

Compliance to hygiene guidelines at the National Hospital of Pediatrics in Hanoi, Vietnam

A quantitative observational study

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SAMMANFATTNING

Introduktion/Bakgrund

För att förhindra spridning av vårdrelaterade infektioner är det viktigt med en hög nivå av följsamhet till hygienrutiner hos hälso- och sjukvårdspersonal. Det finns bara en begränsad mängd forskning på ämnet utförd i Vietnam. Vårdrelaterade infektioner är både kostsamt för samhället och skapar ett stort lidande för de drabbade patienterna.

Syfte

Syftet är att initiera ett förbättringsarbete inom ämnet vårdhygien genom att observera hälso- och sjukvårdspersonalens följsamhet till hygienrutiner på två avdelningar på National Hospital of Pediatrics i Hanoi, Vietnam. Ett övergripande mål är att observationerna leder till att ämnet uppmärksammas av personalen som då kan bli mer medvetna om deras följsamhet till riktlinjerna

Metod

Studien genomfördes på två sjukhusavdelningar med hjälp av en kvantitativ observationsmetod. Personalens följsamhet till hygienrutiner noterades på ett observationsblad. Bedömningen av observationerna gjordes med hjälp av riktlinjer från Världshälsoorganisationen och Sahlgrenska Universitetssjukhuset.

Resultat

43 procent av hälso- och sjukvårdspersonalen utförde handhygien på ett korrekt sätt enligt hygienriktlinjer. 17 procent av personalen använde handskar korrekt. Eftersom det inte fanns några plastförkläden på avdelningarna var följsamheten till de riktlinjerna 0 procent.

Diskussion

Resultaten av studien visar att det finns förbättringspotential gällande följsamheten till hygienrutiner på avdelningarna. Vikten av följsamhet till hygienrutiner är något som hälso- och sjukvårdspersonal behöver bli kontinuerligt påmind om. Mer forskning behövs angående följsamhet till hygienrutiner i Vietnam.

ABSTRACT

Introduction/Background

A high level of compliance to hygiene guidelines among health care workers is important when preventing the spread of health care-associated infections. There is only a limited amount of previous research on the subject of compliance to hygiene guidelines conducted in Vietnam. Health care-associated infections cause immense suffering for patients and are an economic burden for the society.

Aim

The aim is to initiate a quality-improvement work on the subject of infection control by measuring the compliance to hygiene guidelines among health care workers at two wards at the National Hospital of Pediatrics in Hanoi, Vietnam. The overall purpose is that the findings from the observations will raise the staffs' awareness on the subject and their compliance to the guidelines.

Method

The study was conducted using a quantitative observation method at two hospital wards. An observation sheet regarding the health care workers compliance to hygiene guidelines was used. The assessment of the observations was done based on hygiene guidelines from the World Health Organization and the Sahlgrenska University Hospital.

Result

The level of compliance regarding correct hand hygiene was 43 percent. The level of compliance to correct use of gloves was 17 percent. The level of compliance to correct use of aprons was 0 percent due to the fact that there were no aprons available at the wards.

Discussion

To conclude, there is room for improvement at the two wards regarding the level of compliance to hygiene guidelines. Further work is needed to continuously remind the health care workers about the importance of appropriate hygiene. Further research is needed regarding compliance to hygiene guidelines in Vietnam.

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INTRODUCTION

Infection control is a topical subject of key importance in both developing and developed countries. Health care-associated infections are global problems and cause great physical and emotional stress for millions of people. The most important action a health care worker can take to prevent the spread of infections, no matter the setting of the care, is to perform correct hand hygiene whenever in contact with patients.

When presented with the opportunity to give our nursing education a global perspective, none of us hesitated. The subject of hand hygiene and hygiene guidelines is a part of our education and as future nurses it will be an important part of our work. Health care-associated infections are a matter of patient safety. Except for the consequences for the patient, health care-associated infections add to the workload and constitute a great economic burden for the caregivers and the society. Growing problems with antibiotic resistance is another part of the issue. The use of antibiotics must be reduced as more and more bacteria become resistant to one or several kinds of antibiotics. Some of the infections health care workers spread with their hands are already resistant to many kinds of antibiotic and hard to treat.

Being a part of this quality-improvement project has been incredibly rewarding, as it has been an important experience for us as future nurses. Quality-improvement work is one of a nurse most powerful tool when improving the care for the patients. The experience of care from a Vietnamese hospital will help us to see our profession and the care we give in a global comparative perspective.

BACKGROUND

Vietnam

Vietnam is a communist dictatorship of 331,210 square kilometers situated in southeast Asia with its borders to China, Laos and Cambodia (Swedish Institute of International Affairs, 2011a & 2011b). In 2012 Vietnam had a population of approximately 91,5 million (Central Intelligence Agency, 2012) and in 2010 28,8 percent of the population lived in the cities (Swedish Institute of International Affairs, 2011c). The official language is vietnamese and there are at least thirty other languages spoken by minority groups. Practice of religion is only

allowed in forms that are officially granted and the authorities have issued several restrictions. The dominating religion in Vietnam is Mahayana Buddhism, there is also a significant minority of Roman Catholic Christians and a small group of Muslims (Swedish Institute of International Affairs, 2011d). Vietnam is situated in the tropical region and a large part of the country has a moist and warm climate. In the capital Hanoi the cold winter winds from China can cause the temperature in January to drop to close to zero degrees Celsius during the night (Swedish Institute of International Affairs, 2011e). In 2008 clean water was available to 94 percent of the population (Swedish Institute of International Affairs, 2011f). The quality of the infrastructure is poor, which holds back the advances of the country due to the problems in traveling and transportation of goods. Investments have been made to improve the infrastructure. However, these have preferentially affected the main roads around the largest cities (Swedish Institute of International Affairs, 2011g). Other difficulties the country is facing includes: high risks of major infectious diseases, environmental issues such as deforestation, pollution of water and industrial related problems in the urban areas. In 2010 14,5 percent of the population was living under the poverty line. The majority of the population is young and the country puts great effort in meeting the challenging demands of the fast growing working-age population (Central Intelligence Agency, 2012).

In 2009 the total cost of health care in Vietnam was 7.2 percent of the GDP. In Vietnam the life expectancy at birth is 72 years for men and women, which is four years above the global average. The under-five year mortality rate is 23 per 1000 live births compared to global average of 57. The maternal mortality rate per 100 000 live births is 59, the global is 210. The prevalence of tuberculosis is 334 per 100 000 Vietnamese, almost twice that of the global average which is 178 per 100 000 people. 84 percent of the births in Vietnam are attended by skilled health personnel (World Health Organization, 2012a).

The healthcare system in Vietnam

Between the years 1958 and 1986 the health care was cooperatively financed and free of charges for the people. In 1986 an economic reform, *Doi moi*, was put in place. This changed the economy from centrally planned to market-oriented. The government subsidies for the health care stopped and user fees were introduced. The households contribute largely to the budget for health care and in addition to user fees two thirds of the cost for health care for people is informal fees (e.g. bribes). The organization of the Vietnamese healthcare system is

structured into four administrative levels: central, provincial, district and commune. The highest level is the Ministry of Health and the primary level for seeking health care is the commune. Private health care is people's first choice if possible, although it is more expensive and largely without external control (Dao, Waters & Le, 2008). In 1992 a national health care insurance programme was introduced and covered about half of the population in 2008. The insurance programme has had a positive outcome and the goal is to cover the whole population (Ekman, Liem, Duc & Axelson, 2008). Presently there is not enough health care workers or hospital beds available in the country and the standard of the health care is sometimes poor and inadequate (Embassy of Sweden Hanoi, 2012).

