMAD SPECIALIST HOSPITAL (MMSH)	238	(83)	441	(154)	51	(18)	730(256)
2	SHEIKH MUHAMMAD JIDDA GENERAL HOSPITAL (SMJGH)	09	(03)	68	(24)	19	(07)	96(34)
3	INFECTIOUS DISEASE HOSPITAL (IDH)	12	(05)	36	(13)	18	(06)	66(23)
	TOTAL	**259**	**(91)**	**545**	**(191)**	**88**	**(31)**	**892(313)**

KEY:

Pop = population

3.4 Data Collection Instrument

The instrument for data collection was researcher's developed questionnaire titled Handwashing Practices among Health Care Providers in kano metropolis, Kano state (HWPHCP). The questionnaire consists of three sections A, B and C. Section A consists of socio-demographic characteristics of the respondents, section B was on moments of handwashing practices and section C was on technique of handwashing practices. Each section has 6 items and the scoring mode was on a five point likert scale thus; Always (A) 5 points, Often (O) 4 points, Sometimes (S) 3 points, Seldom (SL) 2 points and Never (N) 1 point. Scoring 24-30 points is considered always practicing while scoring less than 24 points is considered never practice. The highest and lowest point respondents can score in a section is 30 and 5 respectively.

3.5 Validation of the Instrument

The questionnaire was subjected to vetting by five experts in Health Education in the Physical and Health Education (PHE) Department, Bayero University, Kano (BUK) for face and content validity. Their observations, corrections, comments and suggestions were incorporated into the final draft of the questionnaire. The supervisor gave the final approval for the administration of the questionnaire.

3.6 Reliability of the Instrument

To ascertain the reliability of the instrument, a pilot study using 20 respondents from Wudil General Hospital, Kano State Nigeria was done. The reliability of the instrument was assessed using test re-test method and the result was analyzed using Pearson Product Moment Correlation Coeffcient (PPMCC). A reliability of 0.80 was obtained.

3.7 Data Collection Procedure

The researcher obtained an introductory letter from the Head of Department, Physical and Health Education (PHE), Bayero University Kano and was taken to Executive secretary of Hospitals Management Board (HMB), Kano State. The letter was approved and copies were sent to Chief Medical Directors of Murtala Muhammad Specialist Hospital, Infectious Diseases Hospital and Sheikh Muhammad Jiddah General Hospital Kano, to seek for their permission to administer the questionnaire. Informed consent form was attached to the questionnaire which the respondents signed before filling the questionnaire. Three hundred and thirteen (313) questionnaires were administered by the researcher and three (3) research assistants (1 hospital secretary from each hospital). The distribution and collection of the questionnaires was done within six (6) weeks.

3.8 Data Analysis

Descriptive statistics of simple frequency count and percentage were used to organize and describe the socio-demographic information of the respondents. Data on the major hypotheses were analyzed using Chi-square and ANOVA was used to analyze the sub- hypotheses at 0.05 level of significance.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This study investigated handwashing practices among health care providers in Kano metropolis, Kano state. Three hundred and thirteen (313) questionnaires were distributed out of which two hundred and fifty (250) were duly completed, returned and used for data analysis. Sixty three questionnaires (63) were not retrieved because some health care providers did not submit the questionnaires given to them due to warning strike embarked by Nigerian Medical Associaton (NMA) and Joint Health Sector Union (JOHESU) during data collection.

4.1 Results. For the purpose of presenting the findings of this study, all data collected were tabulated and presented as follows:

Table 4.1: Demographic Information of the Respondents

Variables	Frequency	Percentage (%)
Profession		
Physician	59	23.6
Nurses	134	53.6
Lab. Scientist/technician	57	22.8
Total	**250**	**100**
Educational level		
Diploma	147	58.8
Degree	78	31.2
Post graduate	25	10.0
Total	**250**	**100**
Years of working experience		
1-5 years	97	38.8
6-10 years	43	17.2
11 years and above	110	44.0
Total	**250**	**100**

Table 4.1 above shows that a total response from 250 participants was analyzed which represent 100 %. The table indicates that 59 (23.6%) of the participants were physicians and 134 (53.6%) of the participants were nurses while 57 (22.80%) of the participants were medical laboratory scientists/ technicians. This means majority of the participants were nurses. On the educational level of the participants, the table shows that, 147 (58.8) of the participants possessed diploma and 78 (31.2 %) of the participants have degree while 25 (10.0%) of the participants have postgraduate certificates. This means majority of the participants were diploma holders. Regarding the years of working experience, the table points that, 97 (38.8%) of the participants have being working for 1-5 years and 43 (17.2%) of the participants have being serving for 6-10 years while 110 (44.0%) of the participants have being working for 11 years and above. This ascertained that, majority of the respondents have being working for 11 years and above.

