Examination date: 2014-06-03
Bachelor of Science in Nursing, 180 credits
Course: 41
Bachelor’s Thesis, 15 credits

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ABSTRACT

Background
Healthcare-associated infections constitute a threat to patient safety and an economic burden on health systems worldwide. The most effective way to prevent healthcare-associated infections is through proper hand hygiene practice, but studies show that compliance is low. In 2009, the World Health Organization released hand hygiene guidelines and tools to address the issue.

Aim
The aim of the study was to measure the compliance to the WHO Guidelines on Hand Hygiene in Health Care among nursing staff in a private hospital in the Philippines using the evaluation framework of the World Health Organization.

Method
The method used to assess compliance was structured direct observations using the World Health Organization’s observation form. Data was collected in 15 days, during full shifts, and analyzed quantitatively based on overall compliance, according to indication, ward, week day/weekend and shift.

Results
A total of 1920 opportunities were recorded, of which 336 were hand rub performances, 168 hand wash and 1416 missed opportunities, giving an overall compliance of 26.25 percent. The ward with the highest compliance rate was the Neonatal Intensive Care Unit (45.40 percent) and the lowest was Nursing Station 1 (22.26 percent).

Conclusion
The overall compliance rate of 26.25 percent is lower compared to most published studies and healthcare workers were more compliant to indications that protect themselves than to indications that protect patients. The results can be useful in improving quality of care and patient safety.

Key words: Guideline Adherence, Compliance, Hand Hygiene, Nursing Care, Philippines
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BACKGROUND

A Historical View on Hand Hygiene

According to Pittet (2005), the two most renowned pioneers when it comes to hygiene and infection prevention are Ignaz F. Semmelweis and Florence Nightingale. Semmelweis found the connection between antiseptic hand-cleaning and reduced cross transmission of infectious agents. He discovered a relationship between higher maternal mortality rates when babies were delivered by students and physicians, than when babies were delivered by midwives. The reason, he thought, depended on exposure to cadaverous particles that the students and physicians received while working on dead bodies. Semmelweis insisted that a chlorinate lime solution was used to scrub their hands before every patient contact; after his discovery, maternal mortality drastically shrank and stayed low.

Florence Nightingale worked to improve hygiene practice and air control. She explained the relationship between sanitary conditions and postoperative complications. Nightingale cared for victims of the Crimean war and showed that the high mortality rates among soldiers could be explained by the crowding and contagious diseases. She was a well-known model when it came to improving sanitary conditions in hospitals (Pittet, 2005).

The world’s first national hand hygiene guidelines were published in the 1980s. Since then the guidelines have improved several times, for example, the guidelines on when to hand wash and when to use alcohol-based hand rub have changed. In 2009, the World Health Organization (WHO) released guidelines with the aim to provide knowledge on the importance of hand hygiene and set a standard on hand hygiene practice globally (WHO, 2009b).

Healthcare-associated Infections

Healthcare-associated infections (HCAI) are infections that occur in connection to medical examinations, care or treatments either at hospitals, at dentists, nursing homes or in your own home. They constitute a global threat to patient safety and present a great economic burden to health systems (WHO, 2009b).

The Problem with HCAI and its Relation to Hand Hygiene

In high-income countries HCAI affect at least seven percent of in-patients, while in low-income and middle-income countries the statistics are even higher, about 15 percent of patients admitted to hospitals (Allegranzi et al., 2013). In Europe, roughly 5 million HCAI are estimated to occur yearly in acute care hospitals, leading to 25 million days of extended hospital stay, amounting to a cost of €13-24 billion. Mortality in Europe attributed to HCAI is estimated at 1 percent (50 000 cases) per year, although it is a contributing factor in 2.7 percent of deaths (135 000 cases). In developing countries, there is limited data and therefore difficult to assess the scope of the problem (WHO, 2009b).

The most effective way to reduce HCAI is to perform proper hand hygiene (Song, Stockwell, Floyd, Short & Singh, 2006), and according to Stone et al. (2012), it includes the proper use of alcohol rub and soap, and making them more accessible. Song et al. (2006) also concludes that it is important to identify barriers to why the compliance is low to be able to fully implement methodologies to overcome these.
The Importance of Hand Hygiene in Nursing Care

Four basic components in nursing care that regards nurses all over the world are “to promote health, to prevent illness, restore health and alleviate suffering” (International Council of Nurses [ICN], 2012, p. 1). Healthcare workers are obligated to work in a precautionous way that limits the risk of HCAI, and one of the steps to achieve that is for example, the use of hand rub before and after every patient contact (SOSFS 2007:19). Hand hygiene is the most significant way to minimize HCAI and still the compliance of hand hygiene among healthcare workers is low (Al-Tawfiq, Abed, Al-Yami & Birrer, 2013). Nurses are the majority of healthcare workers in hospitals who have the highest numbers of opportunities, and therefore the importance of nurses performing correct hand hygiene is crucial (WHO, 2009b).

To improve hand hygiene compliance, it is not only important to increase the knowledge of when and how to perform proper hand hygiene, it is also crucial to identify the reasons why hand hygiene is not performed. If the reasons are identified, they can be dealt with and overcome (Song et al., 2013). By doing that, and also increasing the availability of places where healthcare workers can perform hand hygiene, both HCAI and hospital costs can be reduced (Chen et al., 2012).

The “Clean Care is Safer Care” Project

The WHO launched its programme “Clean Care is Safer Care” in October 2005 as part of The World Alliance for Patient Safety, approved by the 57th World Health Assembly. The main aim of the programme is to improve hand hygiene worldwide, in all healthcare levels, as it is the primary tool for reducing healthcare-associated infections and promoting patient safety. The programme is the first Global Patient Safety Challenge (1st GPSC) set to HCAI globally (WHO, 2013a).

Within the “Clean Care is Safer Care” programme, the WHO developed recommendations, improvements and implementation strategies to promote hand hygiene practice all over the world in all health care settings. This led to the WHO Guidelines on Hand Hygiene in Health Care, an evidence-based document for health-care workers, hospital administrators and health authorities (WHO, 2009b).

In 2009, the WHO launched its annual global campaign “SAVE LIVES: Clean Your Hands” as an extension to its “Clean Care is Safer Care” programme. The campaign aims to teach health-care workers to clean their hands at the right time in the right way. Today, it includes a wide resource of improvement tools and materials based on existing research and evidence, rigorous testing and on experts in the field, as well as a global annual day with a focus on improving hand hygiene in health care. As of April 2012, 127 Ministers of Health have pledged commitment to reduce HCAI and support the WHO’s work, and over 40 countries and areas have commenced hand hygiene campaigns (WHO, 2013a).

My Five Moments for Hand Hygiene

A main component of the “Clean Care is Safer Care” programme is the concept of “My five moments for hand hygiene”. They are indications on when to practice hand hygiene, focused on contacts occurring within the patient zone while practicing health care. Here,
the patient zone is defined as “the patient and some surfaces and items that are temporarily and exclusively dedicated to him or her” (WHO, 2009a, p. 9). The first two indications are meant to protect the patient, and the last three are aimed to protect the healthcare worker and healthcare surroundings. The five moments are: “1. before touching a patient; 2. before clean/aseptic procedure; 3. after body fluid exposure; 4. after touching a patient; 5. after touching patient surroundings” (WHO, 2009b, p. 101-102).

The WHO defines hand hygiene as “any action of hand cleansing” (WHO, 2009a, p. 4). This is done either through hand-rubbing with an alcohol-based solution, or hand washing with soap and water. When performed with the proper technique, it makes hands free from potentially harmful contamination and safe for patient care. The preferred method of hand hygiene is hand-rubbing with alcohol-based solution and should be used when available. When hands are visibly dirty or soiled with body fluids, when they have been exposed to potential spore-forming organisms either suspected or proven, or after using the toilet, hands must be washed with soap and water (WHO, 2009a).

**Definition of Hand Hygiene Compliance**

The WHO defines hand hygiene compliance as “the ratio of the number of performed actions to the number of opportunities” (WHO, 2009a, p. 19) and it can be calculated using the following formula:

"Compliance (%) = \frac{\text{performed actions}}{\text{opportunities}} \times 100"

(WHO, 2009a, p. 19)

**Measuring Hand Hygiene Compliance**

An ideal method to measure hand hygiene should render unbiased results and an exact numerical value of hand hygiene practice in relation to healthcare-associated infection outcomes. Such a method does not exist today; current methods of measurement only render an approximate value on hand hygiene compliance, and each method have both advantages and disadvantages (WHO, 2009b).

Current methods of measuring hand hygiene compliance can be divided into two groups: direct and indirect methods. Direct methods include direct observation, patient assessment and self-reports from healthcare workers. Indirect methods consist of monitoring hand rub consumption, soap consumption, use of sinks or use of hand rub dispensers (WHO, 2009b).