National Hospital of Pediatrics in Vietnam

The National Hospital of Pediatrics is situated in Hanoi since 1969. During a bombing raid in 1972 most of the hospital was damaged. However, it was built up again and finished in 1981. Before 1997 the hospital was called "Vietnam-Sweden Children Hospital" and after that "The Olof Palme Pediatric Institute" because of the cooperation with Sweden (National Hospital of Pediatrics, n.y.). The collaboration has been active for 40 years and the core of the relationship is quality-improvement work in Vietnam and is now becoming more of a mutual exchange (Ministry for Foreign Affairs, 2012). According to Professor Anna-Lena Hellström (Personal Communication, 16-05-2012) the Sahlgrenska Academy, University of Gothenburg has a good relationship and ongoing collaboration with the National Hospital of Pediatrics. Students from different programs are offered the opportunity to visit and complete some of their education at the hospital. Nurses from the University of Gothenburg and from the Sahlgrenska University Hospital have ongoing quality-improvement projects at the National Hospital of Pediatrics.

Nursing education in Vietnam

According to doctoral candidate and nurse Duong Thi Hoa (Personal communication, 26-01-2013) the staff at the hospital wards consists of doctors, nurses and nurses assistants. The education of nurses can vary, as there are three ways of becoming a nurse. Nursing school with a two and a half years education, nursing college for three years or a bachelor in nursing that is a four years university education. Continuing from bachelor there is a master in nursing that can be accomplished by adding two years of university education. The three educational levels decide some aspects of the nurses' work. For example the longer education means a higher

salary. Nurses with a bachelor degree can become head nurses and can manage for example more advanced technology, supervises students and conducts research.

Communicable diseases

Communicable diseases represent about 30 percent of the global disease burden. Many of them can be treated and cured with the right care and medicine. There are still millions of deaths in the world every year caused by communicable disease and most of the victims are children under five years (Eriksson, 2009). A communicable disease occurs when the infectious matter is transferred from one host to another. The matter is either spread direct or indirect with the help of a carrier. There are still new discoveries made in field of communicable diseases. For example diseases such as gastric ulcer and cancer, previously considered as a cause of lifestyle, may be caused by an infection. Also the infectious matter adapts and evolves into new forms of infection and can rapidly become a threat as an epidemic or pandemic (Pellmer & Wramner, 2007).

A health care-associated infection is an infection that the patient acquire while admitted to a hospital or in contact with another health care facility, during treatment or after being discharged. It also includes health care workers infected through the work. The most common health care-associated infection is a surgical site infection, followed by a lower respiratory tract infection and a urinary tract infection. At risk of getting health care-associated infections are patients with higher susceptibility like elderly patients, patients undergoing chemotherapy or patients weakened by other disease. These infections are most frequently seen in intensive care units and in acute surgical and orthopedic wards. Health care-associated infection is a cause of emotional stress and suffering for the patient and also a common cause of death. The infection can prolong patient's hospitalization with several days and often does so. This results in increased costs for the patient, the hospital and the society (World Health Organization, 2002).

The Swedish Association of Local Authorities and Regions latest survey from Swedish health care institutions shows that the frequency of health care-associated infections is gradually decreasing in Sweden. In 2012 the prevalence has been on a steady level of nine percent, in 2008 they were on the level of 11 percent. The three most common health care-associated infections are in skin or soft tissue, pneumonia and urinary tract infection. The urinary tract

infections are usually caused by a urinary catheter (Swedish Association of Local Authorities and Regions, 2012).

According to the World Health Organization report “Burden of Endemic Health Care-Associated Infection Worldwide” these infections are a problem in high-income countries as well as in middle- and low-income countries. Every year there are more than four million patients in Europe and 1,7 million patients in USA affected by a health care-associated infection. Approximately 30 percent of the patients treated in an intensive care unit in a high-income country suffer from a health care-associated infection at least once. The prevalence was over all in high-income countries on a level of 7,6 percent. In middle- and low-income countries the same number were 10,1 percent. Such an astonishingly high frequency as 15,5 percent if the used data only originate from high-quality papers. The amount of data on the prevalence of health care-associated infections in middle- and low-income countries is not as comprehensive as the data from high-income countries. According to the World Health Organization there were no published data at all from 66 percent of the countries during the research for their report published in 2010. Only 23 of the topical 147 countries had a functioning national system for registration of health care-associated infections. The most common health care-associated infection reported from a middle- or low-income country was a surgical site infection (World Health Organization, 2011).

Antibiotic resistance

According to the Swedish Institute for Communicable Disease Control latest annual report of communicable diseases in Sweden from 2011 the increased antibiotic resistance is a threat to the public health. An increased antibiotic resistance is caused by an incorrect and unnecessary use of antibiotics. It is also becoming more common with bacteria that no longer respond to any kind of registered antibiotic (Swedish Institute for Communicable Disease Control, 2012a). The Swedish Institute for Communicable Disease Control published a press release on the 25th of September 2012 informing that the antibiotic resistance is still a threat to the society and the global health. The use of antibiotics decreased last year in Sweden although the presence of resistant bacteria is still increasing (Swedish Institute for Communicable Disease Control, 2012b). The use of antibiotics must decrease in all parts of the society if the development of antibiotic resistance is to be stopped. Not only does the use of antibiotics increase the risk of antibiotic resistance for the society. Repeated use moreover contributes to the number of

individuals developing resistance (National Board of Health and Welfare, 2009). The growing presence of resistant bacteria is generating great expenses for the society and is a cause of morbidity and death. Beyond the need for antibiotics when treating communicable diseases caused by bacteria there is also a need for antibiotics as a preventing treatment, for example after organ transplantation or after cancer treatment. Quality-improvement work in the area of care related hygiene and good hygiene guidelines is according to The Swedish Institute for Communicable Disease Control crucial when trying to prevent the growth of resistant bacteria (Swedish Institute for Communicable Disease Control, 2012c).

Antibiotic resistance is a problem all over the world (World Health Organization, 2012b). An infection without a treatment can be hard to contain and it can result in a rapid spread and may develop into an epidemic or pandemic. One of the contributing causes of epidemics today is the hospitals where a lot of ill people are located on a limited area (Pellmer & Wramner, 2007). The National Board of Health and Welfare latest public health report declares that a high grade of compliance to hygiene guidelines among healthcare workers is fundamental when limiting the number of health care-associated infections (National Board of Health and Welfare, 2009).

Florence Nightingale

The important nursing theorist Florence Nightingale has written about the subject of hygiene and infection control. Nightingale (1863) argues that one could expect from a hospital to do no harm and to cure, which was not the prevalent situation. Nightingale finds the explanation to the illnesses acquired at the hospitals to be caused by the environment and conditions of the hospitals and therefore avoidable. Infections are the cause of many communicable diseases and these are spread through the air. Ill people breathe out infectious microorganism as a way, among others, for the body to get rid of illness. Infections are not spread through contact with either surfaces or between people, according to Nightingale.

There are no inevitable infections and therefore it is a great shame for a hospital to have cases of infection to appear or to be spread at the hospital. The best methods of solving the problem are to address some issues regarding hygiene. To have many ill people at the same place is a problem. The place becomes overcrowded and does not leave enough space between the hospital beds and this in continuing hinders sufficient ventilation. Correct ventilation is the key to infection control as infection is spread through the air. The ventilation should be natural and

not artificial as the natural way is superior. The heating of the rooms of a hospital should be done with open fires. Lacking quality of the sewerage causes the infected air to spread back to the hospital and its wards. If the floors, walls and ceiling of the rooms at the wards are being constructed of absorbent materials the infectious microorganisms stick to the materials and may cause infections. Faulty bedding that is not cleaned or dried properly between every patient may contain or give off contamination to the air. Defective furnishing such as beds and plates that cannot be cleansed satisfactorily may spread infection (Nightingale, 1863).

