

## A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria

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### ABSTRACT

#### Background

Hand washing is the process of decontaminating the hands, a cheap and effective method of limiting the spread of nosocomial infections. Good hand hygiene involves cleansing hands in between patients or between examining an infected site and a clean body site on the same patient. Proper hand washing practice involves following the WHO accepted guidelines for hand washing. Hand washing is an effective and inexpensive way to prevent diarrhea and acute respiratory infections. This study aimed to assess the compliance of health care workers in public and private hospital in F.C.T Abuja.

#### Methodology

The study was carried out amongst health workers in public and private hospitals in Kubwa district of Bwari area council, F.C.T Abuja. Kubwa General Hospital and Daughters of Charity Health Care Services were eligible for the study both. Stratified random sampling technique was used to select 224 respondents. Self-administered questionnaires, as well as an observational check list were used to assess the knowledge, attitude and practice of hand washing. A scoring system was devised to grade the questionnaires (KAP score). Further analysis was done using Microsoft Excel.

#### Results

Majority of the respondents (140, which is 68.30%) had good knowledge of hand washing using KAP scoring. 44 (21.5%) respondents had very good knowledge of nosocomial infections. Thirty-two of these respondents with very good knowledge were Doctors. About half of the respondents interviewed had excellent hand washing practice, while 76 (37.07%) had good practice. For the limiting factors to hand washing, lack of material (soap, water, towels) was the most frequently indicated.

#### Conclusion

There was good awareness of hand washing principles, nosocomial infections and good attitude towards hand washing. However, this did not correlate well with practice which was below average.

**Keywords:** Hand washing; Nosocomial infections; Health workers; Health Care Facilities; Kubwa District, Bwari Area Council; Abuja; Nigeria;

### INTRODUCTION

#### Background

Hand washing is a primary preventive strategy to reduce lower respiratory infections and diarrhea and lessen the impact of illness. Handwashing is a

process of decontaminating the hands, or simply put removing dirt from the hands. Good hand hygiene involves cleansing hands before and after examining different patients or between examining an infected and a clean body site on the same patient. Cleansing may involve soap and

water, water alone, or alcohol rubs.<sup>1</sup> The Hungarian physician Ignaz Fülöp Semmelweis (1818–1865) was the first to demonstrate that the simple act of hand washing could save lives, especially when health workers do it routinely and thoroughly.<sup>2</sup> As a young doctor working in the Maternity Department of Vienna Lying-in hospital, Semmelweis suspected a “cause and effect” relationship between two observations of his own: one, doctors and medical students were going straight from the autopsy room to the delivery room to perform internal examinations on expectant mothers without washing their hands; and two, many of the women were dropping dead from puerperal fever also known as “childbed fever.”<sup>2</sup> In his quest to link these events, he discovered that the simple process of hand washing could actually save lives. Nosocomial infections (hospital acquired infection) constitute a major challenge of modern medicine. A nosocomial infection is defined as an infection acquired in hospital by a patient who was admitted for a reason other than that infection; or an infection occurring in a patient in a hospital or other health care facility in whom the infection was not present or incubating at the time of admission. This includes infections acquired in the hospital but appearing after discharge, and also occupational infections among staff of the facility.<sup>3</sup> Most infections that become clinically evident after 48 hours of hospitalization are considered hospital-acquired. Infections that occur after the patient's discharge from the hospital can be considered to have a nosocomial origin if the organisms were acquired during the hospital stay.<sup>4</sup> Unfortunately, hospital acquired infections continue to plague both western industrialized and non-western resource poor countries, often for lack of observance of this simple hygiene practice.<sup>2</sup> On average, infections complicate 7% to 10% of hospital admissions.<sup>5</sup> Transmission of microorganisms from the hands of health care workers is the main source of nosocomial infections, and hand washing remains the most important preventive measure.<sup>5</sup> Unfortunately, compliance with hand washing is unacceptably low in most institutions.<sup>5</sup> Determinants of adequate hand washing in hospitals are largely unknown. However, it is important to note that a great many highly qualified and skilled hospital doctors, nurses and other health workers do work hard to prevent and control hospital acquired infections, despite the constant constraints of time and other resources (human and material) in both

rich and poor countries.<sup>2</sup> Nevertheless the question remains: how can we prevent and control (if not eradicate) avoidable fatal infections acquired in the very places where our patients go to regain their health, and not to be maimed or killed?<sup>2</sup>

### **Indications for Hand Hygiene**

- Wash hands with soap and water when visibly dirty or visibly soiled with blood or other body fluids or after using the toilet.<sup>6</sup>
- If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of *Clostridium difficile*, hand washing with soap and water is the preferred means.<sup>6</sup>
- Use an alcohol-based hand-rub as the preferred means for routine hand antisepsis in all other clinical situations described in items D(a) to D(f) listed below, if hands are not visibly soiled.<sup>6</sup> If alcohol-based hand rub is not obtainable, wash hands with soap and water.<sup>6</sup>

Perform hand hygiene:

- before and after touching the patient;<sup>6</sup>
- before handling an invasive device for patient care regardless of whether or not gloves are used;<sup>6</sup>
- after contact with body fluids or excretions, mucous membranes, non-intact skin, or wound dressings;<sup>6</sup>
- if moving from a contaminated body site to another body site during care of the same patient;<sup>6</sup>
- after contact with inanimate surfaces and objects (including medical equipment) in the immediate vicinity of the patient;<sup>6</sup>
- after removing sterile or non-sterile gloves.<sup>6</sup>

Before handling medication or preparing food perform hand hygiene using an alcohol-based hand rub or wash hands with either plain or antimicrobial soap or water.<sup>6</sup> Soap and alcohol-based hand rub should not be used concomitantly.<sup>6</sup>

Some key points in hand washing have been outlined by the World Health Organisation. They recommend that doctors wash their hands:<sup>7</sup>

- Immediately on arrival at work.
- After touching blood, body fluids, secretions, excretions and contaminated items whether or not gloves are worn.

## A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria

- Before putting on gloves for invasive procedures
- Before and after removing gloves
- Before and after each patient contact
- Between procedures on the same patient to prevent cross-contamination.
- Anytime microorganisms may be transferred to other patients, staff or environments

Equipment and supplies required include:

- Soap or mounted liquid soap.
- Running water from a tap or kettle/goblet.
- Disposable paper towels or small square towels for each section
- Alcohol-based disinfectant.<sup>7</sup>

Hand washing techniques were also outlined:<sup>7</sup>

- Remove jewelry (rings, watches, bracelets, etc.)
- Turn on the tap
- Wet hands thoroughly under running water to at least four inches above the wrist.
- Soap hands adequately.
- Rub hands vigorously front and back, in between fingers, finger tips, the sides of the hand, the thumbs, up to and including the wrists.
- Rinse under clean running water until all traces of soap are removed.
- Dry hands from tip of fingers to the wrist with paper towel or hand drier. If paper towels are unavailable, shake off excess water and allow hands to air dry.
- Use same paper towel to turn off tap if not elbow controlled.
- Use alcohol-based disinfectant by applying product to palm of one hand and rub hands together, covering all surfaces of hands and fingers until hands are dry.