Hypothesis testing:

Major hypothesis 1: Health care providers in Kano metropolis do not significantly practice hand washing at the appropriate moments

Table 4.2: χ^2summary of health care providers on moments of handwashing practice

Variables	Always	Never	Total	χ^2 Value	df	P-Value
FO	232	18	250	183.184	1	.001
FE	125	125				

χ^2value =183.184 at df 1, ($p<0.05$) Tab=3.841

Table 4.2 shows that 232 (92.8%) of the participants always practice hand washing at the right moments and 18 (7.2%) of the participants never practice handwashing at the right moments. The statistical analysis indicated chi-square (χ^2) value of 183.184 at df 1, ($p<0.05$).

This means the null hypothesis is rejected on the account that health care providers always practice handwashing at the appropriate moments.

Major Hypothesis 2: Health care providers in Kano metropolis, Kano state do not significantly practice appropriate technique during handwashing.

Table 4.3: χ^2summary of health care providers on technique of handwashing practice

Variables	Always	Never	Total	χ^2 Value	df	P-Value
FO	212	38	250	121.104	1	.001
FE	125	125				

χ^2value =121.104 at df 1, ($p < 0.05$). Tab=3.841

Table 4.3 shows that 212 (84.8%) of the participants always practice appropriate technique during handwashing and 38 (15.2%) of the participants never practice appropriate technique during handwashing. The statistical analysis indicated chi-square (χ^2) value of 121.104 at df 1, ($p < 0.05$). This means the null hypothesis is rejected on the account that health care providers always practice appropriate technique during handwashing.

Sub- Hypothesis 1 There is no significant difference in the moment of handwashing practices by health care providers in Kano metropolis based on their profession.

Table 4.4: One way ANOVA summary on the difference in the moment of handwashing practice by health care providers in Kano metropolis, based on their profession

Sum of Squares	df	Mean Square	F	Prob.	
Between groups	.84	2	0.42	.627	.535
Within groups	16.620	247	.067		
Total	16.704	249			

F (2,247) = .627, P > 0.05.

A one way ANOVA was carried out to examine the difference in the moment of handwashing practice by health care providers in Kano metropolis based on their profession, the

result shows that there was no significance difference F(2,247) = 0.627, P > 0.05, therefore the null hypothesis was accepted on the account that no significance difference exists.

Sub- Hypothesis 2: There is no significant difference in the moment of handwashing practices by health care providers in Kano metropolis based on their educational level

Table 4.5: One way ANOVA summary on the difference in the moment of handwashing practice by health care providers in Kano metropolis based on their educational level.

Sum of Squares	**df**	**Mean Square**	**F**	**Prob**.
Between groups	51.853	2	25.926	1.373	.255
Within groups	4664.023	247	18.883		
Total	4715.876	249			

F (2,247) = 1.373, P > 0.05.

A one way ANOVA was carried out to examine the difference in the moment of handwashing practice by health care providers in Kano metropolis based on their educational level, the result shows that there was no significance difference F(2,247) = 1.373, P > 0.05, therefore the null hypothesis was accepted on the account that no significance difference exists.

Sub- Hypothesis 3: There is no significant difference in the moment of handwashing practices by health care providers in Kano metropolis based on their years of working experience.

Table 4.6: One way ANOVA summary on the difference in the moment of handwashing practice by health care providers in Kano metropolis based on their years of working experience

Sum of Squares	**DF**	**Mean Square**	**F**	**Prob.**
Between groups	113.473	2	56.737	3.045	.049
Within groups	4602.403	247	18.633		
Total	4715.876	249			

F (2,247) = 3.045, P < 0.05.

A one way ANOVA was carried out to examine the difference in the moment of handwashing practice by health care providers in Kano metropolis, Kano state based on their years of working experience, the result shows that there was significance difference F (2,247) = 3.045, P < 0.05, therefore the null hypothesis was rejected on the account that significance difference exists. Post-hoc analysis was conducted to determine where the difference lies.