Hygiene and hygiene guidelines

The human skin normally houses a flora of resident bacteria, protozoa and microscopic fungi, constituting the normal skin flora. If the skin is without wounds, eczema or entrances into the body such as drainage or needles the normal skin flora acts as a superior protection against other microorganisms. However, if the skin is damaged in any way our own skin flora can cause infections, for example bacteria from the colon may cause urinary tract infection (Lindahl, Skyman & Fryklund, 2009). It is usually a microorganism from the transient flora on the health care workers hands that causes health care-associated infections. A transient flora, including bacteria, viruses and fungi, could also be acquired through either direct skin contact or contact with a contaminated source. These microorganisms usually do not become residential or multiply on the skin, although some microorganisms have this ability (Mathai, Allegranzi, Kilpatrick & Pittet, 2010).

The Austrian doctor Ignaz Semmelweis was one of the first to do research on possible connection between hand hygiene and health care-associated infections. In 1847 he discovered that infectious microorganisms were spread between patients at the hospital through the health care workers hands. Since then several research studies have proven the effectiveness of correct hand hygiene when decreasing the prevalence of health care-associated infections. Hand wash with water and soap offers a mechanical removal of microorganisms and other kinds of matter on hands. Alcohol-based hand rub offers a chemical removal, most effective at concentration levels of 75-85 percent (Mathai, Allegranzi, Kilpatrick & Pittet, 2010). The World Health Organization has presented an easy instrument called “My five moments” for health care workers to remember when there is a need to clean and/or disinfect hands. These moments are before touching a patient, before a clean or aseptic procedure, after a risk of

exposure to body fluids, after touching a patient and after touching patient surroundings (World Health Organization, 2009).

The World Health Organization launched in 2005 a global patient safety campaign *Clean Care is Safer Care*. The goal of the campaign is to maintain a better infection control and minimize the occurrence of health care-associated infections. Improved hand hygiene is one the most effective ways to minimize the spread of health care-associated infections and antibiotic resistance. The campaign offers both information and guidelines to improve health care-workers compliance to hygiene guidelines. The campaign includes several strategies and tools for example self-assessment surveys, posters and learning programs to be used both in hospital as well as in home-based and long-term care settings (World Health Organization, 2009).

The indications for hand hygiene according to the World Health Organization are presented in the report *Guidelines on Hand Hygiene in Health Care*. According to these, hands should be washed with water and liquid soap if visibly soiled by body fluids or other substances and after using the toilet. Hand wash with soap is also the preferred manner if exposed to a potential source of spore-forming pathogens. In any other situation when hand hygiene needs to be performed, alcohol-based hand rub is preferred. If not available, hands should be washed with water and soap. Hand hygiene should be performed before and after touching a patient, before being in contact with an invasive device, after contact with body fluids, non-intact skin, wound dressings or mucous membranes. Also between contact with a contaminated body site and another body site on the same patient, after contact with surfaces and objects in the patient's surroundings and after the use of non-sterile or sterile gloves. Hand hygiene should be performed before contact with food and preparation of it and before preparing medicine for patients. Soap and alcohol based disinfection should not be used at the same time. A pair of gloves is not a replacement for the action of hand hygiene in any form. Gloves should be used when there is a risk of contact with blood, mucous membranes, non-intact skin or other potentially infectious materials. The same gloves should not be used for contact with several patients and must be removed after every patient contact. If gloves are used, they should be changed between contact with different contaminated body sites on the same patient or contact with the environment. Reuse of gloves is not recommended (World Health Organization, 2009).

The Swedish National Board of Health and Welfare has published a description of the competence of a licensed nurse, "Description of competence for registered nurses". In this publication it says that a nurse should work according to hygienic principles and guidelines and prevent infection and spread of contagion (National Board of Health and Welfare, 2005). In Sweden there is an obligation by law, SOSFS 2007:19, that you as a caregiver have to follow the hygiene guidelines from the Swedish National Board of Health and Welfare. The guidelines serve to prevent health care-associated infections and include three topics: hand hygiene, work clothes and protective equipment. Correct hand hygiene is to wash hands with liquid soap and water when hands are visibly soiled or after contact with a patient infected by gastroenteritis. Also alcohol-based disinfection should be used immediately before and after contact with a patient and before and after the use of gloves. Protective equipment such as gloves and plastic aprons shall be used when there is a risk for contamination from body fluids (SOSFS 2007:19).

Since 2010 the Swedish Association of Local Authorities and Regions has done two surveys a year on health care workers compliance to hygiene- and clothing guidelines. The compliance is increasing and the clothing guidelines are followed by more than 90 percent of the health care workers. The hygiene guidelines have a compliance rate on approximately 70 percent (Swedish Association of Local Authorities and Regions, 2012).

According to doctoral candidate and nurse Duong Thi Hoa (Personal communication, 01-02-2013) there was some documents available at the hospital about hand hygiene, although all in vietnamese. The Ministry of Health has trained health care workers at the hospital about hand hygiene after the World Health Organizations guidelines.

The project: Infection control at the National Hospital of Pediatrics

According to pediatric nurse Monica Johansson (Personal communication, 13-09-2012) the Sahlgrenska Academy and the National Hospital of Pediatrics in Hanoi have an ongoing quality-improvement project about patient safety and infection control. In the spring of 2011 seven Vietnamese head nurses from different departments visited Gothenburg as a part of this project. During their visit they met the Swedish pediatric nurse Monica Johansson, who has special competence in quality-improvement work at the Sahlgrenska University Hospital. She talked about hygiene guidelines and their importance. The Vietnamese nurses were also

presented to a material to bring back to their departments so that they could inform the staff and observe the compliance to the hygiene guidelines on the wards. The observation sheets were divided into two parts, hygiene guidelines and clothing guidelines. The guidelines on these two topics are based on the Sahlgrenska University Hospital hygiene guidelines and the World Health Organizations international hygiene guidelines from *Clean Care is Safer Care*. It is also the same guidelines as the Swedish National Board of Health and Welfare describes (Sahlgrenska University Hospital, 2011, Swedish Association of Local Authorities and Regions, 2012 & World Health Organization 2009). According to Anna-Lena Hellström (Personal communication, 04-04-2013), the quality-improvement work serves to educate the head nurses so that they can educate their staff. Furthermore, there are to be continuous follow-ups using the observation sheet presented above. After each follow-up there should be a discussion on how to improve further. This is to identify where the obstacles to improved compliance to hygiene guidelines lies and to remove these. Continuous follow-ups are required to see the progress.

According to Head Nurse Doan Thuy Quynh at the Infection Department (Personal communication, 20-02-2013) and the Head Nurse Thanh Huong Bui at Surgical Intensive Care Unit (Personal communication 18-02-2013) guidelines from the National Hospital of Pediatrics are followed at the Infection Department and at the Surgical Intensive Care Unit. Further education is executed by the staff from the Infection Control Department at the hospital training the health care workers at Infection Department about hygiene guidelines. At the Surgical Intensive Care Unit Head Doctors and Head Nurses remind the other health care workers to always and everywhere perform appropriate hand hygiene. Furthermore, posters about infection control, which act as reminders, are placed throughout both departments.