**Direct Methods**

The WHO considers direct observation as the “gold standard” for monitoring hand hygiene compliance as it is the only method which can detect all hand hygiene opportunities and following actions, as well as the number of times these have been performed and if they were performed within the right time frame. The chosen hand hygiene action and the quality of the performed hand hygiene can also be observed. Observations are often done by trained and certified observers. This means that the method is very time and resource-
Observation bias is also known as the “Hawthorne effect”. The term was coined from the Hawthorne factory of Western Electric where researchers noted the tendency of people to behave differently when observed. A study was conducted in five intensive care units in a university hospital in Germany to determine the influence of the Hawthorne effect on compliance with antiseptic hand rub. In the first period, covert observations were done, meaning that healthcare workers had no knowledge that they were being observed and showed an overall average of 29 percent compliance. The second period with an overt observation when healthcare workers were aware their “hygienic performance” was monitored gave an overall average of 45 percent. The researchers concluded that the Hawthorne effect had a great influence on compliance with a 55 percent increase with overt observation (Eckmans, Behnke, Gastmeier and Rüden, 2006).

A variation to direct observation is using video cameras to record data which may minimize the Hawthorne effect. It is costly and resource-demanding, both financially and time-wise. Selection bias remains because only selected areas may be observed and it raises the question of privacy for both patients and healthcare workers (Haas & Larson, 2007).

The other direct method of patient assessment means that patients are the observers of hand hygiene. Patients may be uncomfortable in a formal role and may not always be physically or mentally able to perform this task (WHO, 2009b).

Self-reports by healthcare workers is another direct method but it tends to be overestimated when compared to compliance measured by direct observation (WHO, 2009b). In a 2013 study based on the WHO’s “My Five Moments for Hand Hygiene” in a Thai hospital, observed compliance was 23.2 percent by direct observation, compared to 82.4 percent by self-reports (Eiamsitrakoon, Apisarnthanarak, Nuallong, Khawcharoenporn & Mundy, 2013).

Indirect Methods
Indirect methods of measuring hand hygiene performance record consumption of products such as paper towels, alcohol-based hand rub or liquid soap in order to estimate the number of hand hygiene performance. The method is less expensive and less prone to the biases of direct observation, but further research is needed if product consumption correlates with observed hand hygiene compliance. Another disadvantage is that it cannot determine if the hand hygiene action was performed for the correct indication or if it was performed with the correct technique. A variation to this method is automated or electronic monitoring where sensors are used to measure consumption (WHO, 2009b).

Factors That Affect Hand Hygiene Compliance
The WHO conducted a systematic review of the research on hand hygiene prior to publishing the WHO Guidelines on Hand Hygiene in Health Care. They divided the factors that affect hand hygiene compliance into factors for poor adherence / low compliance and factors for good adherence / improved compliance. In the observed factors for poor adherence they concluded 23 reasons, among them doctor or nursing assistant status, belonging to the male sex, working in intensive care, surgical care, emergency care or...
anesthesiology, working during a week day, wearing gowns and/or gloves, before contact and after contact with patient environment, patient care in non-isolation room, patient contact for two minutes or less, interruption in patient care activities, activities with high risk of cross-transmission, understaffing or overcrowding and high number of opportunities for hand hygiene per hour of patient care (WHO, 2009b).

In self-reported factors for poor adherence, the WHO concluded 16 factors such as hand washing agents cause irritation and/or dryness, that there are not enough sinks or they are inconveniently placed and lack of hand washing resources, for example soap. Other factors were time constraints, prioritizing patients’ needs, performance of hand hygiene interferes with the caregiver-caretaker relationship and that there is a perceived low risk for infection. Wearing gloves or believing that gloves can replace proper hand hygiene, lack of institutional guidelines or knowledge of these, lack of knowledge, experience and education, lack of role models among colleagues and skepticism about the importance of hand hygiene were also mentioned (WHO, 2009b).

A study was conducted in a hospital in Thailand by Eiamsitrakoon et al. (2013) on hand hygiene compliance based on the WHO’s “My Five Moments for Hand Hygiene”. In the study, participants stated 11 reasons for non-compliance of which “I hurry/emergent patient conditions”, “I don’t see any dirt/I think it’s not too dirty”, “I forget”, “I’m too busy/too many patients”, “It is inconvenient” were the more major reasons (Eiamsitrakoon et al., 2013, p. 1142).

In another study by Kowitt, Jefferson & Mermel (2013), they also observed lower hand hygiene compliance before entering a patient room compared to leaving it. Their research also found that weekends are associated with better compliance rates compared to weekdays, and that nurses have better compliance compared to other professional categories. Their study also showed that compliance increased progressively from day to evening to night and that it was higher in pediatric and ICU units compared to medical and surgical units.

Another aspect that can be considered is the behavioral aspect of hand hygiene. Findings from a study on hand washing and behavioral factors suggest that hand washing behavior is developed in early childhood. Hand washing behavior was divided into two categories, inherent and elective, where inherent behavior is intrinsic behavior that drives most to wash their hands and happens when hands are visibly soiled, feel sticky or gritty, and elective behavior are all other behaviors not in the inherent category. In nursing practice, inherent behavior includes hand washing after touching patients who are perceived as “unhygienic” through appearance, age or demeanor, as well as after “emotionally dirty places” such as axillae or genitals, while elective behavior encompasses hand washing after noninvasive, impersonal contact with a patient and his/her surroundings. While inherent behavior is associated with hand washing after activities that pose a risk to oneself, elective is associated with hand washing after activities that not perceived as a threat to oneself and therefore does not trigger an instinctive response to wash hands (Whitby, McLaws & Ross, 2006).

Statistics on Hand Hygiene Compliance
Hand hygiene compliance of healthcare workers in different countries and settings vary, but they are often low and not enough to ensure patient safety (WHO, 2009b). In a two-
year quasi-experimental study based on the WHO’s hand hygiene publications, Allegranzi et al. (2013) found an overall compliance rate of 51 percent across five different countries in six different sites before intervention. Another study in Thailand showed a compliance of 23.2 percent based on “My Five Moments for Hand Hygiene” (Eiamsitrakoon et al., 2013). The WHO (2009b) also reports a big variation on hand hygiene compliance in their literature review, ranging from five percent to 89 percent, giving an overall average of 38.7 percent. Definitions of compliance and indications, as well as the methods and criteria used for the research that were included were not detailed in some studies (WHO, 2009b).

The Philippines

The Republic of the Philippines is a country composed of 7107 islands located in South East Asia in the Pacific Ocean. It has a land area of 300,000 km² divided into three geographical regions: Luzon, Visayas and Mindanao, which in turn is further divided into 80 provinces. The 2013 population estimate is 105,720,644, making it the 13th most populated country in the world. The capital, Manila, is located in Luzon with a population of 11.5 million. The official languages are Filipino and English, although there are over 100 dialects spoken throughout the country (Central Intelligence Agency [CIA], 2013).

The country is a former Spanish colony, later turned American colony, before it attained its independence in 1946. A lot of remnants from the colonial period remains; for example, 82.9 percent of the population is Catholic and ideals are mostly Western (CIA, 2013).

The Philippines has a tropical marine climate. The year is divided into rainy season and dry season, and it regularly suffers from typhoons, as well as volcanic activity and earthquakes (CIA, 2013).

According to 2013 estimates, 26.5 percent of the population is living below the poverty line. 48.8 percent are living in urban areas, 92 percent of the population has access to improved drinking water, and 72 percent has access to improved sanitation facilities (CIA, 2013).

The Health Status of the Philippines

According to the WHO statistics from 2005, the leading cause of death among Filipinos is heart disease, vascular diseases then malignant neoplasms/cancer. The average lifespan is 72.21 years (CIA, 2013). Among communicable diseases, pneumonia and tuberculosis are the major causes of mortality (Romualdez et al., 2011). Maternal mortality rate is also one of the highest in Southern Asia while the prevalence of HIV/AIDS is less than 0.1 percent of the population (Karlsson, 2013). The major infectious diseases are bacterial diarrhea, hepatitis A, typhoid fever, dengue fever, malaria and leptospirosis (CIA, 2013). High tobacco and alcohol consumption are also major health problems (WHO, 2013b).

The Philippine Healthcare System

There are around 1700 hospitals in the Philippines, of which around 60 percent are privately owned (Karlsson, 2013). The principle governing agency of the Philippine Health System is the Department of Health (DOH). The DOH provides national policy direction and develops national plans, technical standards and guidelines on health. In 1991, the structure was decentralized, giving local government authorities autonomy and responsibility for their own health services, and provincial governments for secondary and
tertiary care. The national government also manages a number of tertiary level facilities. This resulted in a fragmentation of the overall management of the system, leading to considerably varying quality of health care across the country (Romualdez et al., 2011).