Also, the following should be observed:

- Towels should never be shared.
- Used paper towels should be properly disposed of.
- Personal towels to be reused must be stored properly and washed at least once daily. It is better to have more than one towel for frequent replacement.

- Rub hands with a 65-95% alcohol solution to disinfect the hands when hand washing facilities are not available.

### Specific Objectives

- Determine the awareness and knowledge of proper hand washing among health care workers in Kubwa F.C.T Abuja.
- Determine the knowledge of health workers on nosocomial infections with regards to hand washing.
- Describe the attitude of healthcare workers in public and private hospitals in Kubwa F.C.T Abuja towards hand washing.
- Describe the handwashing practices of healthcare workers in public and private hospitals in Kubwa F.C.T Abuja.
- To identify the factors that influences the effective practice of hand washing amongst healthcare workers in public and private hospitals in Kubwa F.C.T Abuja.

### Literature Review

Promoting hand hygiene compliance is an ongoing public health effort.<sup>1</sup> Proper hand hygiene is among the most important measures for preventing and controlling microbial pathogen cross-transmission<sup>2-4</sup> and is a cost effective intervention for the control of many infectious diseases.<sup>5</sup> Despite efforts to increase public awareness, hand hygiene compliance rates are difficult to influence and remain stubbornly low.<sup>10</sup> In particular, increasing hand-washing rates after the use of public restrooms has been challenging.<sup>11,12</sup> Interventions have been tested in numerous settings (e.g., schools and hospitals); however, no single intervention has produced consistent and lasting improvements in hand-washing rates.<sup>3,13</sup> Education, training, and behavior modification are often cited as important components of hand-washing compliance (HWC) programs.<sup>11,14,15</sup> However, interventions with only one component have not yielded significant gains in HWC, or the gains have been transitory, falling back to baseline levels over time.<sup>13,14,16-18</sup>

For more than 150 years, hand hygiene has remained arguably the most cost-effective intervention to prevent and control healthcare-associated infections. However, although performance of hand hygiene is an inherently simple and inexpensive practice, numerous studies have highlighted poor compliance with hand hygiene recommendations.<sup>10</sup>

However, the level of hand hygiene compliance remains low worldwide, and it was termed “unacceptably poor” by a public health authority in London, United Kingdom.<sup>11</sup> Interventions aimed at improving hand hygiene compliance have been implemented, but the effects of these interventions remain modest and/or of short duration.<sup>12,13</sup>

Doctors and other health workers put themselves and their patients in danger when they fail to observe routine hygiene practices<sup>14</sup>. Among the deadliest pathogens encountered in hospitals are methicillin-resistant *Staphylococcus aureus* (MRSA), multi-resistant strains of *Klebsiella* and *Pseudomonas*<sup>15,16</sup>, respiratory syncytial virus (RSV) which poses very high risk to sick infants and young children in intensive care units (ICU) as well as to the health workers attending to them<sup>8</sup>; *acinetobacter baumannii* infections that are prevalent in adult and general ICU<sup>9</sup>; as well as more recently discovered viral infections such as SARS.<sup>17</sup> Such infections can invade the skin, urinary tract, lower respiratory tract, and surgical wounds.<sup>18-20</sup>

Hospital-acquired infections are a major threat to patients and place a great burden on national healthcare services.<sup>21,22</sup> This problem must be combated with an adequate level of hand hygiene compliance, which is of crucial importance in preventing cross-transmission<sup>23,24</sup> and has been identified as a health policy priority.<sup>21,25</sup>

### **Knowledge of Hand Washing**

A study was carried out in Mysore University to assess the knowledge, attitudes and practices among the different health care workers on nosocomial infections.<sup>26</sup> A total of 150 health care workers, 50 doctors, 50 nurses and 50 ward aides were included. A questionnaire was administered to the health care workers to assess their knowledge, attitudes and practices on nosocomial infections. They were further subjected to a series of similar questionnaires at intervals of 6, 12 and 24 months after an education module. Subjects in each category of staff were observed for compliance to hand washing practices in the ward in the post-education period. The study showed an increase in the number of subjects in each category scoring good and excellent in the post-education questionnaire; however, this declined with the progress of time.<sup>26</sup> It was observed that the compliance level to hand washing practices differed among the different HCWs. Total compliance was

63.3% and ward aides were most compliant 76.7% (adjusted Wald 95% CI= 58.80-88.48) It was concluded that education has a positive impact on retention of knowledge, attitudes and practices in all the categories of staff and that there is a need to develop a system of continuous education for all the categories of staff.<sup>26</sup> A separate study revealed that some doctors believe that the use of gloves use obviates the need for hand hygiene, while some complained that there was a lack of scientific information of definitive impact of improved hand hygiene on health-care-associated infection rates.<sup>27</sup>

### **Attitude towards Hand Washing**

As was the case in Semmelweis' lifetime, promotion of the simple, effective and inexpensive practice of hand washing continues to be hindered by ignorance, arrogance and/or carelessness on the part of health workers, however high ranking, educated and skilled. Infection prevention guidelines are issued, re-issued, revised and updated regularly; and cognitive (educational and empowering), technical (step-by-step practical training on how to wash hands) and novel ideas of incentives and rewards for health workers are repeatedly put forward,<sup>21, 28-37</sup> and yet the problem remains unsolved. Reportedly among the worst offenders are doctors working in ICUs, emergency departments (ED), and post anesthesia care units (PACU) where patients are most vulnerable.<sup>38, 39</sup> At least one self-report of a modern-day doctor in an English hospital obstetrics and gynaecology unit admitting to this offence and trying to justify it in terms of lack of time and belief that hand washing has little or no value<sup>36</sup> also generated heated debate in the electronic “Rapid Response” forum of the British Medical Journal initiated by the “Hand washing Liaison Group's” editorial.<sup>40</sup> However, it is important to note that a great many highly qualified and skilled hospital doctors, nurses and other health workers do work hard to prevent and control HAI, despite the constant constraints of time and other resources (human and material) in both rich and poor countries. Nevertheless, the question remains: how can we prevent and control (if not eradicate) avoidable fatal infections acquired in the very places where our patients go to regain their health, and not to be maimed or killed? Attitudinal and behavioural problems are often at issue, more than the lack of material resources, education or knowledge per se. Research evidence suggests that some

health workers are worse than others in this regard: while registered nurses and nurse practitioners who generally have more contact with patients champion the cause of infection prevention by washing their hands thoroughly between patient contact, physicians and specialist consultants often fail to do the same, setting a bad example for younger doctors and medical students.<sup>38,41</sup> Regardless of the methodological and analytical difficulties surrounding the interpretation of comparative data, nosocomial infection rates are generally likely to be higher in teaching hospitals, compared to non-teaching ones. Moreover, the evidence is inconclusive as to whether technical intervention or education and feedback work best - both activities are often required.<sup>32,41</sup>