Previous research on infection control conducted in Vietnam

Le, Dibley, Nho, Archiblad, Jarvis & Sohn (2007) study focuses on surgical site infections due to that it is the most common health care-associated infection in Vietnam. The study took place at a neurosurgical ward at a Vietnamese hospital. The intervention in the study consisted of a 70 percent alcohol-based hand rub to be used by all health care workers, such as doctors and nurses. The health care workers were trained in how to use the alcohol-based hand rub properly and health care workers and patients were given an educational brochure about the importance of hand disinfection. An encouraging poster was put up in the departments' nursing station.

The incidence of surgical site infections had decreased by 54 percent ($P = 0,09$) after the intervention compared to baseline measurements. There was a reduced length of stay by two days ($P = 0,0001$) after the intervention and a reduction from eight to six days in median duration of antibiotics use ($P = 0,0001$). The results were not statistically significant. To conclude, the intervention was successful in reducing surgical site infections by using alcohol-based hand rub and education.

The study performed by Nguyen, Nguyen & Jones (2008) shows that the frequency of health care-associated infections dropped by 84 percent ($P = 0,000$) after implanting a hand hygiene program at a urology department consisting of introducing 75 percent alcohol-based hand rub. Health care-associated urinary tract infections were reduced to 0,8 percent from 5,4 percent. Surgical site infections occurred in 7,7 percent of the patients. However, after the program only 1,1 percent of patients got surgical site infections. The program included one hour training of all the health care workers at the intervention department, daily training of the relatives to new patients and daily efforts to strengthen all health care workers. Posters on how to perform proper handy hygiene were placed at the department. The compliance by the health care workers and the relatives was examined after the introducing the alcohol-based hand rub. Hand hygiene was done most consistently after wound care. Doctors scored 42,9 percent, registered nurses 64,3 percent, student nurses 71,4 percent and relatives 22,2 percent. Overall the student nurses had the highest compliance.

The aim of the study performed by Johansson, Phuong, Walther & Hanberger (2011) was to look into the prevalence of antibiotic resistance, the use of antibiotics and compliance to hygiene guidelines. The study was done at three intensive care units at three different hospitals in Vietnam. The use of antibiotics was based on the deliveries from the pharmacy. Regarding the health care workers compliance to hygiene guidelines the following aspects were observed: working clothes with short sleeves, short hair or hair in ponytail, no watches, jewellery, rings on hands or wrists, short nails without nail polish, hand hygiene with either washing with soap and water or with alcohol-based hand rub before and/or after being in contact with the patient and gloves when risk of contact with body fluids. Both nurses and doctors were observed. The results presented from the study showed big difference between the three intensive care units. Hand hygiene more often meant washing your hands with soap and water than using alcohol-based hand rub. The rate of compliance in all three intensive care units was in mean 41,7

percent ($P = 0,033$) and ranged between 33,3 and 50 percent ($P = 0,033$). Correct use of gloves was in mean 86,7 percent ($P = 0,543$) at all wards combined. No posters, guidelines or any such information was displayed at the units. The level of antibiotic resistance varied a lot between the three hospitals. The use of antibiotics was low and the level of antibiotic resistance high. Compliance to hygiene guidelines was poor.

The study performed by Schultz et al. (2013) at a tetanus intensive care unit measures the effect of infection control efforts and mixing antibiotics in treatment on prevalence and increase or decrease of five antibiotic resistant microorganisms. The ward had four sinks for washing hands and one alcohol-based hand rub dispenser for every bed. Gloves were used when there was a risk of contamination of body secretions. One glove was used when performing suction of respiratory tube and tract. The first year of the two-year study baseline data was collected. The second year the antibiotic treatment was altered from one type of antibiotics to a mixture of several types. Additionally, the infection control was enhanced and the health care workers were educated on the subject. The data from the observational sessions ($n=311$) showed the level of compliance among the health care workers to be 54 percent concerning correct hand hygiene before and after contact with a patient. The level of compliance to correct use of gloves was 70 percent. To conclude, the study showed that improved infection control and a mixed antibiotic treatment had different effects on different antibiotic resistant microorganisms.

AIM

The aim of the thesis is to initiate a quality improvement work on the subject of infection control by measuring the compliance to hygiene guidelines among health care workers at two wards at the National Hospital of Pediatrics in Hanoi, Vietnam. The overall purpose is that the findings from the observations will raise the staffs' awareness on the subject and their compliance to the guidelines.

METHOD

Chosen method

Our thesis was an initiation of quality improvement work and the study was conducted using a quantitative observation method. This method was chosen because it is an adequate way of collecting data when seeking information about events and behaviors in natural situations (Patel & Davidsson, 2011). Throughout the observational sessions of the study the observers were participating, so called participating observer. However, this participation is passive and the observations are in focus. The observers are present in the rooms and affect the work in the rooms. Therefore the observers may act in the rooms to be able to attain information relevant for the observations, for example to move around in the room to get a clear view (Eliasson, 2006).

Study design and site

The observation is structured in which alcohol disinfection of hands, gloves as guided, apron as guided and correct use in all three steps are assessed as correct or as incorrect. The observation sheet that was used can be found in appendix 1. The sheet is the same as the one that the head nurses of the Infection Department 1 and the Surgical Intensive Care Unit were presented to when visiting Gothenburg and the Sahlgrenska University Hospital. The observation sheet is designed by nurse Monica Johansson and addresses the same aspects as the observation sheets on general guidelines on hygiene produced by the Sahlgrenska University Hospital (Sahlgrenska University Hospital, 2011). The Swedish Association of Local Authorities and Regions addresses the same aspects as the observation sheet used for this thesis except that hand disinfection is divided into two parts: before and after (SKL, 2012). Therefore the observational sheet used for this thesis was changed into dividing hand disinfection into two categories. This makes the data comparable. The topical guidelines are presented in the World Health Organizations global campaign Clean Care is Safer Care (WHO, 2012) and were presented at the same time as the observation sheets to the head nurses.

Previous observations

According to Head Nurse Doan Thuy Quynh at the Infection Department (Personal communication, 20-02-2013) and Head Nurse Thanh Huong Bui at the Surgical Intensive Care Unit (Personal communication 18-02-2013) the staff was not informed about this study

beforehand on neither of the observed departments. However, the staff realised what the subject of the observations was as the study continued and the purpose of the observations was not kept secret. All members of the staff had knowledge about the hygiene guidelines and how to implement them in the daily routine at the ward before the beginning of the study. The staff at the Surgical Intensive Care Unit has carried out observations on the same subject once after the head nurses visits to Gothenburg. Staff from the Infection Control Department at the hospital visit the Surgical Intensive Care Unit one or two times per month and the Infection Department once a week to perform infection control observations.

Data collection

The observational study was implemented by observing the health care workers, including all types of nurses and doctors. The reason for observing all health care workers was because of the importance of hand hygiene in all health care professions. The category of the health care worker was noted. Two categories were possible: nurse or doctor. Students were categorized into their future professions category. Two observers conducted the observations. The observer stood in the room at one place with the clearest visibility over the room for the moment. This spot could be changed during the observation sessions. The observations lasted approximately 45 minutes. When a health care worker started performing a task this individual was observed throughout the whole task until it was finished. No new observation started until the previous observation was completed. If an observation was not complete after 45 minutes, the observer stayed in the room until the observation was complete or until additionally maximum 10 minutes had passed. There were two parallel observation sessions. In one day there were 8 observation sessions in total. The observers visited the same rooms throughout the week but never the same room twice in one day. The same health care worker could be observed several times although the aim was to observe several members of the staff. Consequently the sample of people observed was accordingly to whom entered the room. The observations included all physical contact with the patient and/or the patient's immediate surroundings completed by the health care workers. What the health care worker did was noted on the observation sheet. This was to make assessing possible later in the process. The observations were held on two different wards: Infection Department 1 and Surgical Intensive Care Unit. Four days of observations were held on each ward. The first week of observations was conducted in the Infection Department and the following week on the Surgical Intensive Care Unit. In the

Infection Department there were 28 observational sessions and at the Surgical Intensive Care Unit there were 32.