The cost of health care is paid for by the individual. For a majority of Filipinos, health care is facilitated and subsidized by the Philippine Health Insurance Corporation (PhilHealth). PhilHealth is a tax-exempt government corporation/agency attached to the DOH, established in 1995 following the “National Health Insurance Act of 1995”. Its role is to administer the Philippine National Health Insurance Program at central and local levels (Republic Act no. 7875 [R.A. 7875]). Despite this, there are still considerable inequities in health care access and outcomes between socio-economic groups in the Philippines. A major contributing factor to the inequities is the high cost of accessing and using health care (Romualdez et al., 2011).

Today, rural and poor areas of the country continue to be critically under-served. A major challenge for the health system is to attract and retain staff in these areas. There is also a deficiency in service delivery, related to inefficient patient referral system and gatekeeping (Romualdez et al., 2011).

**Nursing in the Philippines**

Filipino nurses undergo a four-year academic programme consisting of general education and professional courses that prepare them for work in community health and general hospital care (Romualdez et al., 2011). At the end of the programme, they take the Board of Nursing exam in order to become a licensed nurse. According to the “Philippine Nursing Act of 2002” (Republic Act of 9173 [R.A. 9173]), a nurse’s duty is to: “(a) Provide nursing care through the utilization of the nursing process; […]; (b) Establish linkages with community resources and coordination with the health team; (c) Provide health education to individuals, families and communities; (d) Teach, guide and supervise students in nursing education programs […]; and (e) Undertake nursing and health human resource development training and research, […];” (R.A. 9173, p. 8-9). Nurses are also primarily responsible for promoting health and preventing illness as independent practitioners (R.A. 9173).

The majority of healthcare workers in the Philippines are nurses and midwives. There is an oversupply of nurses compared to national needs, and this is attributed to the international demand because many studied nursing with the aim of working abroad. This also means that a majority of educated nurses who still live in the Philippines are not able to practice their profession in their country because of limited work opportunities or low wages (Romualdez et al., 2011).

**Hand Hygiene Practice in the Philippines**

According to Dr. Roman (personal communication, 24 November 2013, Appendix A), a board member of the Philippine Hospital Infection Control Society, there are no national hand hygiene guidelines in the Philippines. The guidelines are at a local level depending on the institution, and are based on the resources of the hospital. The hand hygiene policies differ from different institutions, even between the public hospitals under the Department of Health. A procedural manual and a standard handbook is in the creation process.
Problem Statement

Given the importance of preventing HCAI in the health care delivery setting and the availability of guidelines, the importance of compliance and its impact to HCAI (Al-Tawfiq et al., 2013) needs to be assessed.

The most basic measure to prevent HCAI is to practice proper hand hygiene. Studies on compliance to hand hygiene guidelines of healthcare workers vary greatly, with mean baseline rates from 5 percent to 89 percent (WHO, 2009b). Therefore it is of interest to measure the compliance to the WHO’s hand hygiene guidelines of nursing staff in a hospital in the Philippines. Nursing staff are of particular interest because they are the most involved in patient care (WHO, 2009b).

We have chosen to write about this subject because we believe that compliance to hand hygiene is a basic, important duty of all healthcare personnel. Despite its significance, we have observed instances during our clinical placements in Sweden that hygiene guidelines are not being followed. This fueled our interest to find out more about the subject and expand our vision about the implications of this problem in a different country, such as the Philippines.

AIM

The aim of the study was to measure the compliance to the WHO Guidelines on Hand Hygiene in Health Care among nursing staff in a private hospital in the Philippines using the evaluation framework of the World Health Organization.

METHOD

Study Setting and Population

Data was collected in a private hospital and medical center in the Philippines with an 87-bed capacity. It has over 100 medical specialists, over 150 supporting staff, modern equipment and facilities, enabling the hospital to provide tertiary care to nearby areas.

The Nursing Service Department is the largest department in the hospital and nursing care is practiced in the following areas: Emergency Room (ER), Outpatient Department (OPD), Intensive Care Unit (ICU), Neonatal Intensive Care Unit (NICU), Delivery Room (DR), Operating Room (OR), Recovery Room (RR), General Ward and Dialysis. The General Ward consists of two nursing stations: Nursing Station 1 (NS1) and Nursing Station 2 (NS2).

Nursing staff ranged from three to six per shift depending on the ward, day and shift, and includes registered nurses, volunteer nurses and nurse attendants. All volunteer nurses and some nurse attendants are registered nurses. Some nurse attendants are also nurses who failed the nursing board exam. Nurses worked eight-hour shifts, 7:00-15:00, 15:00-23:00 and 23:00-7:00.

Nursing is practiced differently depending on the ward. In the ICU and NICU, primary nursing was practiced, whereas in the general ward it was functional nursing. Primary
nursing entails holistic care of the patient, whereas functional nursing is divided into
different roles, usually: charge nurse, medicine nurse, intravenous (i.v.) nurse and bedside
nurse. Functional nursing is practiced in order to maximize personnel resources when they
are scarce.

NS1 and NS2 have a hand washing sink each (excluding toilet and dirty room sinks) where
a disinfectant soap is located. NS1 and NS2 have three hand rub dispensers by the station,
of which two are portable and are sometimes carried around by the nursing staff. There is
an isolation room in NS2 with a hand rub dispenser beside the door. In the NICU, there are
two hand washing sinks (excluding toilet sink) and three hand rub dispensers, of which two
are portable. The ICU has a hand washing sink (excluding toilet and dirty room sinks) and
a portable hand rub dispenser in most rooms. Above most sinks in the above-mentioned
wards were reminders of “My Five Moments for Hand Hygiene”, as well as the steps in
proper hand washing technique.

The hospital has an Infection Control Committee (ICC) consisting of a nurse and a doctor
who are in charge of overseeing hand hygiene practice and monitoring healthcare-
associated infections. The hospital bases their hand hygiene protocol (see Appendix B) on
the WHO’s and the Center for Disease Control's (CDC) hand hygiene recommendations.
The ICC also regularly monitors the hospital staff’s compliance and reports statistics on
HCAI monthly to the DOH.

Study Design

The method used to assess compliance was a structured observation to address the aim of
the study. A structured observation is used to collect data about specific behaviors, actions
and events using a formal instrument. It also follows a protocol on what to observe, length
per observation period and how to record information (Polit & Beck, 2012). In this case, it
was a direct observation of hand hygiene (WHO, 2009b) using the WHO’s observation
form (see Appendix C) as an instrument. Hand hygiene opportunities according to the
WHO’s “My Five Moments for Hand Hygiene” as well as performed hand hygiene for
those indications were observed during a full shift and recorded using a checklist.

The data was analyzed quantitatively based on the observation form and formula for
multistage sampling method was used (Polit & Beck, 2012) for the study because of the
need to combine probability and nonprobability sampling, given the available resources.
Randomization was the preferred sampling method, and was used when applicable.

Inclusion Criteria

In the WHO Hand Hygiene Technical Reference Manual, participants are divided into
different professional categories (WHO, 2009a). Nurses are the healthcare workers with
most patient contact (WHO, 2009b) and therefore the categories included in this study are
nurses, volunteer nurses and nurse attendants because of the time constraints and the need
to narrow the scope of the study to fit the extent of the thesis. Since all workers in the
chosen categories have a nursing background, they were considered equal. Only healthcare
workers who come in direct contact with patients were observed for efficiency in data
collection because the indications on when to perform hand hygiene is directly connected to patient care, for example before patient contact.

**Sampling Method**

For the first stage of sampling, a convenience sampling method (Polit & Beck, 2012) was used due to lack of resources and given the short time frame for the study. An email (see Appendix D) was sent to a contact in a hospital asking for permission to conduct the study in their facility, which they approved. It was chosen because it was easiest to solve the practical aspects of the study, such as accommodation, transport and so on.

In the second stage, a nonrandom selection (Polit & Beck, 2012) of departments was done. The hospital management granted access to the following departments: NS1, NS2, NICU, ICU and ER. After an orientation of the hospital, the ER was excluded because the workload was minimal and therefore the proportion of observations done in relation to the time spent there would be impractical.

Three weeks were chosen as the observation period, giving a total number of 15 observation days. The days of the week during which observations were conducted were purposively selected to give a week-proportionate distribution between weekdays and weekends giving 11 weekday days, 4 weekend days (Figure 1). Only day and evening shifts were included for practical reasons, so as not to be given two shifts directly after each other, for example a night shift then a day shift.

During the third stage, the departments and shifts were randomized by simple random sampling using a random integer generator (Random.Org, 2014). By assigning a number to each department and shift beforehand, the department and shift could be matched with a number (Figure 1) in the generated number sequence (Figure 2). Two sequences were generated; one for departments and one for shifts. A quota sampling method was implemented for the departments giving each department a maximum of four shifts.