### **Practice of Hand Washing**

A study carried out at University of Benin Teaching Hospital (UBTH) on hand washing practices amongst medical doctors showed that the clinical practice of hand washing was not satisfactory. However, the average reported compliance rate was 52% whereas the observational study revealed a rate of 16%. Factors proposed for this were lack of materials, inconveniently located sinks, and insufficient time, amongst others.<sup>42</sup> Another study conducted at Obafemi Awolowo University Teaching Hospital showed that only 37.9% of the graduating medical students in Obafemi Awolowo University wash their hands regularly after touching patients and only 26.2% do so after taking off protective hand gloves.<sup>43</sup>

A series of 5 unobstrusive, observational studies recording hand washing after direct patient contact was carried out in Kaiser Foundation Hospital in Fontana, California, USA which had as its objective determining the motivating and behavioral factors responsible for improving compliance with hand washing amongst physicians.<sup>31</sup> Infectious disease physicians met with participants to report study results and obtain a commitment to handwashing guidelines with follow up interviews. In the Intensive care unit, 5 studies conducted between April 1999 and September 2000, rates of physician compliance with handwashing were 19%, 85%, 76%, 74% and 68%. It was discovered that personal commitment and meeting with an infectious disease physician had the most influence on handwashing behaviour<sup>44</sup>. Another study sought to assess doctors' hand-washing practices and their attitudes and beliefs about hand hygiene. It

involved 163 medical students, residents, and staff physicians in a large Swiss University hospital.<sup>1</sup> Trained observers watched doctors' hand hygiene during patient care activities. They counted the number of times that doctors should have cleansed their hands and the number of times that they actually did. They then asked doctors to answer written questions about their attitudes and beliefs toward hand hygiene. They found that Doctors cleansed their hand 57% of the times that they should have<sup>1</sup> whereas in Mysore University, total compliance was 63.3% and ward aides were most compliant 76.7% possibly because they were more under direct supervision of a hospital supervisor.<sup>26</sup>

Hospital wide surveillance of hand hygiene reveals that the average number of hand washing opportunities varies markedly between hospital wards. For example, nurses in pediatric wards had an average of eight opportunities for hand hygiene per hour of patient care compared with an average of 20 for nurses in intensive-care units.<sup>27</sup> In addition to washing their hands for limited time periods; personnel often fail to cover all surfaces of their hands.<sup>27</sup>

In a study involving private and public hospitals in Abeokuta Nigeria, respondents were required to fill questionnaires. Their results showed that 94.6% of healthcare workers always wash their hands after handling patients.<sup>32</sup> However the Lagos University Teaching Hospital's Committee observed that Hand hygiene practice reduces hospital -acquired infections by 90% but only about 28% of Nigerian healthcare workers observe hand washing after attending to patients and 41% of these healthcare workers' hands were found to be positive for Vancomycin-resistant enterococci (VRE).<sup>45</sup>

Also, a focus Group Study of Hand Hygiene Practice among Healthcare Workers in a Teaching Hospital in Toronto, Canada, Participants reported that the realities of their workload (e.g, urgent care and interruptions) make complete adherence to hand hygiene impossible. The guidelines were described as overly conservative, and participants expressed that their judgment is adequate to determine when to perform hand hygiene. Discussions revealed gaps in knowledge among participants; most participants expressed interest in more information and education. Participants reported self-protection as the primary reason for the performance of hand hygiene, and many admitted to prolonged glove use because it gave them a sense of protection.

Limited access to hand hygiene products was a source of frustration, as was confusion related to hospital equipment as potential vehicles for transmission of infection. Participants said that they noticed other HCWs' adherence and reported that others HCWs' hygiene practices influenced their own attitudes and practices. In particular, HCWs perceive physicians as role models; physicians, however, do not see themselves as such.<sup>46</sup>

### **Factors Affecting the Practice of Hand Washing**

The study carried out in the Swiss University mentioned above showed that doctors cleansed hands most often when a hand-rub solution was easily available.<sup>1</sup> They did not wash hands as often when they had busy workloads with many patient interactions and when they performed activities with high risks for spreading infections.<sup>1</sup> Medical students and internists (internal medicine doctors) washed hands most often, whereas anesthesiologists, critical care physicians, and surgeons washed hands least often. The researchers however conceded that Doctors may have changed their normal hand-cleansing activities because they often knew they were being observed and that hand washing habits vary with location. They concluded that providing easy access to cleansing materials and improving attitudes toward hand hygiene, particularly among doctors working in technical specialties, merit emphasis.<sup>1</sup>

Observed risk factors for poor adherence to recommended hand-hygiene practices: male sex, working in an intensive-care unit, working during the week (versus the weekend), wearing gowns/gloves, activities with high risk of cross-transmission, and high number of opportunities for hand hygiene per hour of patient care.<sup>27</sup>

Self-reported factors for poor adherence with hand hygiene included irritation and dryness caused by hand washing agents, inconveniently located/shortage of sinks, lack of soap and paper towels, insufficient time, understaffing/overcrowding, low risk of acquiring infection from patients.<sup>19</sup> In Nigeria, lack of facilities such as epileptic water supply, lack of soap, heavy workloads, poorly located sinks amongst others were cited as reasons for non adherence.<sup>45</sup> With such frequent periods of hand washing, concern has been expressed over the risk of dermatitis that the procedure could expose one to. In certain surveys, approximately 25% of nurse's report symptoms or signs of dermatitis

involving their hands, and as many as 85% give a history of having skin problems.<sup>41</sup> Frequent and repeated use of hand-hygiene products, particularly soaps and other detergents, is a primary cause of chronic irritant contact dermatitis among health care workers.<sup>41</sup>

Irritation associated with antimicrobial soaps may be caused by the antimicrobial agent or by other ingredients of the formulation. Affected persons often complain of a feeling of dryness or burning; skin that feels "rough," and erythema, scaling, or fissures. Damage to the skin also changes skin flora, resulting in more frequent colonization by staphylococci and gram-negative bacilli.<sup>8</sup> Although alcohols are among the safest antiseptics available, they can cause dryness and irritation of the skin. Other factors that can contribute to dermatitis associated with frequent hand washing include using hot water for hand washing, low relative humidity, failure to use supplementary hand lotion or cream, and the quality of paper towels.<sup>8</sup> Potential strategies for minimizing hand-hygiene-related irritant contact dermatitis among health care workers include reducing the frequency of exposure to irritating agents (particularly anionic detergents), replacing products with high irritation potential with preparations that cause less damage to the skin, educating personnel regarding the risks of irritant contact dermatitis, and providing caregivers with moisturizing skin-care products or barrier creams. One strategy for reducing the exposure of personnel to irritating soaps and detergents is to promote the use of alcohol-based hand rubs containing various emollients. It is neither necessary nor recommended to routinely wash hands after each application of an alcohol hand rub as this may lead to dermatitis. The use of hand lotions and creams should also be encouraged to replace depleted skin fats and oils and thus improve hydration.<sup>8</sup>