Data analysis

The final assessments on whether the health care workers had performed correctly according to the guidelines were made after all of the observation sessions were finished by the two observers. Regarding hand disinfection before and after contact with a patient and the use of gloves the guidelines from the World Health Organization were used. Regarding the use of aprons the guidelines of the Region of Västra Götaland were used due to the lack of guidelines from the World Health Organisation. During the observation sessions the observer mainly focused on what the health care workers were doing and if they disinfected their hands, used gloves or used aprons.

The collected data was processed using the Microsoft Excel programme. To clarify the results, the data was organized into tables and figures. The result of the analysis together with useful information on the subject of hygiene was presented with the help of Microsoft Power Point presentations. These were sent to the departments' head nurses for further use in their infection control work.

References

The aim was to use information mainly from international, Vietnamese and Swedish agencies, institutions and authorities. Further literature used in the thesis has been discussed earlier in the nursing programme and contributes to present basic knowledge on certain subjects.

Information on some subjects has been collected through personal communication. Professor Anna-Lena Hellström is one of the project leaders and has key knowledge about the infection control project that the thesis is a part of. The doctoral candidate Duong Thi Hoa is employed by National Hospital of Pediatrics and the Sahlgrenska Academy. She was a part of the group that was presented to the infection control project. Nurse Monica Johansson has contributed greatly to the project and was responsible for the information and design of the project tools.

Several methodical searches were conducted using the database PubMed. The searches when useful articles were found are presented in appendix 2. The word compliance was used as well as the word adherence, which are both found in documents from the World Health

Organization. Although the database Cinahl was used, there were no useful articles presented that were not already found in PubMed. The selection from the list of hits was based on judging the articles titles relevance to the purpose of the thesis. Following the selection through titles, the abstract were read and assessed. If the article was relevant and available in full text the whole article was read. Those articles that were found relevant have been used in the thesis.

Ethical considerations

Professor Nguyen Thanh Liem Ph.D. Director of the National Pediatric Hospital in Hanoi approved the study before it commenced. Doan Thuy Quynh, head nurse of the Infection Department, and Trinh Van Hanh, Vice Director of Nursing Office and Head Nurse Surgical Intensive Care Unit, approved of the study being conducted at the two respective wards. The study has also been approved and supervised by Pham Thu Ha, Director of Nursing Office.

The ethical challenge of working in a children's hospital was acknowledged before the study was conducted. Taking into concern that it is an observational study where the health care workers are in focus, the study was likely to be conducted without compromising with ethics regarding the patients or the relatives. When questions about the observer's presence were posted by the parents or the staff the observers tried to answer as good as possible despite the language barrier. No other information than the health care workers profession was noted on the observation sheets to minimize possible identification of specific individuals. The results of the study will be presented combining the both wards to further minimize possible identification. Although the risk of some health care workers feeling uncomfortable when observed was present similar infection control work was done continuously at the two wards and therefore the observations were not new to the health care workers.

RESULT

Number of observations

The total amount of observations was 339, 285 observations of nurses and 54 of doctors. As seen in Table 1 there are more observations from the Surgical Intensive Care Unit than from Infection Department 1. This is due to the fact that the workload was more consistent at the Surgical Intensive Care Unit. At the Infection Department 1 the nurses and doctors work was

more concentrated to different periods during the day. There are more observations of nurses due to the fact that the nurse’s work meant more contact with the patients.

Table 1. Number of observations conducted at each ward, divided into professions and total.

Number of observations	Nurse	Doctor	Total
SICU *	190	22	212
Infection Dep. 1 **	95	32	127

* Surgical Intensive Care Unit

** Infection Department 1

Hand hygiene

In Figure 1 the level of compliance to performing correct hand hygiene both before and after contact with a patient among health care workers, nurses (n=285) and doctors (=54), is presented. In the remaining observations the health care workers either performed only one step correct or none correct. The presented observations of hand hygiene are moments when hand hygiene guidelines were fully conducted correctly. The level of compliance to correct hand hygiene before contact with a patient was 65 percent for both professions at both wards. The level of compliance to correct hand hygiene after contact with a patient was 61 percent for both professions at both wards.

Figure 1. Level of compliance to performing correct hand hygiene before and after contact with a patient among health care workers. Data was collected at Surgical Intensive Care Unit and Infection Department 1.

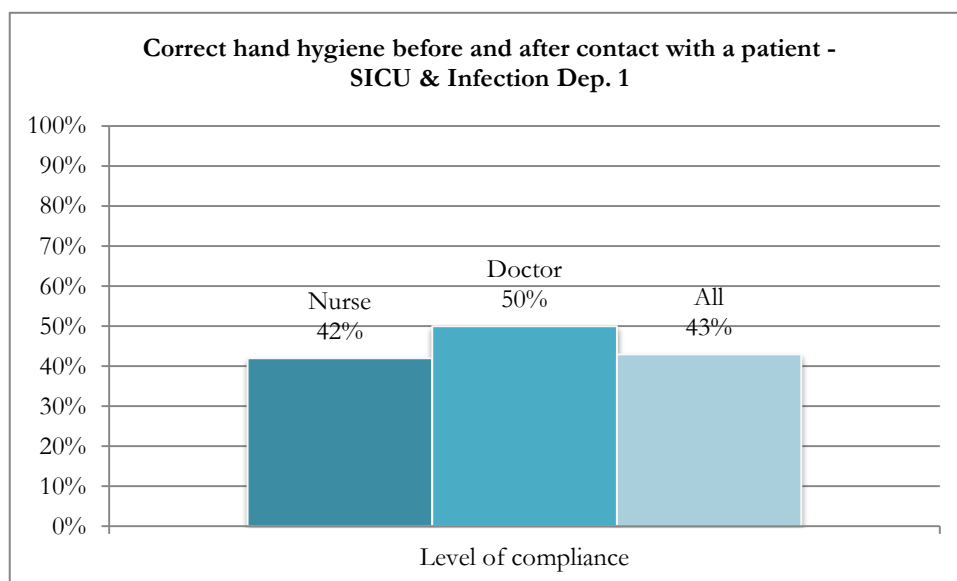
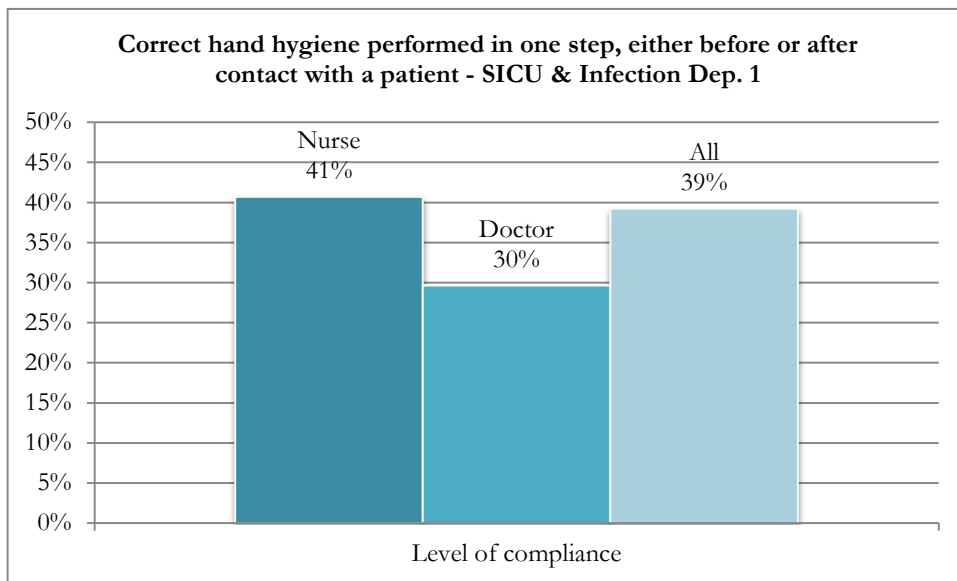