<table>
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<th>DATE</th>
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<th>DEPARTMENT</th>
<th>SHIFT</th>
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**Figure 1.** The schedule that was followed by the observers. Departments and shifts were randomized.

**Random Integer Generator**

Here are your random numbers:

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<td>3</td>
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<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Timestamp: 2014-03-18 00:09:27 UTC

**Figure 2.** A randomly generated sequence from Random.org showing the randomization of the departments. Numbers are read from left to right.

On the fourth stage of sampling, nurses were matched with the observers. A random sequence was generated in the same way as the departments and shifts, where observer #1 always received the first number in the sequence and observer #2 received the second number. The names of the nurses were retrieved the day before the shift and each name was assigned a number in the same order the names were given. This observation method was chosen because it was not possible for two observers to follow three to five nurses simultaneously. In some cases, the patient workload was low making it possible to observe more than one, if not all nurses.

**Data Collection**

The data was gathered through structured observations during three weeks in the hospital. The observations were conducted during different times of the day in different days of the week to obtain a more representative result (WHO, 2009a).

An observation was conducted in the following way: the observer shadowed a healthcare worker when he/she performed healthcare services. Using the observation form provided by the WHO, date, department and hand hygiene practice was noted down in the observation sheet. The observers filled in the sheet discreetly when the followed healthcare workers were not looking to minimize observer bias. The observers followed the respective healthcare workers for the whole shift.

The observer observed and noted every opportunity during a session when hand hygiene was required, and if hand hygiene was performed. The indications for hand hygiene are specified by “My Five Moments for Hand Hygiene” (WHO, 2009a).
Pilot Study
A pilot study was conducted on the first two days during the introduction and orientation of the hospital. The observation period was divided into five minutes and after every observation period the observers compared and discussed the opportunities that were recorded to check if the observers regarded hand hygiene indications and actions in the same way, minimizing inter-observer variability. The recorded opportunities were from different wards and times. 50 opportunities were recorded and the results of the pilot study were excluded from the study’s result due to the lack of structure in the data collection during the pilot observations.

Data Processing and Data Analysis

Raw data was entered into a data set (see Appendix E) on Microsoft Excel and compliance rates were analyzed according to the WHO’s compliance formula: number of performed hand hygiene actions divided by the total number of opportunities. Indications for hand hygiene were coded from 1-5, corresponding to the different moments in “My Five Moments for Hand Hygiene” (moment one, before patient contact = 1, moment two, before clean/aseptic procedure = 2, and so on). Each opportunity was assigned a unique opportunity number.

Data quality was checked by looking for missing values, data distribution, and calculating the minimum and maximum to look for possible outliers and wrong entries. Entries were also verified by double-checking the entered raw data against the manual data twice. Furthermore, the summaries of the data were checked against manual computations done by the two observers independently of each other.

Subgroup analyses were conducted using descriptive statistical analyses by grouping data according to ward, indication, work shift and weekday/weekend to find out whether there were differences in compliance rates between the different categories.

Validity
Validity evaluates if the method used really measures what it is meant to measure (Polit & Beck, 2012). The observation method used in this study, including observation form and compliance calculations are a validated hand hygiene observation method from the WHO (2009b).

Reliability
Reliability evaluates how accurate and how consistent the data is collected (Polit & Beck, 2012). The instrument that was used to write down the results (Appendix C) contained the information needed for the calculations of compliance, and were continuously used for all the observations. After a careful review of the WHO’s Hand Hygiene Technical Reference Manual, where the opportunities of when to perform hand hygiene are well defined (2009a), a pilot study was made where the observers observed the same opportunities and then compared the results to make sure that the observers regarded hand hygiene indications and actions in the same way. Nurses were paired with observers through randomization to minimize selection bias. All the data was noted down electronically (Appendix E) which makes it possible for anyone to see the result and make the same conclusions. The results were calculated both automatically through Microsoft Excel and manually by the observers.
Ethical Considerations

Informed consent is intended to protect the participants’ autonomy, integrity and from harm (Helgesson, 2006). The top management was asked for permission to conduct the study. According to them, it was not necessary to ask each participating staff to sign a consent form; a signed letter from the president was sufficient, but each participant was still asked for consent orally before the start of each shift.

Before the start of the study, the staff was informed by the chief nurse about the study’s method. She informed that it is a structured observation, where the participants will be followed and observed on, in her own words, “hand washing”. The observers further informed participants that the data will be handled confidentially, meaning that there will be no personal consequences for the participants (Helgesson, 2006).

The names of personnel being observed were never written down to protect them. The collected data and partial results were inaccessible to all but the observers during the observation period. Summarizing the results and analyzing the data was made in private.

The name of the hospital was removed from the study to protect the hospital’s reputation from eventual consequences. The different wards are mentioned so that the results can be compared to similar wards in other research.
RESULTS

Data distribution is shown by complementary diagrams below. The results are presented in tables with compliance rates according to indication, ward, shift and day, as well as a breakdown of the compliance rates according to indication and ward.

Figure 3. The total distribution of hand rub, hand wash and missed performances across all data.

The indication with the least data is indication two, “before clean/aseptic procedure” with six recorded opportunities, while the indication with the most data is indication five, “after patient surroundings” with 1065 recorded opportunities.

Figure 4. Data distribution according to indication.
A total of 1920 opportunities were recorded: 336 were hand rub performances, 168 were hand wash performances and 1416 were missed performances. This gives a total compliance of 26.25 percent (rounded off to two decimals), according to the WHO’s hand hygiene compliance formula. Out of the 15 total observation days, only 14 are included in the results. No data was collected during one of the observation days because there were no patients, hence it was disregarded in the results.

Compliance rates for Table 1-5 are calculated according to the following formula/definition of compliance (as mentioned in the background):

\[
\text{Compliance (\%)} = \frac{\text{Performed actions}}{\text{Opportunities}} \times 100
\]

(WHO, 2009a, p. 19)

Table 1. The main findings of this study that is the compliance according to the different indications.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Opportunities</th>
<th>Hand rub</th>
<th>Hand wash</th>
<th>Missed</th>
<th>Compliance</th>
<th>Missed %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>680</td>
<td>112</td>
<td>6</td>
<td>562</td>
<td>17.35%</td>
<td>82.65%</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>16.67%</td>
<td>83.33%</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
<td>2</td>
<td>16</td>
<td>42</td>
<td>30.00%</td>
<td>70.00%</td>
</tr>
<tr>
<td>4</td>
<td>109</td>
<td>36</td>
<td>17</td>
<td>56</td>
<td>48.62%</td>
<td>51.38%</td>
</tr>
<tr>
<td>5</td>
<td>1065</td>
<td>185</td>
<td>129</td>
<td>751</td>
<td>29.48%</td>
<td>70.52%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1920</strong></td>
<td><strong>336</strong></td>
<td><strong>168</strong></td>
<td><strong>1416</strong></td>
<td><strong>26.25%</strong></td>
<td><strong>73.75%</strong></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>384</strong></td>
<td><strong>67.2</strong></td>
<td><strong>33.6</strong></td>
<td><strong>283.2</strong></td>
<td><strong>28.43%</strong></td>
<td><strong>71.57%</strong></td>
</tr>
</tbody>
</table>

In Table 1, the results show that the indication with the highest compliance rate was indication four with 48.26 percent and the indication with the lowest compliance rate was indication two 16.67 percent. Indication one and two have the lowest compliance rates (17.35 and 16.67 percent), and indication three, four and five have the highest compliance rates (30.00, 48.62 and 29.48 percent respectively), showing that healthcare workers were more compliant in “after” indications than “before” indications.

Table 2. The results according to the wards.

<table>
<thead>
<tr>
<th>Ward</th>
<th>Opportunities</th>
<th>Hand rub</th>
<th>Hand wash</th>
<th>Missed</th>
<th>Compliance</th>
<th>Missed %</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>794</td>
<td>116</td>
<td>82</td>
<td>596</td>
<td>24.94%</td>
<td>75.06%</td>
</tr>
<tr>
<td>NICU</td>
<td>174</td>
<td>63</td>
<td>16</td>
<td>95</td>
<td>45.40%</td>
<td>54.60%</td>
</tr>
<tr>
<td>NS1</td>
<td>530</td>
<td>72</td>
<td>46</td>
<td>412</td>
<td>22.26%</td>
<td>77.74%</td>
</tr>
<tr>
<td>NS2</td>
<td>422</td>
<td>85</td>
<td>24</td>
<td>313</td>
<td>25.83%</td>
<td>74.17%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1920</strong></td>
<td><strong>336</strong></td>
<td><strong>168</strong></td>
<td><strong>1416</strong></td>
<td><strong>26.25%</strong></td>
<td><strong>73.75%</strong></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>480</strong></td>
<td><strong>84</strong></td>
<td><strong>42</strong></td>
<td><strong>354</strong></td>
<td><strong>29.61%</strong></td>
<td><strong>70.39%</strong></td>
</tr>
</tbody>
</table>

Table 2 shows that NICU was the ward with the highest compliance rate (45.40 percent), while NS1 had the lowest compliance rate (22.26 percent). ICU, NS1 and NS2 all had compliance rates in the twenties (24.94, 22.26 and 25.83 percent), and there is a significant difference between these and NICU’s compliance rate.
The results in Table 3 show that day shifts have a higher number of opportunities (1049), compared to evening shifts (871). The compliance rate was also higher during the evening shifts, 28.36 percent compared to 24.50 percent for day shifts.