Table 4.7 summary of Scheffe post-hoc analysis on the moment of handwashing practice by health care providers in Kano metropolis based on their years of working experience

Dependent variable	(i) working experience	(j) working experience	sig.	95% lower boundry
Moment of handwashing	1-5 years	6-10 years	.403	-3.0161
		11 and above years	.050	-2.944
	11 and above years	1-5 years	.050	-0.167
		6-10 years	.878	-1.5165

The post-hoc analysis using scheffe indicated that there is significance difference in the moment of handwashing practice by health care providers based on their years of working experience. As shown in the analysis, handwashing practices at the appropriate moment of health care providers within the range of 11 and above years of working experience differs from their counterpart who are within the range of 1-5 years. This means that years of working experience influenced handwashing practice by health care providers in Kano metropolis.

Sub- Hypothesis 4: There is no significant difference in the technique of handwashing practices by health care providers in Kano metropolis based on their profession

Table 4.8: One way ANOVA summary on the difference in the technique of handwashing practice by health care providers in Kano metropolis based on their profession

	Sum of Squares	df	Mean Square	F	Prob.
Between groups	82.657	2	41.328	1.714	.182
Within groups	5956.499	247	24.115		
Total	6039.156	249			

F (2,247) = 1.714, P > 0.05.

A one way ANOVA was carried out to examine the difference in the technique of handwashing practice by health care providers in Kano metropolis, Kano state based on their profession, the result shows that there was no significance difference F(2,247) = 1.714, P > 0.05, therefore the null hypothesis was accepted on the account that no significance difference exists.

Sub- Hypothesis 5: There is no significant difference in the technjque of handwashing practices by health care providers in Kano metropolis based on their educational level

Table 4.9: One way ANOVA summary on the difference in the technique of handwashing practice by health care providers in Kano metropolis based on their educational level

Sum of Squares	df	Mean Square	F	Prob.
Between groups	7.622	2	3.813	.156	.856
Within groups	6031.534	247	24.419		
Total	6039.156	249			

F (2,247) = .156, P >0.05.

A one way ANOVA was carried out to examine the difference in the technique of handwashing practice by health care providers in Kano metropolis, Kano state based on their educational level, the result shows that there was no significance difference F(2,247) = .156, P

>0.05, therefore the null hypothesis was accepted on the account that no significance difference exists.

Sub-Hypothesis 6: There is no significant difference in the technjque of handwashing practices by health care providers in Kano metropolis based on their years of working experience.

Table 4.10: One way ANOVA summary on the difference in the technique of handwashing practice by health care providers in Kano metropolis based on their years of working experience

Sum of Squares	df	Mean Square	F	Prob.
Between groups	50.259	2	25.130	1.036 .356
Within groups	5988.897	247	24.247	
Total	6039.156	249		

F (2,247) = 1.036, P > 0.05.

A one way ANOVA was carried out to examine the difference in the technique of handwashing practice by health care providers in Kano metropolis, Kano state based on their years of working experience., the result shows that there was no significance difference F (2,247) = 1.036, P >0.05, therefore the null hypothesis was accepted on the account that no significance difference exists.

4.2 DISCUSSION

This study investigated the Influence of Demographic Variables on Handwashing Practice among Healthcare Providers in Kano Metropolis, Kano State. The finding of this study revealed that health care providers in Kano metropolis wash their hands at the appropriate moment. Their practice is as a result of fear of contracting diseases from the patients. The finding is in line with finding of Okanu (2011) who reported that majority of medical officers, nurses and resident doctors knew the importance of handwashing in the prevention of hospital acquired

infection. More than fifty percent (50%) had good knowledge of hand hygiene. About fifty four percent (54%) of them always wash their hand between direct contact with a patient and after an invasive procedure ninety two percent (92%) of them wash their hands when visibly soiled and 57% after removing gloves. But this finding is in contrary to that of Abdul'aziz and Bakr (2009) who assessed Knowledge, Attitude and Practice of hand washing among health care workers in Ain Shams University hospital, Cairo and reported that most nosocomial infections are thought to be transmitted by the hands of health care workers, they also pointed that handwashing among health care workers plays a central role in preventing the transmission of infectious agents, but despite requirements by the Centre for Disease Control to implement handwashing guidelines in the hospitals, practice among health care workers remains low. They further indicated that, the reasons for low compliance to handwashing are attributed to such factors as: lack of awareness and knowledge among health care workers as regard the importance, techniques, methods and quality of hand hygiene, human factors that lead to low compliance to handwashing are busyness, forgetfulness, low staff to patient ratio and attitudes among staff toward bio-safety. So also the finding is in contrary to that of Boyce & Ptitter (2002) who reported that handwashing is considered to be the most important recommended practice to combat hospital associated infections. It is now recognized as the do it yourself that all health care professionals are encourage to perform due to its ability to interrupt the transmission of infectious disease pathogens. However, compliance rate with handwashing is very low among health care providers. The reasons behind these low rates include: lack of practicing handwashing as a behavioral pattern by health care professionals; decreased interest in their practical applications with increased educational status; heavy workload; lack of sufficient sinks for hand washing in clinical areas and lack of knowledge of health care providers regarding handwashing.

