KNOWLEDGE AND PRACTICES TOWARDS HAND HYGIENE AMONG PEDIATRIC NURSES IN HOSPITAL UNIVERSITI SAINS MALAYSIA

by

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ABSTRACT

The most important factor in the prevention and control of nocosomial infections is with appropriate hand hygiene practice by healthcare workers. Knowledge and practices towards hand hygiene is essential in order to enhance the prevention or reduction of health care associated infections. The objective of this descritive and cross-sectional study was to identify knowledge and practices towards hand hygiene among pediatric nurses in Hospital USM. A total of 66 respondents were selected using purposive sampling method. The data was obtained using a self-administered questionnaire which consisted of three sections. In section A there were five demographic characteristics, in section B and C there were nine with a 5-Likert type questionnaires in each to determine respondents' level of knowledge and practices on hand hygiene. The data were processed with SPSS version 22.0 to analyze descriptive statistics, Chi Square test and Spearman rho's correlation for answering the research questions. This study showed that respondents' had excellent level of knowledge (70% excellent and 30% good knowledge level) and excellent practice level of hand hygiene (70% excellent and 30% good practice level). However, there was no significant relationship between socio-demographic variables and knowledge level ($p>0.01$) towards hand hygiene. But there was a significant correlation between knowledge and practices (r =1.000, $p< 0.01$). This showed that there was positive relationship between the respondents' knowledge and practices whereby higher knowledge associated with excellent practices of hand hygiene. Overall, the findings of this study revealed that nurses must have good knowledge and practice level to sustain good hand hygiene to prevent cross infections in wards.

*Keywords: *Knowledge, Practice, Hand Hygiene, Pediatric Nurses*

PENGETAHUAN DAN AMALAN TERHADAP PENCUCIAN TANGAN DI KALANGAN JURURAWAT PEDIATRIK DI HOSPITAL USM

ABSTRAK

Faktor yang paling penting dalam pencegahan dan mengawal jangkitan nosokomial adalah dengan amalan kebersihan tangan oleh kakitangan kesihatan. Pengetahuan dan amalan kebersihan tangan adalah penting dalam usaha untuk meningkatkan pencegahan atau pengurangan penjagaan kesihatan yang berkaitan dengan jangkitan. Objektif kajian deskriptif dan keratan rentas ini adalah untuk mengenal pasti pengetahuan dan amalan terhadap kebersihan tangan di kalangan jururawat pediatrik di Hospital USM. Seramai 66 responden telah dipilih dengan menggunakan kaedah persampelan bertujuan. Data yang telah diperolehi dengan menggunakan soal selidik yang ditadbir sendiri terdiri daripada tiga bahagian. Dalam bahagian A terdapat lima ciri-ciri demografi, di bahagian B dan C terdapat sembilan soalan dengan 5-Likert jenis soal selidik pada setiap soalan untuk menentukan tahap responden terhadap pengetahuan dan amalan pencucian tangan. Data diproses dengan perisian SPSS versi 22.0 untuk menganalisis statistik deskriptif, ujian Chi Square dan korelasi Spearman rho untuk menjawab soalan kajian. Kajian ini menunjukkan bahawa responden mempunyai tahap yang sangat baik pengetahuan (70% tahap pengetahuan yang sangat baik dan 30% baik) dan tahap amalan yang sangat baik kebersihan tangan (70% sangat baik dan 30% tahap amalan yang baik). Walau bagaimanapun, terdapat hubungan yang tidak signifikan antara pembolehubah sosio-demografi dan tahap pengetahuan ($p > 0.01$) terhadap kebersihan tangan. Tetapi ada hubungan yang signifikan antara pengetahuan dan amalan ($r = 1.000$, $p < 0.01$). Ini menunjukkan bahawa terdapat hubungan positif antara pengetahuan dan amalan responden di mana pengetahuan yang lebih tinggi yang berkaitan dengan amalan-amalan yang sangat baik untuk kebersihan tangan. Secara keseluruhan, dapatan kajian ini menunjukkan bahawa jururawat perlu mempunyai pengetahuan dan amalan tahap yang baik untuk mengekalkan kebersihan tangan yang baik untuk mencegah jangkitan silang di wad.