The results in Table 4 show that there is a significantly higher compliance during week days (29.89 percent) than weekends (14.63 percent). There were also more recorded opportunities for week days (1462) than weekends (458).

The results in Table 5 show that there is a significantly higher compliance according to ward.
Table 5 shows the compliance rates of the wards to the different indications. The compliance rates for indication two, three and partially four are based on small data sets and varies greatly between the wards. NICU had the highest compliance rate for indication one (47.06 percent) and five (46.51 percent), but also the fewest recorded data (85 and 43 respectively) for these indications. NS1 had the lowest compliance rate for indication one (5.59 percent) and five (28.06 percent).
DISCUSSION

Results Discussion

The overall compliance rate based on the WHO’s “My Five Moments for Hand Hygiene” and compliance definition is 26.25 percent. The WHO reported an overall average baseline rate of 38.7 percent (2009b) among studies included in their publication. Recent studies based on the WHO’s indications reported a compliance rate of 51.0 percent (Allegranzi et al., 2013) and 23.2 percent (Eimasitrakoon et al., 2013). In comparison, the overall compliance from this study is lower, with the exception of the findings of Eimasitrakoon et al., (2013) which is the most similar to this study’s result. This may be because the study setting is similar: both studies were conducted in Asian countries in hospitals that may have similar resources and attitudes towards hand hygiene behavior.

The reason for the comparably lower overall compliance rate of 26.25 percent may be attributed to the different factors mentioned in the background of the study. The researchers cannot draw any definitive conclusions based on the gathered data, however some of the factors that were observed during data collection were: male sex, wearing gowns/gloves, after contact with patient environment, duration of contact with patient equaling to under two minutes such as tending to a patient’s call, interruption in patient-care activities such as answering the phone or fetching materials, understaffing as mentioned by the nurses and demonstrated by the practice of functional nursing, and high number of opportunities for hand hygiene per hour of patient care (WHO, 2009b). There were also a limited number of sinks and hand washing resources such as soap and hand rub, wearing of gloves/belief that gloves substitutes hand hygiene and a belief that hand hygiene interferes with the caregiver-caretaker relationship; some patients take offense when hand hygiene is performed in front of them because they perceive the reason to be that they are dirty (ICC nurse, personal communication, 18 March, 2014). Another reason may be that there are no national guidelines for hand hygiene practice in the Philippines (personal communication, Dr. Arthur Roman, 24 November, 2013), and therefore there may be a lack of knowledge among newly-employed nurses who have not yet received hand hygiene training at their workplaces.

Table 1 shows the main findings of this study, that is, the compliance to the different indications for hand hygiene specified by the WHO. Indication one and five are the indications with the highest frequency, indicating that before patient contact and after patient surroundings are the highest occurring indications for hand hygiene among nursing staff involved in in-patient care in the hospital. Eimasitrakoon et al. (2013) report indication one and four as their highest occurring, which differs from this study’s indication five, and this can be due to the study setting. According to the WHO (2009a), if a healthcare worker touches a patient and then touches an object in the patient surroundings before exiting the patient zone, indication five overrides indication four. In the study hospital, the rooms in NS1 and NS2 all opened with doorknobs, which count as patient surroundings, and meant that healthcare workers always touched these upon entering and exiting the room. This may be the reason why there were more recorded opportunities for indication five than indication 4.

A conclusion that may be drawn from the compliance rates in Table 1 is that healthcare workers are better at the “after” indications than the “before” indications. According to the WHO (2009a), indications one and two or “before” indications, are intended to protect the
patient from microbial transmission, whereas indications three to five are intended to protect the healthcare worker and the healthcare area. A parallel can be drawn to the research by Whitby et al. (2006), with inherent and elective hand washing behavior. “After” indications are associated with inherent behavior that are done to protect oneself, whereas “before” indications are associated with elective behavior in activities that are not perceived as a risk to oneself, and therefore does not come naturally to a person. It is for this reason that elective hand washing behavior, “before” indications, may be the first to be omitted in stressful situations (Whitby et al., 2006), and may be why the compliance to these is significantly lower compared to “after” indications.

There is little data for indication two (Table 1) and this can be attributed to the fact that the researchers unfortunately missed the WHO’s definition of “before clean/aseptic procedure” as including preparation of food and medication. Indication three also has few recorded data, but this can be due to the nature of the indication, that it simply does not occur as often as the others. The fact that the recorded opportunities for these data is small compared to the other indications raises the question of the compliance rate for indication two and three’s reliability.

In comparison between wards in Table 2, the ward with the most recorded opportunities was the ICU, suggesting that the nursing care there requires more patient contact compared to other wards. The researchers believe that this could be because of the nature of the ICU with the high infection risk among patients that limits relatives to partake in patient care, as well as the higher burden of care on ICU nursing staff. In NS1 and NS2, the researchers observed that it is the norm for relatives and family members to take care of their sick, shouldering some of the burden of care from the nursing staff. Had it not been this way, the recorded opportunities may have been more equal between the wards. Furthermore, NICU had the lowest recorded number of opportunities and this may be due to the number of patients during the time of the observations.

The ward with the highest overall compliance was NICU and the ward with the lowest was NS1. ICU and NS2 also showed compliance rates close to NS1. Several conclusions can be drawn from this, of which the most important is that the access to hand hygiene resources, such as sinks, soap, paper towels and so on, does not seem to affect the compliance rate. In the ICU, the researchers observed that there was hand rub in almost every room, but this seemed to have little or no effect on the compliance rate. It can be argued though, that the compliance rate is influenced negatively by the high number of opportunities for hand hygiene per hour of patient care (WHO, 2009b) and busyness/too many patients (Eiamsitrakoon et al., 2013), given the higher care demand of ICU patients. The same reasoning can be reversed to apply to the high compliance rate in NICU which had the lowest number of opportunities compared to the other wards. NICU did not have as many patients at the time of observation (the most patients observed during a shift were three), and therefore did not have as many opportunities for hand hygiene per hour and were not as busy, positively affecting the compliance rate. Hence, a second conclusion may be that the workload on the nursing staff, represented by the number of opportunities in Table 2, affects compliance. A third conclusion can be that since compliance rates in ICU, NS1 and NS2 were all in the twenties percentage, the overall compliance rate of 26.25 percent can be deemed reliable.
According to the results in Table 3 and 4, the day shifts had a lower compliance than the evening shifts, and that weekday shifts had a significantly higher compliance than weekend shifts. Kowitt et al. (2013) found that compliance increased from day to evening shift, and from week day to weekend, which partially correspond to the study’s findings. The WHO (2009b) also reports that work during the week compared to the weekend is a factor to poor compliance, which corresponds to Kowitt et al.’s (2013) findings. The reason that the results of this study does not agree with the WHO (2009b) and Kowitt et al. (2013) may be the size of the data, that is, more opportunities were recorded during the week than the weekend, due to the sampling method. Another explanation may be because observation day 4 was excluded, which happened to be a weekend and at NICU which had the highest overall compliance rate, and that this affected the weekend compliance rate negatively due to the lack of data.

One interesting find in Table 5 is that NICU had the highest compliance percentage for indication five, after touching patient surroundings, while NS1 had the lowest compliance percentage for the same indication. Compliance rates for NS2 and ICU for indication five were only slightly higher than NS1’s. One main difference between NICU, NS1, NS2 and ICU were the patient surroundings. In NICU, the patients consisted of babies who were placed in cribs, and therefore the patients’ surroundings only included the crib and items that were temporarily and exclusively dedicated (WHO, 2009a) to the baby. That the patient zone was smaller in NICU could explain the high compliance rate for indication five. In comparison, NS1 and NS2 had similar settings where the patient surroundings were larger in area due to the mobilization of the patients and included for example, doorknobs, which were constantly used to go in and out of the room. In the ICU, the patients’ surroundings were similar to the nursing stations, but one large difference was that most patients were bedridden and that the doors in the ICU could be opened without using hands. This indicates that the size of what is perceived as the patient zone may also be a factor in compliance for indication five.