The finding of this study revealed that heath care providers always practice appropriate technique during handwashing. This is because there is available information displayed in conspicuous areas in the hospitals stressing the importance of handwashing and how it can be performed correctly. This finding is in line with that of Balafama et- al. (2011) who conducted research on handwashing practice among health care workers in teaching hospital, they reported that, the components of handwashing technique included; use of soapy water in a basin, use of cold running water, use of warm running water and rubbing soap on wet hands for about 20 seconds before rinsing. They further indicated that the majority of health workers have good practice of handwashing as use of soapy water in the basin (55.8%) followed by washing front and back of hands including under the nails (41.0%) and use of cold running water (36.4%). But the finding is in contrary to Nzarko (2009) who reported that the prevalence of handwashing was higher after doing the difference procedures or interventions than before doing them, yet handwashing was only done in a more appropriate way before doing the different interventions except for the non-invasive procedures where it is nearly similar before and after. They further show that the most common form of inappropriate handwashing was in the improper drying and having short contact time

The finding of this study revealed that no significant difference in the moment of handwashing practices by health care providers in Kano State based on their profession. This finding is due to high level of awareness on the importance of hand hygiene in their job. The finding is in line with that of Idang et-al. (2014) who conducted research on practice of handwashing for the prevention of nosocomial infection among nurses in general hospital Ikot Ekpene, Akwa Ibom State, Nigeria. They revealed that majority of health workers had good knowledge of handwashing and few don't have the knowledge. But despite the good knowledge

possessed by the health workers some always wash their hands, some do so occasionally and others never wash their hands at all. Factors such as inadequate knowledge of handwashing techniques, long nails, wearing of rings and water related problems affect the practice of handwashing. But the finding is contrary to that of Cambell (2010) who pointed that, Nurses are professionally and ethically accountable for their action, the MNC code of conduct and standard requires nurses and midwives to a high standard of practice and care at all times, yet despite the momentum of hand hygiene, some nurses are still presenting with low compliance because they perceive it as not their problem, that it is something to do with infection control staff and they have to deal with it. Similarly, Nazarko (2009) indicates that, nurses often fail to practice hand hygiene because they are busy and they feel hand hygiene takes up precious time. In addition, nurses often perceive that gloves can be used as an alternative to handwashing. They usually tend to remove the gloves without washing their hands or use the same gloves to deliver intended care to multiple patients. Even when they remove their gloves, only 20% of nurses wash their hands. Canham (2011), Campf and Loffler (2010) claimed that, nurses avoid handwashing because they are frightened that skin problems such as dermatitis could develop.

The finding of this study revealed that no significant difference in the moment of handwashing practices by health care providers in Kano State based on their educational level. This finding is contrary to that of Sushitra and Lakhshimi (2007) that assessed Impact of education on knowledge, attitudes and practices among various categories of health care workers on nosocomial infections, they showed that, there was significant difference in the moment of handwashing responses according to the level of education and the first post-education responses. However, the improvement in answers declined among graduates, and still further dropped in the third post- graduate education assessment.

The finding of this study revealed that there was significant difference in the moment of handwashing practices by health care providers in Kano State based on their years of working experience. This indicates that years of working experience influenced handwashing practices at the appropriate moment. The finding is attributed to number of nosocomial infection witnessed by long serving staff. This finding supported that of Sushitra and Lakhshimi (2007) which revealed that years of experience in the hospital significantly correlated to increased knowledge, attitudes and practices on universal precautions among the various categories of HCWs but this did not translate into good clinical practice in the ward. The finding is contrary to that of Karabay, Sencan, Alpeterker and Oksuz (2005) who reported that, hand washing practices is seen more in junior nurses and newly recruited staff.