Figure 2. Correct hand hygiene performed in only one step, either before or after contact with a patient among health care workers. Data was collected at Surgical Intensive Care Unit and Infection Department 1.

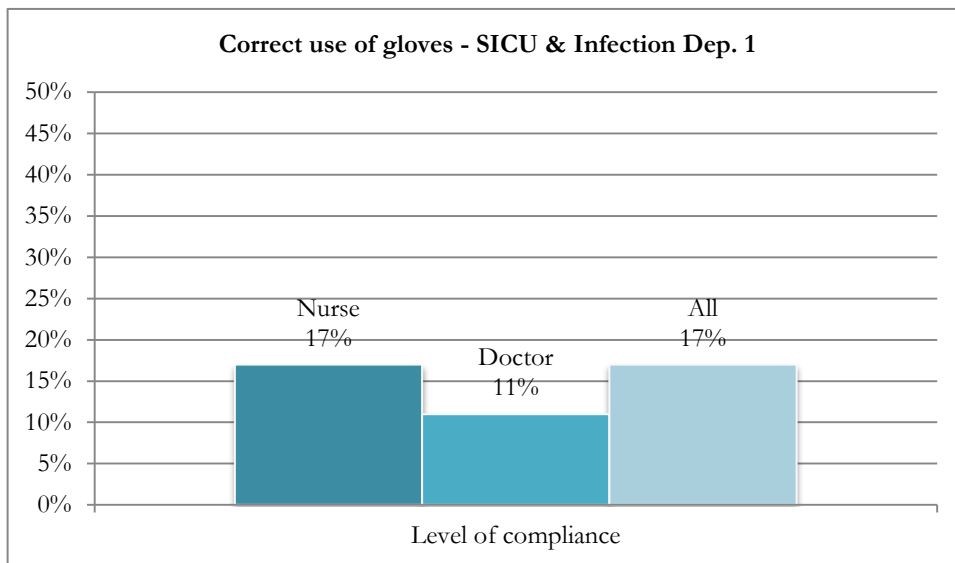


In Figure 2 data about correct hand hygiene performed in only one step, either before or after contact with a patient, is presented. This means that the health care worker did not fully conduct the hand hygiene procedure. This data is presented to show how often only one step, in the two-step procedure, is conducted. 20 percent of the observed health care workers only conducted hand hygiene before contact with a patient and 19 percent only conducted hand hygiene after contact with a patient at both wards. During the other observations the health care workers either conducted both steps correctly or none of the two steps correctly.

Use of gloves

Gloves were available at all the rooms where observations were conducted. The use of gloves varied both within and between the observational sessions. During certain task the staff was consistent in the use of gloves, for example catheterization of urinary bladder and suction of respiratory tube and tract. The level of compliance to correct use of gloves is presented in Figure 3. The number of observations when gloves should have been used by the health care workers is similar between the two wards. Due to the fact that the parents cared for their own child at the Infection Department 1 and did not so at the Surgical Intensive Care Unit the tasks that required gloves varied for the health care workers between the wards. The number of moments when gloves should have been used according to the guidelines differs between the two professions doctor (n=9) and nurse (n=176).

Figure 3. Level of compliance to correct use of gloves among health care workers. Data was collected at Surgical Intensive Care Unit and Infection Department 1.



Use of aprons

Regarding the use of aprons the compliance was zero percent due to the fact that there were no aprons available at the wards. There were 23 moments observed when apron should have been used out of 339 observed moments in total. According to the guidelines apron should be used when there is a risk of contamination of the working clothes by body fluids. There were five moments observed at the Infection Department 1 when a health care worker should have used an apron. At the Surgical Intensive Care Unit there were 18 moments observed when apron should have been used.

Compliance to hygiene guidelines in all three steps

The level of compliance represents if the health care workers perform the tasks according to the hygiene guidelines. The three assessed steps are: correct hand hygiene before and after contact with a patient, correct use of gloves and correct use of apron. Performing correctly according to guidelines means that the health care worker uses gloves and aprons when required and do not use them when it is not required. For example if the health care worker uses gloves when it is not required, this is not performed according to the guidelines.

Table 3. Compliance in all three steps to hygiene guidelines among health care workers. Data was collected at Surgical Intensive Care Unit and Infection Department 1.

Correct use in all three steps	Is used correctly	Moments when all three steps should have been correct	Compliance
Nurse	44	285	15%
Doctor	22	54	41%
All	66	339	19%

METHOD DISCUSSION

Chosen method

How the observation method may have affected the result is crucial to analyze. The observers likely affected the health care workers. However, the overall aim of the study is to raise health care workers awareness of compliance to hygiene guidelines. The observers presence may have acted like a reminder for the hygiene guidelines and ultimately worked in favor of the aim.

Study design and site

The same observer chose the same four rooms every day. The purpose of this was so that the patients and parents would learn to recognize the observer and be as comfortable as possible with the observers' presence. There is a chance that the staff on the wards would feel uncomfortable being observed. This was recognized by the observers who tried to be accessible and act friendly towards the staff. If it did not interfere with the observations the observers could converse with and answer questions from the staff. The observers were open towards the staff, patients and parents with how and what they were observing. However, no results were presented in advance. This was due to the fact that the observations were not analyzed yet and would only give a partial description.

Data collection

Due to the knowledge among the staff about the study, the results do not necessarily reflect the average compliance to hygiene guidelines. Furthermore this was not the aim of the study. Although the results do not necessarily represent the average compliance to hygiene guidelines, some assumptions about the compliance can still be made. To ensure that the levels of compliance to hygiene guidelines are representative of the reality the observations would have

to be conducted in secret. Keeping the purpose of the observations secret could create an unfriendly environment for the staff and could ultimately affect the care of the patients. It is hard for a health care worker to act normal when observed because this is usually not a normal part of the work-routine. To the study's advantage similar observations have been performed before. Therefore the staff on the wards should be more accustomed to the implementation of the observations.

On the original observation sheet there was no separation of hand hygiene before and after contact with a patient. The observers noted this nevertheless to be able to see a more nuanced representation of the situation. Information about the performance of correct hand hygiene before and after contact with a patient could make it possible to see behavioral patterns behind the performance of correct hand hygiene. In addition, the data would be comparable to data from the Swedish Association of Local Authorities and Regions regarding the compliance to hygiene guidelines in Sweden.