### **Nosocomial Infections and Hand Washing**

Hand hygiene is recognized as a primary determinant of the incidence of healthcare-associated infection and the cross-transmission of nosocomial pathogens, but compliance rates among healthcare workers (HCWs) are often less than 40%.<sup>47</sup> Multimodal interventions have the greatest chance of successfully improving adherence to practices.<sup>48</sup> As in many other health-related areas, beliefs, attitudes, and perceptions influence HCWs' hand hygiene

behavior. However, the inability to achieve sustained, high-quality performance of hand hygiene suggests that changing this behavior is complex.<sup>49,50</sup> Rather than taking an empirical approach to improve hand hygiene adherence, we might seek insight into the motivational factors driving this behavior, to shape further promotional interventions and obtain better outcomes.<sup>49</sup>

A study on the Promotion of hand washing as a measure of quality of care and prevention of hospital-acquired infections in Eritrea: The Keren study Showed that Although only 30% of health workers routinely washed their hands between patient contact, the study revealed genuine interest in training and the need to reward good practice in order to motivate health workers. Educational intervention and technical training resulted in significant improvements in health workers' compliance with hospital infection prevention standards. Patient satisfaction with health workers' hygiene practices also improved significantly.<sup>2</sup>

The study concluded that Hospital-based health workers' hand washing practice needs to improve globally. There is no room for complacency, however, in Eritrea (as indeed in other African countries) where public health services need to keep patients' welfare at heart; particularly with respect to women in childbirth, as mothers continue to bear the lion's share of post-war rebuilding of lives, livelihoods, and the country as a whole.<sup>2</sup>

## **MATERIALS AND PROCEDURES**

The study was carried out in Kubwa General Hospital, and Daughters of Charity Health Care Services, Kubwa which are the two major health institutions in Kubwa District of Bwari Area Council, which is situated on the northern part of Abuja along Abuja-Suleja express way. It is bounded on the North by lower Usman Dam, on the South by Jabo village and on the West by Zaba town. Geographically, Kubwa falls between latitude 9° 09" North, longitude 6° 44" and 7° 20" East. It is one of the areas designated for resettlement within the Federal Capital Territory<sup>53</sup>. It covers an area of approximately 860 hectares.

The land of Kubwa is generally low, undulating and speckled with rock outcrops. The soils in the district are typically deep and well drained having only local constraints where they are high in clay or stones. They contain large

amount of humus making them considerably fertile and suitable for farming. The onset of rainy season is usually experienced in April, and most of the annual rainfall is recorded between the months of July and September. The temperature ranges between 21°C and 32°C in the area<sup>53</sup>.

According to 2006 census, the population of Kubwa is about 12,183 people<sup>54</sup>. The dominant tribe in the area is Gwari. The Gwari people are the indigenous tribe in the area but various other Nigerian tribes from different parts of the country moved to Kubwa as a result of resettlement scheme in the area. The area is now socially heterogeneous with people divergent tribes exhibiting divergent cultures and traditions. Other minority tribes in the area include Koro, Gwardara, Gada, Hausa/Fulani, Igbo and Yoruba. The people in the area engage in agricultural activities, cattle rearing, crafting and civil service.

## **Study Population**

Study population consisted of health workers directly in contact with patients such as Doctors, Nurses, Laboratory scientists, ward maids etc.

## **Eligibility criteria**

- Inclusion criteria: Health workers whose daily activities involve direct contact with patients.
- Exclusion criteria: Health workers and Non-health workers whose daily activities are not in direct contact with patients

## **Study Design**

A descriptive cross-sectional study was adopted for this research work.

## **Ethical Clearance/Permission/Consent**

Approval was sought from the ethical committee of both hospitals. Informed consent was obtained from participants, confidentiality and privacy was also assured.

## **Sample Size Determination**

The sample size determination was based on Krejcie and Morgan's sample size formula sampling techniques which states that:

$$n = N/(1+N/n^*)$$

$$n^* = Z^2Pq/e^2$$

Where n = Sample size

$$N = \text{total population} = 863$$

## A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria

$n^*$  = minimum sample size

Z = standard deviation at 95% CL (1.96)

P = prevalence of 26% (0.26)

q = proportion of people = 100-P = 100 - 26 = 74% (0.74)

e = allowable error margin of 0.05

Substituting the values into the formula we have

$$n^* = 1.96 \times 2 \times 0.26 \times 0.74 / (0.05)^2$$

$$n^* = 1.0192 \times 0.74 / 0.0025$$

$$n^* = 1.0192 \times 296$$

$$n^* = 301.6832$$

recall the formula  $n = N / (1 + N/n^*)$

substituting values into formula we have,

$$n = 863 / 1 + \frac{863}{301.6832}$$

$$301.6832$$

$$n = \frac{863}{\frac{301.6832 + 863}{301.6832}}$$

$$\frac{301.6832 + 863}{301.6832}$$

$$301.6832$$

$$n = 863 / 3.8606167$$

$$n = 223.5$$

$$\sim 224$$

### Sampling Method

First a cluster sampling followed by a Stratified random sampling then a systematic sampling method was used. The population was divided into Doctors, Nurses, Medical Laboratory Scientist (Med.Lab.sc), ward maids. The study population was 863, comprising 305 Doctors, 458 Nurses, 70 Medical laboratory scientists and 30 ward maids.

Sampling fraction =  $\frac{\text{sample size}}{\text{Total population}}$

$$= \frac{224}{863}$$

$$= 0.2595596$$

Sampling fraction = 0.2595596

$$= 0.26$$

The sampling fraction was used to determine the number of the doctors, nurses, medical laboratory scientist and ward maids required for the study. These were then selected using simple random sampling.

*Distribution of Respondents by professional categories*

Professional categories	Sampling fraction pop. size for professional category	Expected
Doctors	0.2595596 x 305=79.16	79
Nurses	0.2595596 x 458=118.89	119
Med.Lab.sc.	0.2595596 x 70 =18.16	18
Ward maids	0.2595596 x 30 =7.78	8
<b>Total</b>	<b>223.9956</b>	<b>224</b>

### Data Collection

A total of 84 samples were collected from Daughters of Charity Health Care Services and 121 samples collected from Kubwa General Hospital. Data was collected by self-administered and interviewer administered semi-structured questionnaires containing open and close ended questions on demographic data, knowledge, attitude and practice of hand washing, factors affecting hand washing and knowledge of the technique of effective hand washing. The self-administered questionnaires were given to participants who were literate, and the interviewer administered questionnaires to participants who were illiterate, by the researchers.

### Duration of Study

The study was carried out over a period of four months (4 months).

### Data Processing

The data collected from each respondent was analysed using Microsoft Excel and their frequencies and percentages were presented in tables and charts.