The finding of this study revealed that no significant difference in the technique of handwashing practices by health care providers in Kano State based on their profession. This finding corroborates Basurrah and madani (2006) study on handwashing and gloving practice among health care workers in medical and surgical wards in Riyadh, Saudi Arabia who reported that, adherence to hand hygiene was seen in 70% of medical students, 18.8% in of nurses and 9.1% of senior medical staff but the technique was suboptimal in all. The finding is contrary to that of Canham (2011) who revealed that, hygiene requirements depend on the type of procedure, the degree of contamination and the persistence of antimicrobial action on the skin. Even when nurses spend a longer time on hand hygiene, their technique is often poor compared to other health care workers in terms of leaving large areas unwashed effectively, i.e. wrists, thumbs, nail beds and between fingers. Also, Karaaslan (2014), reported that the duration of hand cleansing episodes by HCWs ranged on average between as little as 6.6 seconds and 30 seconds, in addition to washing their hands for very short period of time, some HCWs often failed to cover

all surfaces of their hands and fingers. In summary, the frequency of hand hygiene opportunities per hour of care may be very high, and despite the hand hygiene compliance rate, the applied technique failed by some Laboratory staff.

The finding of this study revealed that no significant difference in the technique of handwashing practices by health care providers in Kano metropolis based on their education level. This finding correlates with that of Mahmud, Muhammad & Iyad (2011) who found that, handwashing technique is poor among health care professionals because they fail to wash their hands as thorough or as frequently as they should do, They further showed that gender, level of education and marital status had no influence on professionals' handwashing compliance, but age and their years of experience are positively correlated with self-reported handwashingan. But differs with an observational study of HCW to measure the effect of education alone and education plus performance feedback in 3 hospitals for adherence to a HW protocol by Victor et-al. (2003) which revealed that, the baseline rate of Handwashing protocol before contact with patients was 17%. With higher level education, HW before contact with the patients increased to 44%. Using education and performance feedback HW further increased to 58%. In the private hospitals where administrative support for the HW program was significantly greater, HW compliance was significantly higher. Therefore policies and education of HCW significantly improved their adherence to the HW protocol.

The finding of this study revealed that no significant difference in the technique of handwashing practices by health care providers in Kano State based on their years of working experience. This result contravene study on Hand hygiene practices among doctors in a tertiary health facility in southern Nigeria by Okanu et-al. (2011) which revealed that, consultants had a better knowledge of hand hygiene than the other cadres. This may be attributed to the fact that

the consultants were more experienced since a longer duration of experience is correlated with increased knowledge. They may, therefore, serve as positive role models for their younger colleagues and influence their hand hygiene behavior. It is worth noting that majority of the respondents did not know hand hygiene technique, this trend was also reflected in their practice of hand washing which showed that barely 10% of the respondents washed their hands properly on arrival at work. Mahmud, Muhammad and Iyad (2011) also reported that, gender, level of education and marital status had no influence on professionals' handwashing compliance, age and their years of experience are positively correlated with self-reported handwashing.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 SUMMARY

This study investigated Influence of Socio-demographic Variables on Handwashing Practices among Healthcare providers in Kano metropolis, Kano state. To achieve the purpose of the study, six research questions, two major hypotheses & six sub- hypotheses were formulated. Descriptive survey research design was used. The population of the study comprised of one thousand six hundred and eighty three (1,683) health care providers. The sample size of the study was three hundred and thirteen (313) health workers from three departments of nursing, medicine & surgery and pathology of Murtala Muhammad Specialist Hospital, Infectious Disease hospital and Sheikh Muhammad Jiddah hospital, Kano. Proportionate sampling technique was employed for the selection of a representative sample of health care providers from each discipline and the number of participants were selected by random sampling technique in each stratum. The instrument for data collection was researcher's developed questionnaire named Hand Washing Practice among Health Care Providers in kano metropolis, Kano state (HWPHCP), it was validated by 5 experts in PHE department and its reliability was 0.80. Three hundred and thirteen (313) questionnaires were distributed out of which two hundred and fifty (250) were duly completed, returned and used for data analysis. Descriptive statistics of simple frequency count and percentage were used to analyze the socio-demographic information of the respondents. Data on the major hypotheses were analyzed using Chi-square and ANOVA was used to analyze the sub- hypotheses at 0.05 level of significance. From this process, the following major findings were made;

1-Health care providers in Kano metropolis, practice handwshing at the appropriate moments

2-Heath care providers in Kano metropolis, practice appropriate technique during handwashing

3-No significant difference in the moment of handwashing practices by health care providers in Kano metropolis, based on their profession

4- No significant difference in the moment of handwashing practices by health care providers in Kano metropolis, based on their educational level

5-There was significant difference in the moment of handwashing practices by health care providers in Kano metropolis, based on their years of working experience.