Data analysis

Regarding the assessments of the observations, these were done together by the observers with the help of guidelines produced by the World Health Organization, the National Board of Health and Welfare and Sahlgrenska University Hospital. The reason for this was to make sure that the observations was assessed in the same way. Regarding the assessment of the use of aprons there are no guidelines from the National Hospital of Pediatric or from the World Health Organization. There are only guidelines from Sweden to rely on for this assessment, which is a weakness in the study. Regarding the assessment of correct use in all three steps, these numbers differ from the other figures in the result, as these are not based on if the health care worker performs something. The numbers only reflect if the hygiene guidelines have been followed, whether it means gloves or apron should have been used or not. This gives a deeper understanding for the level of compliance.

Tables and figures presented are based on the total amount of observations from both wards combined. However, there are differences in the care between the wards that could offer different perspective on compliance to hygiene guidelines, if number were presented separately. For example, the nurses at the Surgical Intensive Care Unit perform more tasks that require gloves and might therefore develop a more consistent habit of using gloves. The major

difference in the number of observed doctors and nurses makes the result of the comparison between the two professions misleading. It is not possible to draw conclusions about the doctors' level of compliance alone due to the small number of observed doctors.

References

The purpose of using information mainly from international, Vietnamese and Swedish agencies, institutions and authorities was to ensure that the information was of high quality. Furthermore, the information is relevant on a wide range. Literature from the nursing programme is an adequate source of information due to the fact that it has been approved as useful and reliable by the Sahlgrenska Academy.

The methodical search did not provide many scientific articles on the subject of the study, compliance to hygiene guidelines in Vietnam. The used articles were on the subjects of compliance to hygiene and guidelines health care-associated infections, implementation or improvement of infection control projects and antibiotic resistance. The lack of research from Vietnam is a weakness for the thesis. With more research available the focus could have been more on infection control in Vietnam instead of the more general approach to the subject. Furthermore three scientific articles on the subjects of infection control and the national health care system in Vietnam were found through a methodical search. The article by Mathai et al. (2010) and the article by Ekman et al. (2008) are reviews of the current knowledge in their respective fields. Due to the complexity of the subjects, it is suitable to use a review to acquire a wide perspective. None of the seven used articles are older than five years, which is a strength to the thesis as the subject of infection control is continuously developing.

Some of the references consist of personal communication. Nurse and doctoral candidate Duong Thi Hoa took part in the infection control project during the visit to Sweden. In addition, through her nursing education and employment at the National Hospital of Pediatrics she has knowledge about the Vietnamese nursing education and the guidelines at the National Hospital of Pediatrics. Regarding the Vietnamese nursing education, a search was done. However, this gave no useful results. The guidelines at the National Hospital of Pediatrics are written in Vietnamese and Duong Thi Hoa assisted with the translation of these documents. These aspects make her a suitable reference on the subjects.

Number of observations

The number of observations varied between the wards. Preferably the number of observations should have been the same at the two wards. Due to the differences in the care at the wards this was not possible. According to the World Health Organization (2009) opportunities for correct hand hygiene varies between different types of wards. At a pediatric ward the average number of opportunities for correct hand hygiene for nurses was eight per hour of patient care. At an intensive care unit the average number of opportunities for nurses was 30 per hour of patient care. These numbers offers an explanation to the differences in the numbers of observations in this study. The number of observations is not valued solely on the quantity. It is valued in the number of possible observations. The observations in the study have been conducted during a long time span of a day and during several days. Therefore it is possible to conclude that the observations offer a satisfactory wide picture of the health care workers tasks and what hygiene measurements they require on these two wards.

The observation sessions were scheduled and adjusted according to the nurses working patterns. The room with the most activity was always chosen when starting a new observation sessions. Although the number of observations varied between the wards there were still enough observations from the two wards separately to be able to draw some conclusions about the compliance to hygiene guidelines.

Reliability

Reliability looks into the question if the study is reliable, if repeated under as similar conditions as possible it gives the same results (Eliasson, 2006). The observation sheet has been used before in this project that the thesis is involved in. The observation sheets were developed by nurse Monica Johansson and based on general guidelines on basic hygiene produced by the Sahlgrenska University Hospital (Sahlgrenska University Hospital, 2011). The aspects that are observed are the same aspects that the Swedish Association of Local Authorities and Regions are looking into when evaluating the compliance to hygiene guidelines in Sweden. The hygiene guidelines are the same in both the observation sheet used in this study and the aspects that the Swedish Association of Local Authorities and Regions observe (Swedish Association of Local Authorities and Regions, 2012). This gives the observation sheet used in the study a higher reliability.

Validity

Validity is about if the study is valid, that it really measures the aspects that it is supposed to. A high grade of reliability is a condition that has to be fulfilled to enable a high grade of validity (Eliasson, 2006). The aspects measured by the observation sheet have the same definitions as other observation tools used by well-established organizations such as the Region of Västra Götaland and the Swedish Association of Local Authorities and Regions.

RESULT DISCUSSION

Number of observations

As seen in Table 2 there are almost twice as many observations from the Surgical Intensive Care Unit than from the Infection Department 1. Therefore, the results could be more applicable on the reality at the Surgical Intensive Care Unit.

Education and knowledge about hygiene guidelines

From what has been observed and what the head nurses communicated in this study the health care workers should be well educated on the subject of hygiene guidelines. However, the data presented in this study does not support this. Explanations may be sought in lack of reflection about the guidelines and that they are seen as a set of rules and not an integrated part of patient care. In addition, following the examples of your colleagues may be a problem if the colleagues' behaviours are not correct. When there is a shortage in both time and resources the subject of infection control may be overlooked and the focus kept on well-established matters. However, as Nightingale (1863) argues, the subject of infection control should always be regarded as essential to health care and therefore be prioritised. The lack of local official guidelines regarding hygiene and relying on guidelines from the World Health Organization may lead to a sense of distance and therefore a lower level of compliance.

Hand hygiene

As shown in Figure 1 the level of compliance to correct hand hygiene both before and after contact with a patient was 43 percent compared to the level of compliance to performing only one step, which was 39 percent. This shows that most of the health care workers know that they ought to disinfect their hands although there may be a lack of knowledge regarding correct hand disinfection. The fact that 39 percent of the health care workers performed only one step

of hand hygiene correct could indicate that there is a behavioral determinant present when health care workers perform or do not perform hand hygiene. According to the World Health Organization (2009) certain contacts with patients evoke a feeling of being dirty when others do not. How and when an individual perform hand hygiene is something that becomes routine in a person's early years and these patterns stay with us. Moments that require a performance of hand hygiene in a health care setting does not necessarily do so in the everyday life. In the everyday life a person usually performs hand hygiene as a protection from dirtiness and sickness. In a health care setting there are multiple reasons for performing hand hygiene. This requires that health care workers entering this setting create a different routine for hand hygiene.

The number of observed nurses (n=285) was enough to enable some conclusions. The number of observed doctors (n=54) was fewer. However, there are enough observations to draw some conclusions regarding compliance to hand hygiene guidelines. The level of compliance between the two professions is quite even. The level of compliance to hand hygiene guidelines is the highest level of compliance among the three observed steps. This may be due to the fact that this step needs to be conducted with every contact with a patient and therefore becomes a habit.