In the questionnaire a total of 31 questions (divided into 5 sections) were asked. Questions 1-9 accessed the socio-demographic status of each respondent. Question 9-31 was used to access the awareness and knowledge of hand washing, knowledge of nosocomial infections, attitude towards, practice of factors affecting the practice and knowledge of technique of effective hand washing, each correct answer provided by the respondents earned a mark, except for question 14 where 2 marks was scored for the single correct answer. Scores obtained per respondent was summed up with those of other respondent of same professional category to get the frequencies which was then represented as percentages. Depending on the total obtainable score per section or group of questions to be accessed, Individual respondent performance was then graded as No, Poor, Fair,



**A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria**

Good, very good, Excellence, knowledge, attitude or practice as the case may be.

Concerning awareness and knowledge of hand washing, 7 questions (9-15) were asked viz: “What do you understand by hand washing?” which had two correct options 2marks plus extra 1 mark scored for any other correct answer indicated by respondent; “What are the types of hand hygiene you know?” which had four correct options; and “What is the standard duration for each hand wash?” which had one correct option.; “Have you heard of nosocomial infection?” (1mark). Next, respondents were asked the definition of nosocomial infections (one correct option but 2marks was scored). They were also asked for the route of spread of nosocomial infections (three correct options but an additional 1 marked was scored for any other correct answer indicated by respondents).

Questions 9-15 was jointly used to access awareness and knowledge of hand washing. A total of 16marks were obtainable, which was used to grade performance. Score of 0-2 (no), 3-5 (poor), 6-8 (fair), 9-11 (good), 12-14 (very good), 15 and above (excellence) awareness and knowledge of hand washing. For knowledge of nosocomial infection scores obtained from questions 13-15 was used. A total of 7marks was obtainable. Scores of 0-2 (poor) 3-5 (good), 6 and above (very good)

On attitude towards hand washing 3 questions were asked viz; “do you think hand washing is important?” (1 mark for “yes”), next, “if yes why” (1 mark), “when should you wash your hands?”, which had 4 correct options. A total of 6marks

were obtainable, and graded as 0-2 (poor), 3-5 (good), 5-6 (very good) attitude.

On practice of hand washing, they were asked when they washed their hands (5 marks), what they washed their hands with (3 mark), and what they dried their hands with (3marks plus 1 mark for others),how they wash their hands (question 22) (6marks), The number of patients seen by each doctor per day (1mark)was divided by the average number of times s/he washed his/her hands per day(1 mark) to get the perceived compliance rate<sup>43,9</sup> since doctors are expected to wash their hands at least in between patient contact. It was then compared with the observed compliance rate. A total of 20 marks was obtainable and graded as 0-4 (poor), 5-8 (fair), 9-12 (good), 13-16 (very good), 17-20 (excellence) practice.

For factors affecting the practice of hand washing, each factor was accessed independently based on answers obtained from each respondent and then summed up to obtain frequency for each factor accessed.

Questions 18, 19, 20 and 22 were also analysed independently based on participant’s responses by professional categories.

Data from the two hospitals were analysed independently using Chi square to test if any statistical difference exist between them.

**RESULTS AND ANALYSIS**

In this study a total of 224 questionnaires were distributed, however, only 205 (91.50%) were retrieved from the respondents’. The results of the respondents are presented in tables below.

**Table4.1.** Distribution of Respondent’s By Socio - Demographic Characteristics

Variables	Dchcs	Kgh	Total
	Frequency (%)	Frequency (%)	Frequency (%)
<b>Age (years)</b>			
20-29	42(50.0)	65(53.7)	107(52.2)
30-39	23(27.4)	39(32.2)	69(33.7)
40-49	16(19.1)	9(7.4)	27(13.2)
50-59	2(2.4)	6(5.0)	8(3.9)
≥ 60	1(1.2)	2(5.0)	3(1.5)
<b>Sex</b>			
Males	32(38.1)	55(45.5)	87(42.4)
Females	52(61.9)	66(54.5)	118(57.6)
<b>Marital Status</b>			
Singles	40(47.6)	80(66.1)	120(58.5)
Married	43(51.2)	35(28.9)	78(38.1)
Separated	1(1.2)	5(4.1)	6(2.9)
Divorced	0(0.0)	0(0.0)	0(0.0)
Widower	0(0.0)	1(0.8)	1(0.5)

**A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria**

<b>Ethnicity</b>			
Others	50(59.5)	57(47.1)	108(52.7)
Gwari	34(40.5)	64(52.9)	97(47.3)
<b>Religion</b>			
Christianity	83(98.8)	119(98.3)	202(98.5)
Others	1(1.2)	2(1.7)	3(1.5)

Table 4.1 shows the socio-demographic data of the respondents such as the age, sex, marital status religion and ethnicity.

**Table 4.2.** Distribution of Respondent's by Professional Categories, Departments & Duration of Practice

<b>Variables</b>	<b>Dchcs</b>	<b>Kgh</b>	<b>Total</b>
	<b>Frequency (%)</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>
<b>Professional category</b>			
Consultants	8(8.5)	12(9.9)	20(9.8)
Snr. Registrars	0(0.0)	1(0.8)	1(0.5)
Registrars	8(9.5)	10(8.3)	18(8.8)
House officers	14(16.7)	18(14.9)	32(15.6)
Med. Lab. Sc.	6(7.1)	12(9.9)	18(8.8)
Matrons	9(10.7)	14(11.6)	23(11.2)
Nurses	36(42.9)	49(40.5)	85(41.5)
Ward maids	3(3.6)	5(4.1)	8(3.9)
<b>Department</b>			
Medicine	16(19.0)	30(24.8)	46(22.4)
Surgery	29(34.5)	32(26.5)	61(29.8)
O & G	17(20.2)	23(19.0)	40(19.5)
Paediatrics	10(11.9)	18(14.9)	28(13.7)
Anaesthesiology	3(3.6)	1(0.8)	4(2.0)
Others	9(10.7)	17(14.1)	26(12.7)
<b>Duration of Practice (years)</b>			
< 1	29(34.5)	47(38.8)	76(37.1)
1-5	31(36.9)	44(36.4)	75(36.6)
6-10	6(7.1)	16(13.2)	22(10.7)
11-15	6(7.1)	6(5.0)	12(5.9)
16-20	5(6.0)	2(1.7)	7(3.4)
>20	7(8.3)	6(5.0)	13(6.3)

Table 4.2 shows the distribution of the respondents by professional categories, departments and duration of practice.

**Table 4.3.** Different Strata for the Sample Distribution of Respondents' By Professional Categories

<b>Professional Categories</b>	<b>Expected</b>	<b>Actual</b>
	<b>Frequency (%)</b>	<b>Frequency (%)</b>
Doctors	79(35.3)	71(34.6)
Nurses	119(53.1)	108(52.7)
Med. Lab. Sc.	18(8.0)	18(8.8)
Ward Maids	8(3.6)	8(3.9)
<b>TOTAL</b>	<b>224(100)</b>	<b>205(100)</b>

Table 4.3 above shows the different strata based on professional categories from which the samples were randomly selected.