6- No significant difference in the technique of handwashing practices by health care providers in Kano metropolis, based on their profession

7- No significant difference in the technique of handwashing practices by health care providers in Kano metropolis, based on their education level

8 No significant difference in the technique of handwashing practices by health care providers in Kano metropolis, based on their years of working experience

5.2 Conclusion

Based on the findings of this study, it was concluded that; health care providers in Kano metropolis practice handwshing before, during and after interacting with patients and used appropriate technique of handwashing. Years of working experience influenced the practice.

5.3 Recommendations

On the basis of the findings of this study and the conclusion drawn, the following recommendations were made:

1. Educational programme such as workshop/seminars on handwashing practices in hospitals should be organize regularly to sustain the practice.

2. Hospitals management should provide incentives to health care providers for using proper technique during handwashing practice, this will motivate them to sustain the practice.
3. Commendations either orally or in written should be awarded to the Physicians, Nurses and Medical laboratory Scientists/Technicians for practicing handwashing at the right moments.
4. Epidemiology unit should re-design regular supervision of all health care workers handwashing practices irrespective of their educational level to ensure sustainability at the right moments.
5. More effort should be made to encourage health care providers that spent few years in service to improve and sustain handwashing practices at the right moments.
6. More posters demonstrating good handwashing technique should be provided at conspicuous areas in the hospitals especially where Physicians, Nurses and Medical laboratory Scientists/Technicians are interacting with patients and patient's fluid to serve as a reminder to them.
7. Modern handwashing facilities especially basin/sink, should be provided and made easily accessible to health care worker having both lower and higher educational qualifications to minimize taking much time during handwashing.
8. Single used towels should be provided to all health care workers to replace the present multiple used towels.

5.4 Recommendations for Further Studies

Future research initiatives may be needed to address the different motivating factors for handwashing practices among health care providers to sustain compliance and could cover the entire hospitals of Kano State.

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APPENDIX I: QUESTIONNAIRE

Questionnaire on Hand Washing Practices among Health Care Providers (HWPHCP) in Kano Metropolis, Kano State.

Dear respondent,

I am an M.Sc student of the Physical and Health Education Department, Bayero University, Kano, Nigeria conducting a research on the topic above. This questionnaire is designed to collect the information on the topic. All information will be kept confidential and used for this research work only.

Thank you

Surajo Jinjiri

Instruction: Please tick (√) the column against each statement that is most appropriate to you.

Section A: socio-demographic characteristics of the respondents

1. **Profession**
   a. Physician
   b. Nurse
   c. Medical Laboratory Scientist/Technician

2. **Educational level**
   a. Diploma (ND or HND)
   b. Degree
   c. Post Graduate
3. **Years of working experience**
   a. 1-5 years
   b. 6-10 years
   c. 11 and above years

Section B: Moments of hand washing practices in a hospital

S/N	Statement	Responses				
		Always	Often	Sometimes	Seldom	Never
1	I wash my hands before interacting with patients					
2	I wash my hands after interacting with patients					
3	I wash my hands after simple procedures with patients e.g. taking BP and Temperature					
4	I wash my hands after removing gloves					
5	I wash my hands after interacting with patients' surroundings e.g. beddings, formites					
6	I wash my hands after being exposed to patients' body fluid. E.g. blood, urine and other samples					

Section C: Technique of hand washing practice among health workers

S/N	Statement	Responses				
		Always	Often	Sometimes	Seldom	Never
7	I wash my hands with soapy water in a basin					
8	I use running water from the tap to wash my hands					
9	I rub soap on wet hands for about 20 seconds before rinsing					
10	I wash front and back of the hands including under the nails					
11	I dry my hands with disposable towel after washing					
12	I spend a period of 20-60 seconds during handwashing					

APPENDIX II

(Determinant sample size from a given population)

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	158	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	195	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	90	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	258	15000	375
160	113	800	260	20000	377
170	118	850	255	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Key:

N= Population

S= Sample Size. By Krejcie and Morgan (1970)**.**