Use of gloves

The observers perceived the use of gloves as not always a part of the routine. During some tasks performed by the health care workers the use of gloves was routine such as catheterization of the urinary bladder and suction of respiratory tube and tract. In other cases the use was dependent on which health care worker who performed the task, such as blood sampling and the handling of invasive tubes and catheters. In addition to this, gloves were sometimes used incorrectly. For example alcohol-based hand rub was used on gloves, only one glove was used and the gloves were removed before the whole task that required gloves was completed. This behavior may be explained by lack of knowledge and education about the correct use of gloves. According to the World Health Organization (2009) gloves have been proved to be an efficient protection from contamination of health care workers hands, if they are used correctly with the correct procedures required before and after. Incorrect use of gloves can increase the spread of microorganisms between health care workers, patients and surfaces in the patients' environment and cause health care-associated infections. Incorrect use is for

example failure to remove gloves between contact with patients or use of alcohol-based hand rub on the gloves, which harm the material.

The considerable difference in the amount of moments when gloves should have been used according to the guidelines between doctors (n=9) and nurses (n=176) is important when evaluating the level of compliance. The difference between nurses and doctors in moment when gloves should have been used is because the nurses performed more tasks when there was a risk of contamination by body fluids. Due to the small number of moments when gloves should have been used regarding doctors the results are not comparable. One moment of correct or incorrect use of gloves has a major impact on the level of compliance. The 17 percent level of compliance among nurses represents many more individuals than the 11 percent that represents the doctors. The World Health Organization (2009) concludes that use of gloves is an evidence-based act to protect health care workers and patients.

Use of aprons

The risk of contamination of work clothes was minimal at the Infection Department 1 as the parents performed most tasks when this risk was present. At the Surgical Intensive Care Unit these risk moments was performed by the nurses. There were no aprons available at the wards. However, in case of contamination of the working clothes the clothes may as well be changed. The knowledge about the use of aprons may not be widely spread due to the lack of guidelines. Therefore the information is hard to retain for the head nurses and health care workers. The lack of guidelines from the National Hospital of Pediatrics and the World Health Organization could make it hard to motivate the purchase of aprons for the wards.

Compliance to hygiene guidelines in all three steps

These numbers are not comparable to the other numbers, as they are not assessed in the same way. It could seem unfair to look at these numbers, as there are no aprons at the wards. However, the moments when aprons should have been used (n=23) are relatively few and therefore this analysis illustrates an important aspect on the level of compliance. The doctors had a higher level of compliance than the nurses due to the fact that the doctors' tasks usually did not require the use of gloves or aprons.

Comparing results

According to the Swedish Association of Local Authorities and Regions (2012) the level of compliance to hand hygiene and glove guidelines was approximately 70 percent at Swedish hospitals during two weeks in the fall of 2012. In the Region Västra Götaland, which the Sahlgrenska University Hospital is a part of, the level of compliance was also approximately 70 percent. The study by Schultz et al. (2013) measured a level of compliance to hand hygiene guidelines at 54 percent and Johansson et al. (2011) measured the level of compliance to 86,7 percent regarding the use of gloves. These levels of compliance are a bit higher than those presented in this study. In Sweden the hygiene guidelines are national and the health care workers are obligated by the law SOSFS 2007:19 to follow them in every health care setting. At the two wards at the National Hospital of Pediatrics there are no documents concerning hygiene guidelines available for the health care workers as there are in Sweden. This could affect the levels of compliance as the health care workers could feel unsure about what are the correct procedures regarding hygiene. However, there were a lot of posters from the World Health Organization at the wards regarding correct performance of hand hygiene. The study by Schultz et al. (2013) offered a level of compliance to hand hygiene guidelines similar to this study. Both studies are a part of an infection control project. The number of conducted observations was also similar and therefore these numbers are comparable. The study by Johansson et al. (2011) presented high levels of compliance to use of gloves. When compared to the thesis study the numbers show that there is room for improvement at the two wards at the National Hospital of Pediatrics. According to the World Health Organization (2009) gloves should be used at all times when the guidelines recommend so, regardless of the wards resources and conditions of the health care setting.

Florence Nightingale

The notion written by Florence Nightingale (1863) presented an important clue to the spread of infections and the work regarding infection control. Considering what knowledge the society had on the subject at this time, the measurements to limit the spread of infections were well reasoned. However, research has shown that infections do as well spread through contact between people and surfaces and not only through the air. Nightingale (1863) stated that, no infections were inevitable and a hospital should have been ashamed of having infections at the hospital. The suggestion to solve this was to build a hospital with certain design regarding aspects such as ventilation, laundries, sewages and furniture to stop the spread of infections.

The importance of infection control is identified as an essential part of health care and nursing and the measurements of infection control demanded a great effort. Many of these aspects are relevant in the infection control of today. The precision and effort of Nightingale could act as an inspiration to the infection control of today. Infection control is a cross border subject affecting every health care setting. In 1863 the importance of infection control was identified and its importance has not decreased today. Infection control and the level of health care infections could act as a measurement of the quality of the health care. As Nightingale (1863) writes, health care associated infections are avoidable, consequently every health care infection is a failure.

Conclusion

The conclusion from our research is that there is room for improvement on the staffs' level of compliance to hygiene guidelines. There is a continuous work done regarding infection control on both departments. However, further actions need to be taken to improve the level of compliance among the staff. The head nurses received the Power Point presentations and at the Surgical Intensive Care Unit the presentation was used for further infection control work. The staff was educated through the head nurse translating the presentation into Vietnamese. The subject of hygiene guidelines and compliance to these are one of the department's primary focuses throughout 2013.

Health care workers in all settings need to be reminded on the subject of hygiene. The observers' presence at the wards should act as a reminder, for the head nurses as well as for all the staff. Perhaps a greater reminder as the staff usually are observed by health care workers from their own department or Infection Control department.

In 1863 Nightingale identified the importance of infection control and the work continues today without decreasing in importance. As the purpose of health care is to improve the health of humans it is the health care workers responsibility to provide that care.

Further research is required in the field of infection control in Vietnam. From the perspective of this study further research is required regarding the level of compliance in general and behavioural aspects behind the level of compliance. The focus should be on how to turn knowledge into action among health care workers.

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Infection Control – follow up

Compliance to Hygiene guidelines

Unit.....

Date.....

Correct **alcohol disinfection of hands** – before and after caring of the patient.

Correct **use of gloves** means using gloves when handling body fluids or secretions.

Correct **use of apron** means using apron to cover the clothes whenever chance of contamination.

Observation number or working category	Alcohol disinfection of hands	Gloves as guided	Apron as guided	Correct use in all three steps (Yes/No)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Total				

Infection Control/2010-05-10/mj DSBUS

Methodical search

Date	Database	Search	Filters	Number of hits	Chosen	Name of chosen article
20130120	PubMed	compliance AND infection AND vietnam	-	64	2	"Effectiveness of an alcohol-based hand hygiene programme in reducing nosocomial infections in the Urology Ward of Binh Dan Hospital, Vietnam." & "Reduction in surgical site infections in neurosurgical patients associated with a bedside hand hygiene program in Vietnam."
20130120	PubMed	infection AND antibiotic resistance AND vietnam	Abstract available & publish date: 5 years	23	1	"Need for improved antimicrobial and infection control stewardship in Vietnamese intensive care units"
20130127	PubMed	health AND system AND vietnam	Abstract available, humans & publish date: 5 years	149	2	"Health insurance reform in Vietnam: a review of recent developments and future challenges" & "User fees and health service utilization in Vietnam: How to protect the poor?"
20130210	PubMed	prevention AND "health care associated infections" AND hand hygiene	Abstract available & publish date: 5 years	35	1	"Prevention and control of health care associated infections through improved hand hygiene"
20130215	PubMed	adherence AND hygiene AND vietnam	-	3	1	"Effects of infection control measures on acquisition of five antimicrobial drug-resistant microorganisms in a tetanus intensive care unit in Vietnam."