Another interesting find in Table 5 is the low compliance of NS1 to indication one, before patient contact, making it the lowest compliance rate for all the indications and wards (disregarding the 0 percent compliance in some due to the small data size). According to the WHO (2009b), one reason for poor compliance to hand hygiene is wearing gloves, or believing that gloves can replace hand hygiene. The researchers noticed during the data collection period that some nurses changed gloves between patients instead of performing hand hygiene. Unfortunately, glove usage is not included in the results due to the lack of consistency in data recording since the focus of the observers was on hand hygiene performance. However, this may still be considered a contributing factor to the low compliance rate for indication one as mentioned above. Another reason may be that before patient contact is associated with elective hand hygiene behavior, meaning that it does not come naturally to the person (Whitby et al., 2006).

The outliers in Table 5 such as the 0 and 100 percent compliance for some indications in some wards can be attributed to the limited amount of data, and the researchers consider these values as not reliable.

Using the observation form and compliance calculation form, the researchers believe the aim of the study was met. However, there are always more questions that arise during a study, like the question of why compliance is low, which can be investigated in future
studies with focus on factors that affect hand hygiene. Despite this, statistics like this can still be valuable. According to Eiamsitrakoon et al. (2013), healthcare workers overestimate their own work effort in self-reported compliance compared to data collected by direct observation. The results can therefore have an awakening effect on healthcare workers on how low compliance can be, in comparison to how they evaluate themselves (Eiamsitrakoon et al., 2013). This can make nurses and other healthcare professions more aware of their self-perceived compliance and hopefully lead them to follow guidelines more carefully.

The researchers believe that the biggest contributing factor to the results is lack of knowledge, not only on an institutional level, but also on a national level since there is a lack of national hand hygiene guidelines. The greatest evidence for this is the low compliance rate, the times when healthcare workers performed hand hygiene when there were no indications to do so and the use of gloves to replace hand hygiene. Having national guidelines would mean that it can be implemented in the healthcare workers’ education, improving their knowledge which will hopefully be translated into practice.

The study’s results may be representative of compliance to hand hygiene in a private hospital in the Philippines, but it cannot be certain because researchers found no previous data on hand hygiene compliance published from the Philippines. However, there is published data from other countries on the differences in compliance between wards, week day/weekend and day/evening shift, which makes the results found in this study comparable. Unfortunately, due to the limited time frame and resources of the study, the reasons why hand hygiene is not performed could not be investigated properly. Further research on why hand hygiene is not performed is valuable in order to plan interventions to increase hand hygiene compliance. This result should therefore only be seen as a starting point and baseline for future research to improve compliance to hand hygiene guidelines.

**Method Discussion**

The aim of this study was to measure the compliance to the WHO Guidelines on Hand Hygiene in Health Care among nursing staff in a private hospital in the Philippines using the evaluation framework of the WHO. The chosen method was a structured direct observation, which was considered the most appropriate because it is the only method that allowed the researchers to observe every opportunity for hand hygiene and the hand hygiene actions that followed (WHO, 2009b). It was also the method that allowed the researchers to maximize the given resources to collect the most meaningful data. However, this meant long hours of data collection for the researchers, which sometimes challenged their mental alertness and perception. It was also prone to observation bias, observer bias and selection bias (WHO, 2009b).

Using structured observations, researchers were able to collect similar data independently of each other, and thereby producing a greater data set than if data was only collected by one person. However, this exposes the data to observer bias (WHO, 2009b) and raises the question of inter-observer reliability (Polit & Beck, 2012). This method also requires that definitions of what is being observed, the length of each observation session and how observations are recorded must be well-defined, otherwise inconsistencies in these may have impact on the results (Polit & Beck, 2012).
A multistage sampling method had to be used due to the time and resource constraints of the study. It allowed the researchers to combine probability and nonprobability sampling, however, it also exposes the study to sampling bias (Polit & Beck, 2012) due to the convenience sampling of the chosen hospital and wards. This may mean that the results are not representative of similar hospitals and wards in the Philippines because convenience sampling is the weakest form of sampling (Polit & Beck, 2012). The dates during which the study was conducted were also chosen at nonrandom, and the night shift was purposively deselected for practical reasons which could have affected the results.

The randomization of the shifts and wards increased the scientific value of the study (Polit & Beck, 2012), however the distribution of shifts to each ward was not proportional, for example NS2 was not given any evening shifts, which may also have impacted the results.

Since the observations took place during a whole eight-hour shift, it was impossible to observe every opportunity for hand hygiene. There were times when observations were not made: when the integrity of the patient was threatened, for example in very intimate situations, and when the observer used the bathroom or ate lunch/dinner. The observers tried to eat lunch/dinner at the same time as the participant, but sometimes the participant was so busy that they had no time to eat. The unrecorded opportunities were considered to be minimal in comparison to the total collected data, and consequently had minimal impact on the results.

The time unit could have been divided into smaller increments, for example 20 minutes, spread throughout a shift. However, the researchers did not have prior knowledge of how an average day looks like and how much data could be gathered with that sampling method. Also, it poses the question of what the researchers will do in between the data collection intervals. In another way, the breaks in between intervals can be seen as a “waste” of time which could go to more data collection, creating a greater data set. Therefore, the whole eight-hour shift was chosen as the unit of time.

Due to the main focus of the observations being indications for every patient contact, the researchers missed the WHO’s (2009b) definitions of clean/aseptic procedure as including the preparation of food and medication. Because of this, the opportunities of before clean/aseptic procedure were fewer than if these opportunities had been included in the observations.

Generalizability means that the study findings can be applied to other groups or larger groups than those studied (Polit & Beck, 2012), in this case nurses and nurse attendants in a private Philippine hospital. Since the participants were not evenly distributed over professional categories, this result cannot be generalized as the compliance of the hospital, only the nursing staff. Furthermore, the difference between a private and a public hospital in the Philippines may be too large (Romualdez et al., 2011) to make it generalizable for all nurses in all Philippine hospitals. However, it can be argued that the validity and reliability of this study is sufficient enough to make it generalizable for nurses in private hospitals in the Philippines.

The researchers deem the chosen method and the generated results as adequate in addressing the aim of the study because the observation instrument and the definitions of
compliance and hand hygiene indications are part of a standardized protocol produced by the WHO (2009b).

The method used was based on the WHO’s (2009a) method of how to measure and calculate hand hygiene compliance, and adapted to fit the level of this study and timeframe. As shown in a study by Eiamsitrakoon et al. (2013), self-reported compliance is overestimated in comparison to observed compliance, and direct observations give the most accurate results despite its biases (Haas & Larson, 2007). Therefore, if this study’s method had been questionnaires for self-reporting, the results may have been higher and not as reliable.

Due to the lack of timeframe only nurses and nurse attendants were observed, according to Eckmanns et al. (2006), and Kowitt et al. (2013), nurses are the healthcare workers with the highest compliance rate and therefore the overall compliance may have been lower if all healthcare workers were included in this study.

To summarize, the methodological limitations include the use of convenience sampling in choosing the hospital and wards, the possible missed opportunities in the chosen time unit, that only the nursing staff was observed, the inequality in ward to shift distribution, that the researchers were not trained observers, that some opportunities for “before clean/aseptic procedure” was missed and the biases that direct observation is subject to. However, there are also strengths in favor of this study, including the use of the standardized hand hygiene framework provided by the WHO (2009b) making it comparable in a global perspective, the long observation periods which can provide a bigger picture of the overall compliance, the new data generated in a Philippine hospital as there are no previous published studies on hand hygiene compliance from there and the method of direct observation which renders more detailed data than other methods of measuring compliance.

### Bias Considerations

An aspect which should be considered in understanding the results are the most important biases for the method of direct observation, that is, observation bias/Hawthorne effect, observer bias and selection bias (WHO, 2009b).

Observation bias refers to the Hawthorne effect, when people behave atypically because of the awareness that they are being observed (WHO, 2009b), shyness in front of unfamiliar people or to “look good”. It is for these reasons that telling participants exactly what is being observed should be avoided. The name and the purpose of the study also remained unknown to the participants to prevent impact on the result. The only information about the purpose given to participants is that the observation study concerns “hand washing”. The vagueness is advantageous because oftentimes people only need an introduction and enough information to satisfy their curiosity in order to erase suspicions of ulterior motives (Polit & Beck, 2012). However, this may induce mistrust among those being observed. If observational studies are done frequently, the bias may be equally distributed among all observations. Frequent observations may also desensitize healthcare workers being observed through the frequent presence of observers or by observers with a discreet conduct (WHO, 2009b).