**Table 4.4.** Respondent's Awareness and Knowledge of Hand washing by Professional Categories

<b>Level Of Awareness/ Knowledge</b>	<b>Doctors</b>	<b>Nurses</b>	<b>Med. lab. Sc</b>	<b>Ward maids</b>	<b>Total</b>
	<b>Freq. (%)</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>
<b>Very Good</b>	20(28.2)	14(13.0)	0(0.0)	1(12.5)	35(17.1)
<b>Good</b>	49(69.0)	58(72.2)	8(44.5)	5(62.5)	140(68.3)
<b>Poor</b>	2 (2.8)	16(14.8)	10(55.6)	2(25.0)	30(14.6)
<b>Total</b>	<b>71(100)</b>	<b>88(100)</b>	<b>18(100)</b>	<b>8( 100)</b>	<b>49(100)</b>

Table 4.4 shows the levels of respondents' awareness and knowledge on hand washing by professional categories.

**A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria**

**Table4.5.** Comparison of Respondents' Awareness and Knowledge of Handwashing between Dchcs and Kgh

Variables	Dchcs	Kgh	Total
Awareness/Knowledge	Frequency (%)	Frequency (%)	Frequency (%)
V. Good	15(17.9)	20(16.5)	35(17.1)
Good	59(70.2)	81(66.9)	140(68.3)
Poor	10(11.9)	20(16.5)	30(14.6)
TOTAL (%)	84(100)	121(100)	205(100)
$X^2 = 0.855$ , $df=2$ , $p = 0.652$ , No significant difference exist			

Table 4.5 below compares the level of awareness and knowledge of the respondents' between Daughters of Charity Health Care Services (DCHCS) and Kubwa General Hospital (KGH) for any significant difference.

**Table4.6.** Respondent's Knowledge on Nosocomial Infections by Professional Categories

Variable	Doctors	Nurses	Med. Lab. Sc.	Ward Maids	Total
Knowledge	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
V. Good	32(45.1)	11(10.2)	0(0.0)	1(12.5)	44(21.5)
Good	34(47.9)	76(70.4)	7(38.9)	4(50.0)	121(59.0)
Poor	5(7.0)	21(19.4)	11(61.1)	3(37.5)	40(19.5)
<b>Total Freq (%)</b>	<b>71(100)</b>	<b>108(100)</b>	<b>18(100)</b>	<b>8(100)</b>	<b>205(100)</b>

Table4.6 shows the levels of respondents' knowledge on nosocomial infections by professional categories.

**Table4.7.** Comparison of Respondent's Knowledge On Nosocomial Infections In Dchcs And Kgh

Variables	Dchcs	Kgh	Total
Knowledge	Frequency (%)	Frequency (%)	Frequency (%)
V. Good	19(22.6)	25(20.7)	44(21.5)
Good	51(60.7)	70(57.9)	121(59.0)
Poor	14(16.7)	26(21.5)	40(19.5)
TOTAL (%)	84(100)	121(100)	205(100)
$X^2 = 0.748$ , $df=2$ , $p = 0.688$ , No significant difference exist			

Table4.7 below compares the level of knowledge on nosocomial infections by the respondents' between DCHCS and KGH for any significant difference.

**Table4.8.** Respondents' Perception on when to Wash their Hands by Professional Categories

Variables	Doctors		Nurses		Med. Lab. Sc.		Ward Maids		Total	
	Freq. N=71	%	Freq. N=108	%	Freq. N=18	%	Freq. N=8	%	Freq. N=205	%
P1	63	88.7	88	81.5	7	38.8	6	75.0	164	80.0
P2	21	29.6	27	25.0	0	0.0	3	37.5	51	12.7
P3	39	54.9	42	38.9	2	11.1	6	75.0	89	22.1
P4	36	50.7	47	43.5	7	38.9	6	75.0	96	23.8
P5	0	0.0	3	2.8	0	0.0	0	0.0	3	0.7

**KEY:**

- P – Perception on hand-washing
- P2 – Immediately on arrival at work.
- P4 – After taking off hand glove.
- P1 – Before and after each patient contact.
- P3 – After touching blood and body fluids.
- P5 - Before talking to a colleague.

The perception of the respondents on when to wash their hands is shown in table 4.8 above and the attitude of the respondents' towards hand washing is shown in table 4.9 below.

**Table4.9.** Respondents' Attitude Towards Handwashing By Professional Categories

Attitude	Doctors	Nurses	Med. Lab. Sc.	Ward Maids	Total
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
V. Good	30(42.3)	37(34.3)	1(5.6)	5(62.5)	73(35.6)
Good	34(47.9)	66(61.1)	13(72.2)	3(37.5)	116(56.6)
Poor	7(9.9)	5(4.6)	4(22.2)	0(0.0)	16(7.80)
<b>Total Freq. (%)</b>	<b>71(100)</b>	<b>108(100)</b>	<b>18(100)</b>	<b>8(100)</b>	<b>205(100)</b>

**A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria**

**Table4.10.** Comparison of Respondents' Attitude Towards Handwashing Between Dchcs And Kgh

Variables	Dchcs	Kgh	Total
Attitude	Frequency(%)	Frequency(%)	Frequency(%)
V. Good	30(35.7)	43(35.5)	73(35.6)
Good	44(52.4)	72(59.5)	116(56.6)
Poor	10(11.9)	6(5.0)	16(7.8)
TOTAL (%)	84(100)	121(100)	205(100)
$X^2 = 3.310$ , $df=2$ , $p = 0.173$ , No significant difference exist			

Table 4.10 below compares the attitude of the respondents towards hand washing between DCHCS and KGH for any significant difference.

**Table4.11.** Respondents' Periodic Intervals Of Handwashing By Professional Categories

Variables Q	Doctors		Nurses		Med. Lab. Sc.		Ward Maids		Total	
	Freq. N=71	%	Freq. N=108	%	Freq. N=18	%	Freq N=8	%	FREQ.N =205	%
Q1	11	5.7	36	15.0	2	11.8	4	26.7	53	11.4
Q2	36	18.7	47	19.6	3	17.7	3	20.0	89	19.2
Q3	69	35.8	82	34.2	3	17.7	4	26.7	158	34.0
Q4	24	12.4	29	12.1	2	11.8	1	6.7	56	12.0
Q5	53	27.5	46	19.2	7	41.2	3	20.0	109	23.4

**KEY:**

- Q - Periods of hand-washing. Q1 – Immediately on arrival at work.
- Q2 – Before examining a patient. Q3 – After examining a patient.
- Q4 – Before procedure on the same patient Q5 – After removing hand gloves.