Katakunci: pengetahuan, Amalan, Pencucian Tangan, Jururawat Pediatrik

CHAPTER 1

INTRODUCTION

1.1 Introduction

The increase rate in nosocomial infection among hospitalized pediatric patient has brought awareness among researcher to do research. The idea is to search more appropriate methods in infection control to ensure the maintenance of quality of life or health of the hospitalized pediatric patients at the optimum level. The most simple and convenient method to reduce nosocomial infection is by performing hand hygiene before and after contact with the patients. This awareness has led the researcher to conduct a study to explore the knowledge and practices of hand hygiene among pediatric nurses. The introductory of this study followed by a presentation of the background information related to hand hygiene knowledge and practices. This study also included the problem statement, objectives of the study, research questions and significance of the study.

1.2 Background of the study

Hand hygiene is very important for healthcare worker especially nurse because they always have contact with patient. Transmission of miroorganism from the hands of nurse is the main source of cross infection in ward and it can be prevent by hand washing. According to WHO (2009), compliance to hand hygiene is widely acknowledged as the most important way of reducing infection in healthcare facilities and the spread of antimicrobial resistance.

The compliance of hand hygiene is the effective way of preventing the spread of nosocomial infection (Elaziz & Bakr, 2008). Therefore to avoid the nosocomial infection from happening, each and every healthcare providers have to realize the importance of hand hygiene practice in order to avoid spread of the disease and increased number of nosocomial infection in the hospital. Spread of nosocomial infections caused by transferring of pathogenic microorganism from patient to patient which is the common case occur in ward (Katherason et al., 2010). Most nosocomial infections that happened in hospitals most likely would cause morbidity and mortality among patients. Besides, such problem will also result the increase in the treatment cost and hospital cost which eventually burden the country's economy (Huis et al., 2012).

Since the time of Florences Nightingale, Iqnaz Semmerwis and Joseph Lister cleanliness is emphasized when patient's are being treated. Thus, they practice hand hygiene take good care of patients' cleanliness and the environments and provide good sanitation to patients. This way is to maintain the health status of the patient and avoid nosocomial infection. According to Haas and Larson (2007) stated that there is a relationship between hand hygiene practice and the risk of getting infected and the implication on hospitalization patient.

Mallirou, Sarafis, Zyga and Constantiniditis (2013) stated that the health care provider know about the important of hand hygiene but they did not perform it. The reason given by health care provider who has bad hand hygiene habit including lack of time due to work conditions, limited hand hygiene facilities, coupled with skin will irritation with surgical hand rub. According to Asaldollahi et al., (2015), the job as health care provider are tough to prevent localized of nosocomial infection due to hand hygiene practice not being enforced or low. It is shown that nurses' knowledge

about standard precaution still not enough and nurses believe that washing hand is not important when do the procedures because had already worn gloves (Chau, Thompson, Twinn, Lee & Pang, 2010).

There are many ways to stop the spread of nosocomial infection such as through asepsis medical hand hygiene or surgical, usage of surgical gloves when performing procedure on the patient, maintain aseptic technique, remove invasive device quickly as possible and others (Katherason et al., 2010). Hence, hand hygiene practice cannot be taken for granted as easy and unimportant practice eventhough it is a simple procedure in medical practice.

1.3 Problem statement

Hand hygiene is a single most important factor in the prevention and control nosocomial infection. Appropriate hand washing practices could prevent the transmission from hand of healthcare providers. According to Asadollahi et al,. (2015), nosocomial infection are major causes of mortality and morbidity and have become a major public health focus. Pediatric patient are at risk for nosocomial infection due to their immature system.

According to Abdolahi et al., (2012), estimated 80% of patient who admitted at hospital died related to nosocomial infection whether it is direct or indirect. Therefore, prevention and treatment of nosocomial infection is very important to reduce the mortality rate. Due to the role of nurses in patient care, emphasis on hand hygiene is very important before and after touch the patients. These infection not only give back effect to the patients' outcome but they also pose a financial burden to both patients and hospital as well which is increase overall of medical cost (Reed & Kemmendy, 2009).

According to WHO (2009) five moments of hand hygiene are introduced as an improvement strategy which means to improve practices of hand washing thus will reduce transmission of infection. But then, nurses still neglect this important things as they forget to wash hand, fear of sensitive skin, lack of time due to patients need treatment and insufficient hand rub (Sax et al., 2007).