In a study conducted in Germany, Eckmans et al. (2006) came to the conclusion that the Hawthorne effect increased hand hygiene compliance by 55 percent. This could mean that
the reported overall compliance rate of 26.25 percent for this study percent may in reality be much lower. On occasion, the researchers noticed that other nurses urged their coworkers who were being observed to use hand rub and wash their hands. There were also some instances when the researchers noticed a high frequency of hand rub and hand wash performances when there were no indications for these. Both of these indicate an awareness among personnel that they were being observed. However, the researchers believe that the measurements taken to reduce the Hawthorne effect in this study were sufficient, because in most cases study participants seemed at ease, with no unusual behaviors. It may have also been minimized when the personnel got used to the presence of the observers as the days progressed (WHO, 2009b).

Observer bias refers to the systematic error in inter-observer variation in the method. An observer’s own interpretation of the method and definitions for hand hygiene opportunities and actions may render different results compared to other observers. The same observer may also unconsciously change his or her method over time (WHO, 2009b), also known as intra-observer variation (Polit & Beck, 2012). To ideally minimize this, observers should be trained and validated (WHO, 2009b); however due to the resource restraints of this study, observers aimed to minimize this by calibrating their results against each other’s results in the pilot study by observing the same person, and through continuous consultation with one another during the data collection phase. The researchers did not find any studies exploring the impact of these in hand hygiene compliance rates. Even though measurements were taken to minimize observer bias, it cannot be fully eliminated, therefore it can be said that this also impacted the results. Also, more sophisticated statistical analyses could be made on the raw data (Appendix E) to explore the intra-observer and inter-observer differences.

Selection bias refers to the systematical selection of certain healthcare workers, times, care situations and so on, rendering results that do not reflect the overall compliance. This was minimized by randomizing location, time and healthcare workers (WHO, 2009b). The observers selected the days on which observations were conducted to get a week-proportionate distribution, but chose to randomize if the period was going to be morning, or evening shift, and also in which ward the observation was going to be conducted. Before every shift the staff on duty was randomized to an observer. Randomness minimizes selection bias by having, instead of researcher’s preferences, more factors established by chance (Polit & Beck, 2012). With selection bias, the researchers believe that this had minimal impact on the results due to the randomization of the shifts, wards and study subjects. However, more advanced statistical analyses may explore the relationship of these with the compliance rates as well.

Conclusion

In conclusion, the aim of the study was addressed adequately and the results show the overall compliance rate at 26.25 percent, which is lower compared to most published studies. The results show that healthcare workers are better at protecting themselves in “after” indications, than protecting their patients in “before” indications. Compliance was higher on weekdays and on evening shifts compared to weekends and day shifts. The most observed opportunities were for indication five and the fewest observed opportunities were for indication two. The lack of data for some indications and wards questions the reliability of their compliance rates, such as the overall compliance for indication two in Table 1 and
the outliers in Table 5. The overall compliance rates for the different wards excluding NICU were close to the overall compliance rate, suggesting that 26.25 percent is an approximate of the real value.

The researchers believe that the study results may be representative of Philippine private hospitals but since there is no previous data published on the Philippines, it is difficult to draw conclusions. Despite this, the results are still valuable and can be used in improving quality of care and patient safety for the institution, and can increase nursing staff’s self-awareness towards their own hand hygiene behavior.

Further Research

This study was conducted in a Philippine private hospital, and according to Romualdez et al. (2011) the difference between a private hospital and a public hospital is large, and therefore a comparison study between a private hospital and a public hospital can be of interest. During this study, only nurses and nurse attendants were included, hence it would also be interesting to conduct a study including all healthcare workers to see if and how the compliance rates would differ. According to Eckmanns et al. (2006) and Lowitt et al. (2013), nursing staff have the highest compliance rate while physicians have a lower compliance rate. As a follow-up study, the reasons why compliance is low can be studied. The results for this may lead to the knowledge of why there is a big difference between private and public hospitals, as well as between different healthcare professions. This in turn can help improve the hand hygiene compliance in other Philippine hospitals.

The researchers believe that more research is needed in exploring the economic gains of investing in hand hygiene improvement strategies for the patient and for the institution, if there are any, because much of the health care system in the Philippines is dictated by economic factors. In a study by Chen et al. (2012), an effective hand hygiene programme reduced both healthcare-associated infection rates and hospital costs, suggesting that there may be economical gains for both patients and the hospital in increased hand hygiene compliance.

Clinical Implications

According to the WHO, data quality on hand hygiene compliance in developing countries is poor (WHO, 2009b). Furthermore, there are no published statistics on hand hygiene compliance in the Philippines. The compliance calculated in this study has the potential to be used as the baseline for future use in developing quality of care for patients, and it may also increase self-awareness of nursing staff in their own perceived compliance to hand hygiene guidelines. It can also be compared to future research on hand hygiene compliance rates in the Philippines.

Furthermore, the results of the study may be of use in interventions on institutional level or even national level, by providing decision-makers information on areas which can be improved. It may also increase the institutional priority of hand hygiene compliance and perhaps lead to more resources being invested in improving it.
REFERENCES


APPENDIX A

Email correspondence with Dr. Arthur Roman

Arthur Dessi Roman  gonnabedess@yahoo.com,  Nov 24, 2013 to me

Dear Carmelle,

Thank you for your e-mail. Im Dr. Dess, a board member of the PHICS. Unfortunately, that website has not been updated due to funding issues. We do not have a hand hygiene guideline in the Philippines. The Procedural manual may be of help but not too much details. The guidelines on hand hygiene locally is very institution specific. meaning, depending on the resources of the hospital, the HH policies may differ...even between DOH-retained hospitals.

So if you can tell me exactly which information you want, Id be glad to know so I can direct you.

There is a proecedural manual but I dont have it right now. Il send you maybe tomorrow. There is also a Standard Handbook but it is currently in the creation process so it might not be out in time for your use (80% done). The HAP Guidelines which is a joint project by PHICS, PSMID and PCCP was just recently convened so there is no such guideline yet.

I, in behalf of PHICS, would be happy to collaborate with you for any such undertaking.

regards,
Arthur Dessi E. Roman, MD, FPCP, DPSMID
Internal Medicine - Infectious Diseases
Medical Specialist III, Research Institute for Tropical Medicine
Master in Tropical Medicine Student, Institute of Tropical Medicine, Nagasaki University
Fellow, Korea Foundation for International Healthcare

Carmelle Valles

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Message:
Dear PHICS,

We are two students from Sweden writing our bachelor's thesis on hand hygiene in the Philippines. We are looking for national Philippine guidelines on hand hygiene, and saw that under "Publications", you could select "Procedural Manual" and "HAP Guideline". However there is no document to download. We were wondering if you can send it to us? The "Standards" document was really interesting, but not exactly what we were looking for. Many thanks in advance!

Respectfully yours,
Carmelle & Mandy
From the Hospital’s ”Hand Hygiene Procedures” Protocol

7.0 PROCEDURE

7.1 Indications for handwashing and hand antisepsis:

7.1.1 Before direct contact with all patients.
7.1.2 Before donning sterile gloves.
7.1.3 Before inserting indwelling urinary catheters, peripheral vascular catheters or other invasive devices.
7.1.4 After contact with patient’s skin (e.g. when taking pulse or blood pressure).
7.1.5 After contact with body fluids, excretions, mucous membrane, non-intact skin, and wound dressing.
7.1.6 If coming in contact with inanimate objects in the immediate vicinity of the patient.
7.1.7 After removing the gloves.
7.1.8 Before and after eating and after using the restroom.
7.1.9 When hands are visibly dirty or contaminated with proteinaceous material or visibly soiled with blood or other body fluids (when hands are not visibly soiled, alcohol based hand rub may be used for decontamination).
7.1.10 If handling of Bacillus Antracis is suspected or proven, washing with non-antimicrobial soap is recommended because antiseptic agents have poor activity against spores.

(…)

7.3 Handwashing

7.3.1 Routine handwashing shall be done by vigorously rubbing hands, together with soap for at least 15 seconds followed by rinsing under a stream of water. Hands shall be dried with disposable towel. Hot water that may cause dermatitis shall be avoided.
7.3.2 The liquid soap dispenser shall be replaced or cleaned and filled with fresh product when empty; liquids shall not be added to a partially full container.
7.3.3 After rinsing, avoid touching faucet or any other objects. Turn off faucet using a paper towel. (Multiple use of cloth towels of the hanging type shall not be recommended).
7.3.4 Antimicrobial-containing products that do not require water can be used only in areas where there are no available water and sink. Products shall be applied to palm covering surfaces then rubbed until dry.

7.4. Other aspects of Hand Hygiene

7.4.1 Do not wear artificial nails when direct contact with patients at high risk units.
7.4.2 Keep natural nail tips less than ¼ inch long.
7.4.3 Wear gloves when contact with blood or other potentially infectious materials, mucous membrane, and non-intact skin wound occur.
7.4.4 Remove gloves after caring for a patient. Do not use same pair of gloves for the care of several patients.
7.4.5 Change gloves during patient care when moving from a contaminated body site to a clean body site.
7.4.6 Keep hands moisturized at all times to minimize dryness, which in turn will increase likelihood of cuts in the skin.”
### APPENDIX C

The WHO Observation Form

#### Observation Form

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**Country**:  

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* To be completed by the data manager.  
** Optional, to be used if appropriate, according to the local needs and regulations.  