**Table4.12.** What Respondents' Wash Their Hands By Professional Categories

Variables R	Doctors		Nurses		Med. Lab. Sc.		Ward Maids		Total	
	Freq. n=71	%	Freq. n=108	%	Freq. n=18	%	Freq. n=8	%	Freq. n=205	%
R1	4	5.6	0	0.0	0	0.0	1	12.5	5	2.4
R2	33	46.5	26	24.2	1	5.7	5	62.5	65	31.7
R3	50	70.4	79	73.2	13	72.2	7	87.5	149	72.7
R4	0	0.0	20	18.5	0	0.0	1	12.5	21	10.2

**KEY:**

- R – Agents to wash hand with. R1 – water alone.
- R2 - Plane soap and water. R3 - Antimicrobial soap and water.
- R4 – others.

**Table4.13.** Respondents' Techniques of Hand washing By Professional Categories

Variable S	Doctors		Nurses		Med. Lab. Sc.		Ward Maids		Total	
	Freq. n=71	%	Freq. n=108	%	Freq. n=18	%	Freq. n=8	%	Freq. n=205	%
S1	71	100.0	77	71.3	9	50.0	8	100.0	165	80.5
S2	68	95.8	77	71.3	12	66.7	8	100.0	165	80.5
S3	66	93.0	87	80.6	9	50.0	7	87.5	169	82.4
S4	67	94.4	77	71.3	7	38.9	7	87.5	158	77.5
S5	67	94.4	76	70.4	9	50.0	8	100.0	160	78.1
S6	59	83.1	82	75.9	11	61.1	8	100.0	160	78.1

Multiple responses, n=205

**KEY:**

- S - Techniques of hand-washing S1 – Soap hands adequately
- S2 – Rub hands vigorously front and back. S3 – Wash in between fingers and finger tips
- S4 – Wash the sides of your hand and thumbs. S5 – Wash up to your wrist.
- S6 – Rinse under clean water until all traces of soap are removed.

**A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria**

**Table4.14.** Respondents' Practice Of Handwashing By Professional Categories

	<b>Doctors</b>	<b>Nurses</b>	<b>Med.Lab. Sc.</b>	<b>Ward Maids</b>	<b>Total</b>
<b>Practice</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>	<b>Freq. (%)</b>
Excellent	2(2.8)	0(0.0)	0(0.0)	0(0.0)	2(1.0)
V. Good	39(54.9)	40(37.0)	2(11.1)	3(37.5)	84(41.0)
Good	23(32.4)	41(38.0)	7(38.9)	5(62.5)	76(37.1)
Fair	4(5.6)	18(16.7)	4(22.2)	0(0.0)	26(12.7)
Poor	3(4.2)	9(8.3)	5(27.8)	0(0.0)	17(8.3)
<b>Total Freq. (%)</b>	<b>71(100)</b>	<b>108(100)</b>	<b>18(100)</b>	<b>8(100)</b>	<b>205(100)</b>

Table4.11, 4.12, and 4.13 above show individual responses on the various aspects in the practice of hand washing. However, the grading of the level of practice of hand washing by professional categories is shown in table 4.14

**Table4.15.** Comparison of Respondents' on the Practice of Handwashing In Dchcs And Kgh

<b>Variables</b>	<b>Dchcs</b>	<b>Kgh</b>	<b>Total</b>
<b>Practice</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>
Excellent	1(1.2)	1(0.8)	2(1.0)
V. Good	35(41.7)	49(40.5)	84(41.0)
Good	31(36.9)	45(37.2)	76(37.1)
Fair	10(11.9)	16(13.2)	26(12.7)
Poor	7(8.3)	10(8.3)	17(8.3)
<b>TOTAL (%)</b>	<b>84(100)</b>	<b>121(100)</b>	<b>205(100)</b>
$X^2 = 0.153$ , $df=4$ , $p = 0.997$ , No significant difference exists			

Table 4.15 above compares the practice of hand washing by the respondents between DCHCS and KGH for any significant difference.

Table 4.16 and 4.17 below also show some of the factors that affects effective practice of hand washing among the respondents.

**Table4.16.** Factors Influencing Effective Practice of Handwashing

<b>Factors</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Availability of soap</b>		
Yes	188	95.9
No	7	3.6
No response	1	0.5
<b>Kind of soap present</b>		
Bar soap	22	7.2
Detergent	24	7.8
Liquid Soap	186	60.6
Alcohol based	65	21.2
No response	10	3.3
<b>Sinks in wards/clinics</b>		
Yes	189	92.2
No	5	2.4
No response	11	5.4
<b>Location of Sinks</b>		
Px. Bedside	27	12.5
Nurses bay	93	43.1
One on each- bay	64	29.6
No response	32	14.8
<b>Source of water</b>		
Tap	189	66.8
Drum	67	23.7
Jug	17	6.0
Sachet water	2	0.7
No response	8	2.8
<b>Frequency of tap running</b>		

**A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria**

All the time	78	37.7
Sometimes	103	49.8
Rarely	9	4.4
Never	7	3.4
No response	10	4.8

**Table 4.17.** Limiting Factors to Effective Practice of Handwashing

LIMITING FACTORS	FREQUENCY	PERCENTAGES (%)
Lack of materials	106	42.4
Soap reagents cause skin irritation	12	4.8
Insufficient time/too busy	36	14.4
Sinks are inconveniently located	47	18.8
Belief that the use of gloves obviates - the need for hand washing	7	2.8
Forgetfulness	42	16.8
<b>Total Freq. (%)</b>	<b>250</b>	<b>100</b>

**DISCUSSION**

An attempt to compare the results from the two health care facilities in Kubwa F.C.T Abuja used in this study showed no statistical significance difference. This is probably because they are both located in the same District, have similar challenges and have health care workers of similar background. The discussion therefore applies to the two health care facilities except where otherwise stated. Of the 205 respondents (84 from DCHCS and 121 from KGH), most were within the age group 20-29. There were more females than males in the respondents. This is possibly because 48.2% of our respondents were of the nursing profession which is largely dominated by females. Only three respondents were above 59 years, the age of retirement in the public service being 65 years. Fifty four percent of our respondents were not married this can be explained by the age distribution of 75% being less than 40 years old.

The ethnic group with the largest representation was non - indigene, which is to be expected since it is the Federal Capital Territory (F.C.T). This is probably due to influx of non- indigene to boost the manpower of the health sector of the state. However, there were a slightly higher number of Gwari respondents.

Nurses accounted for most of the population, making up 48.2% of our respondents. This is closely followed by doctors who make up 31.7%, which is made of house officers, (14.29%) consultants (8.93%) junior registrars (8.04%) senior registrars (0.45%). Registrars are few because the resident training has just begun.

Majority of the respondents (68%) had good knowledge of hand washing using the KAP scoring system. Seventeen percent had very

good knowledge of hand washing, while 15% had poor knowledge.

In the area of nosocomial infections, forty respondents had poor knowledge. Eleven of the forty respondents who had poor knowledge of nosocomial infections were medical lab scientist and that accounts for 61% of the medical lab respondents. This is a sad fact because these professionals deal directly with pathogens and poor knowledge of nosocomial infections puts them at risk.