WHO acknowledges the Instituto de Universidades de Ginecología (IUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.  
Revised: August 2008
General Recommendations
(refer to the Hand Hygiene Technical Reference Manual)

1. In the context of open and direct observations, the observer introduces himself/herself to the health-care worker and to the patient when appropriate, explains his/her task and proposes immediate informal feed back.

2. The health-care worker, belonging to one of the main four following professional categories (see below), is observed during the delivery of health-care activities to patients.

3. Detected and observed data should be recorded with a pencil in order to be immediately corrected if needed.

4. The top of the form (header) is completed before starting data collection (excepted end time and session duration).

5. The session should last no more than 20 minutes (± 10 minutes according to the observed activity); the end time and the session duration are to be completed at the end of the observation session.

6. The observer may observe up to three health-care workers simultaneously, if the density of hand hygiene opportunities permits.

7. Each column of the grid to record hand hygiene practices is intended to be dedicated to a specific professional category. Therefore numerous health-care workers may be sequentially included during one session in the column dedicated to their category. Alternatively each column may be dedicated to a single health-care worker only of whom the professional category should be indicated.

8. As soon as you detect an indication for hand hygiene, count an opportunity in the appropriate column and cross the square corresponding to the indication(s) you detected. Then complete all the indications that apply and the related hand hygiene actions observed or missed.

9. Each opportunity refers to one line in each column; each line is independent from one column to another.

10. Cross items in squares (several may apply for one opportunity) or circles (only a single item may apply at one moment).

11. When several indications fall in one opportunity, each one must be recorded by crossing the squares.

12. Performed or missed actions must always be registered within the context of an opportunity.

13. Glove use may be recorded only when the hand hygiene action is missed while the health-care worker is wearing gloves.

| Facility: | to complete according to the local nomenclature |
| Service: | to complete according to the local nomenclature |
| Ward: | to complete according to the local nomenclature |
| Department: | to complete according to the following standardized nomenclature: |
| | medical, including dermatology, neurology, haematology, oncology, etc. |
| | surgery, including neurosurgery, urology, EENT, ophthalmology, etc. |
| | mixed (medical & surgical), including gynaecology, obstetrics, including related surgery |
| | paediatrics, including related surgery |
| | intensive care & resuscitation |
| | emergency unit |
| | long term care & rehabilitation |
| | ambulatory care, including related surgery |
| | other (to specify) |
| Period N°: | 1) pre - 2) post-intervention; and then according to the institutional counter. |
| Date: | day (dd) / month (mm) / year (yy) |
| Start/end time: | hour (hh) / minute (mm) |
| Session duration: | time between start and end time, resulting in minutes of observation. |
| Session N°: | attributed at the moment of data entry for analysis. |
| Observer: | observer’s initials (the observer is responsible for the data collection and for checking their accuracy before submitting the form for analysis. |
| Page N°: | to write only when more than one form is used for one session. |
| Prof cat: | according to the following classification: |
| | 1. nurse / midwife |
| | 1.1 nurse, 1.2 midwife, 1.3 student |
| | 2. auxiliary |
| | 3. medical doctor |
| | 3.1 in internal medicine, 3.2 surgeon, 3.3 anaesthetist / resuscitator / emergency physician, 3.4 paediatrician, 3.5 gynaecologist, 3.6 consultant, 3.7 medical student |
| | 4. other health-care worker |
| | 4.1 therapist (physiotherapist, occupational therapist, audiologist, speech therapist), 4.2 technician (radiologist, radiology technician, operating room technician, laboratory technician, etc), 4.3 other (dietician, dentist, social worker and any other health-related professional involved in patient care), 4.4 student |
| Number: | number of observed health-care workers belonging to the same professional category (same code) as they enter the field of observation and you detect opportunities. |
| Opportunity: | defined by one indication at least |
| Indication: | reasons that motivate(s) hand hygiene action; all indications that apply at one moment must be recorded |
| | bef pat: before touching a patient |
| | bef b.f. after body fluid exposure risk |
| | bef asspt: before clean/aseptic procedure |
| | bef pat: after touching a patient |
| | all p sunt: after touching patient surroundings |
| HH action: | response to the hand hygiene indication(s); it can be either a positive action by performing handrub or handwash, or a negative action by missing handrub or handwash |
| | HR: hand hygiene action by handrubbing with an alcohol-based formula |
| | HW: hand hygiene action by handwashing with soap and water |
| | Missed: no hand hygiene action performed |
Email to the Hospitals

Dear Sir/Madam,

Greetings from Stockholm, Sweden!

We are two nursing students, Carmelle Fajutrao Valles and Mandy Ahlström, from Sophiahemmet University in Stockholm, Sweden (www.shh.se). We will be entering our last year of nursing studies in 2014. Sophiahemmet University is a leading university in the field of nursing in Sweden. It has approximately 1500 students on a yearly basis of which around 450 students are enrolled in the three-year nursing program. The three-year nursing program is one of the premier and most popular nursing programs in Sweden.

As part of our curriculum, we are required to complete a bachelor’s thesis. We would like to do a study on hand hygiene practices among healthcare personnel in a tertiary care hospital as our thesis. This topic interests us because healthcare-acquired infections (HCAIs) are a growing problem worldwide, and we are also interested in looking into how the WHO guidelines are being implemented in a tertiary care facility in a developing country like the Philippines. We are hoping that such a collaborative endeavor may be of use to the hospital quality of care program in some way.

Our proposed general study objective is to evaluate the compliance of healthcare workers to WHO’s hand hygiene guidelines. To achieve this, we plan to randomly collect data through observation of different healthcare personnel, primarily using primarily WHO Hand Hygiene Compliance Observation Form. Our project proposal has been approved by our university, but the gathering of data, analyzing data and writing the thesis paper will be sometime during March-May 2014, for a period of 8 weeks. We hope that we can get a minimum of two weeks to gather our data through structured observation. Attached is a copy of our study proposal and project plan.

We understand that your hospital may already have ongoing programs and we will be happy to collaborate with existing efforts and teams. It is in this light that we would like to ask your advice on how we can start the necessary process of asking official permission to do this study with your institution. Our course director, Prof. Margareta Westerbotn (margareta.westerbotn@sophiahemmethogskola.se), is aware of our intentions and has approved them. Our supervisor is Prof. Carin Casten-Carlberg, karin.casten.carlberg@sophiahemmethogskola.se, is also a professor in our school.

Hereewith are our contact details:
Carmelle Fajutrao Valles - carmellevalles@gmail.com
Mandy Ahlström - mandy.ahlstrom@gmail.com

We would greatly appreciate your guidance on this matter and how we can proceed. Thank you very much for your kind attention.

Respectfully yours,
Carmelle Fajutrao Valles and Mandy Ahlström
### OBSERVATION FORM

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Letter of Invitation from the Study Hospital

UNIHEALTH-BAYPOINTE HOSPITAL AND MEDICAL CENTER

MARCH 10, 2014

TO: CARMELLE VALLES
SOPHIAHEMMET UNIVERSITY
STOCKHOLM, SWEDEN

MANDY AHLSTRÖM
SOPHIAHEMMET UNIVERSITY
STOCKHOLM, SWEDEN

Dear Ms. Ahlström and Ms. Valles,

Greetings!

We appreciate your interest in conducting a research study regarding Hand Hygiene Compliance in Unihealth-Baypointe Hospital and Medical Center. We understand that you will conduct structured observations for a total of 15 days from March 19 to April 7, 2014.

We hereby officially invite you to perform your observational study here in Unihealth-Baypointe Hospital and Medical Center. You are welcome to observe in our Neonatal Intensive Care Unit (NICU), Intensive Care Unit (ICU), Nurse Station 1 (NS1) and 2 (NS2), and the Emergency Room (ER). Our staff will be happy to accommodate you and you may include the nursing staff in the previously mentioned wards without the need to sign individual consent forms.

Kindly present yourself for an orientation of the hospital policies on March 17 and to the Top Management on March 18 for a courtesy call.

We look forward to seeing you!

Best regards,

Shirley P. Droy, RN, MAN, MaEd
Chief Nurse

Roberto M. De Leon, MD, FPCS, FPSGS, FPALES
Chairman

Felix P. Nolasco, MD, MMMOA, FPCS
President

ISO-IMS CERTIFIED HOSPITAL
Block 8, Lot 1A & 1B, Dewey Ave, CBD Area, Subic Bay Freeport Zone, 2222
Tel, No. (047) 250-6870, Fax (047) 250-0534, www.unihealthbaypointe.com