Forty-four respondents had very good knowledge of nosocomial infections out of which 32 were doctors. Good knowledge of hand washing, and nosocomial infections is to be expected from doctors who presumably receive lectures on hand washing and nosocomial infections in medical school and come in contact with various forms of infections every day. Hand washing and other hygienic practices are taught at every level of school, advocated in the work place, and emphasized during medical training but this however has not translated to good hand washing practice as noted by WHO.<sup>47</sup> However, most of them only had a general idea of what it entails and thus could not give appropriate responses when specific details were required of them, a fact which seems to indicate that they may have forgotten some of these principles.

From this study doctors had the best knowledge of hand washing and nosocomial infections, followed by nurses. This agrees with the study carried out by Alaziz<sup>51</sup> among health care in Ain Shams University Hospital in Cairo Egypt but disagrees with Lipsett<sup>52</sup> who reported a higher compliance among nurses (50%) compared to doctors (15%) and nursing support staff.

## A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria

All the respondents agreed that hand washing was important in preventing the spread of nosocomial infections, unlike the study carried out by Pittet *et al* in which there was skepticism regarding the value of hand hygiene.<sup>27</sup> In this study majority of the respondents agrees that hand washing is important in preventing the spread of nosocomial infections.

The result observed agrees with the observations made by experts that cleansing the hands before and after patient contact is one of the most important measures for preventing the spread of microorganisms in healthcare settings.<sup>45</sup> This is as shown on table 4.6 where more than two third (80.0%) of the respondents agreed that health workers should wash their hands before and after each patient contact. Eighty-nine (43.4%) in addition were of the opinion that healthcare workers should wash their hands after touching blood and body fluids and also after taking off hand gloves. However, as was discovered by Pittet and colleagues,<sup>27</sup> some health workers were of the opinion that the use of hand gloves obviates the need for hand washing. Such people feel that when wearing gloves, the hands do not come in direct contact with the patient, and as such, it is not necessary to decontaminate the hands. Just above 11% said that hands should be washed immediately on arrival at work; and this is when health workers are supposed to wash their hands for the first time at work according to WHO guidelines.<sup>6</sup>

A reason that can be proposed for this is that they feel they have not yet handled any equipment or patient and as such find it quite unnecessary to wash their hands at the beginning of the day's job. They however fail to realize that their hands may have been contaminated on the way to work and as such they may transmit infections to unsuspecting patients.

A little less than half of our respondents interviewed had excellent hand washing practice, while 37% had good practice. More than two third involved in the study reportedly washed their hands after each patient contact. Hundred and nine of our respondents also consented to washing hands after taking off hand gloves. However most did not see the need of washing hands between procedures on the same patient, and worse still, immediately on arrival at work, which supports the attitude discussed above. Most washed their hands with plain soap and water and about two thirds use

antimicrobial soap and water. Only a few washed their hands with water alone.

Most respondents claimed to practice the standard procedures for hand washing. More than two third admitted that they soap adequately, rub hands vigorously front and back, wash in between their fingers and finger tips properly, wash the sides of hand and thumb, wrist and rinse under clean water. A slightly less number reportedly did not wash the sides or the hands and thumbs when washing their hands. WHO guideline for hand washing states that towels must never be shared.<sup>6</sup>

There is an obvious difference between attitude on hand washing and the practice of hand washing. As seen on tables 4.9 and 4.10, respondents' attitude towards hand washing is better than the practice and this can be attributed to the limiting factors in these centers as identified by respondents and discussed below.

Almost all the respondents reported that soap was being provided for hand washing in their wards/clinics, albeit sometimes infrequently liquid soap was by far the dominant type of soap provided accounting for about (68.59%) followed by alcohol based (21.20%). Tap water was the most common source of water for hand washing although the taps do not run all the time, according to majority of the respondents. This is no doubt due to frequent interruptions in power supply. When the taps are not running, drums and jugs become the source of water.

For the limiting factors to hand washing, lack of materials (soap, water, towels) was the most frequently indicated. It becomes difficult to wash the hands when the taps do not run frequently and when washing agents are not routinely provided, followed by complain that sinks are inconveniently located. For instance, in the wards most sinks were located one in each bay, and one may find it cumbersome to walk towards. Forgetfulness was next. Only fourteen percent (14%) blamed busy schedules. Lack of materials, heavy workloads and poorly located sinks hand already been outlined as reasons for non-adherence in Nigeria<sup>45</sup> as well as in the study carried out by Pittet.<sup>39</sup>

### CONCLUSION

There is a high knowledge and awareness of hand washing principles and nosocomial infections among health care workers in the tertiary healthcare facilities (DCHCS and KGH) in Kubwa district of Bwari area council of F.C.T

## A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria

Abuja. The attitude to hand hygiene was good; all were of the opinion that hand hygiene is necessary to reduce the spread of nosocomial infections, but they did not all know when the hands ought to be washed. There is a high knowledge and awareness of handwashing principles and nosocomial infections among health care workers in the healthcare facilities (DCHCS and KGH) in Kubwa district of Bwari area council of F.C.T Abuja. The attitude to hand hygiene was good; all were of the opinion that hand hygiene is necessary to reduce the spread of nosocomial infections, but they did not all know when the hands ought to be washed. The handwashing practices were however below average and did not correlate well with knowledge. The major factors affecting hand washing were found to be lack of materials (soap and water), forgetfulness, insufficient time, and inconveniently located sinks.

### RECOMMENDATIONS

#### Hospital Management

- **Frequent Seminars.** Frequent seminars should be organised by the Infection Prevention Committee to stress the burden of nosocomial infections, the battle against it thus far, and the role of hand washing as a weapon. This will also serve to teach or remind them of the standard principles of hand hygiene.
- **Visual Aids.** Written guidelines should be pasted in prominent places in the wards, clinics, nurses and doctors' rooms to serve as a constant reminder for healthcare workers to wash their hands as stipulated.
- **Lay out.** The layout of the wards and clinics should be improved such that there are more sinks in each bay and clinic and these are placed in easy to reach areas.
- **Provision of Materials.** Washing agents should be made available more routinely. Liquid soap with dispenser is preferable because bar soaps easily get soggy. This makes them not only repulsive, but also an inadvertent culture medium. Disposable paper towels, if not electronic hand driers, should be provided, as well as ensuring constant water supply.

#### Healthcare Workers

- **Personal Commitment.** Each doctor should make a personal commitment to protect their patient by washing their hands routinely.

Regardless of the educative processes put in place, very little will be achieved unless each doctor is convinced of the benefits of hand hygiene and adheres.

- **Personal Towels.** Doctors should endeavour to take their own hand towels to work to prevent the spread of infections via towels. At least two should be carried along so that the towel does not become unduly soaked.
- **Use of Hand Rubs.** The use of alcohol-based hand rubs would go a long way in improving hand hygiene because they are portable, hence easy to carry around; effective; and largely non-irritant. They can also be used in the absence of water supply.

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## A Survey of Hand Washing Behavior and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria

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