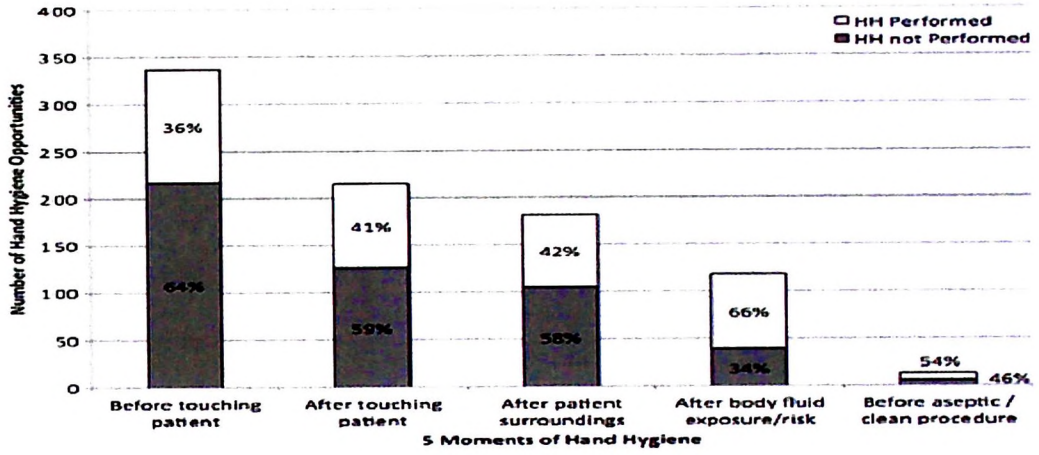

Figure 1.1: Five moments of Hand Hygiene Perform

(source : Buet et al., 2013)

The figure 1.1 as above shows statistic of five moments of hand hygiene. The five moments for hand hygiene defines the keys moments when health care workers should perform hand hygiene. This approach recommends health care workers to clean their hand before touching patient, after touching patient, after touching patient surroundings, after body fluid exposure or risk and before aseptic procedures. The stastistic showed that poor adherence to hand hygiene not performed is higher than hand hygiene performed. Therefore, it should be emphasized about hand hygiene particularly in the pediatric ward since childhood susceptibility to infection.

The problem statement at Hospital USM is nurse not compliance about washing hands before touching different patient. Nurses also be petty in the washing of hands which can cause infection to other patients. Therefore this study was conducted to assess the level of knowledge and practice nurses regarding hand hygiene.

Theoretical/Conceptual

Researcher had used the Health Belief Model by Irwin M. Rosenstock to explain knowledge and practices of hand hygiene in the health care setting among pediatric nurses. In this study, Health Belief Model explain hand hygiene behaviour in response to a vulnerability to one's own health such as to protect oneself from infection. These perception are then influenced by several modifying factors such as demographic characteristics.

1.4 Objectives of the study

1.4.1 General objective

To identify knowledge and practices towards hand hygiene (HH) among pediatric nurses in Hospital Universiti Sains Malaysia (Hospital USM).

1.4.2 Specific objectives

1.4.2.1 To identify the level of knowledge of pediatric nurses' towards hand hygiene at Hospital USM.

1.4.2.2 To identify the level of practice of pediatric nurses' towards hand hygiene at Hospital USM.

1.4.2.3 To determine the association between sociodemographic data (age, marital status, working experience, level of education) of pediatric nurses' and knowledge of hand hygiene.

1.4.2.4 To determine the relationship between pediatric nurses' knowledge and practice of hand hygiene.

1.5 Research question

1.5.1 What is the level of knowledge of pediatric nurses' towards HH at Hospital USM?

1.5.2 What is the level of practices pediatric nurses' towards HH at Hospital USM?

1.5.3 Is there any association between sociodemographic data (age, marital status, working experience, level of education) of pediatric nurses' towards knowledge and practice of HH?

1.5.4 Is there any relationship between pediatric nurses' knowledge and practice of HH?

1.6 Hypothesis

1.6.1 H_o : There is no significant association between selected demographic data (age,marital status, working experience, level of education) of pediatric nurses' knowledge towards HH in pediatric ward at Hospital USM.

H_A : There is significant association between selected demographic data(age, marital status, working experience, level of education) of pediatric nurses' knowledge towards HH in pediatric ward at Hospital USM.

1.6.2 H_o : There is no significant relationship between pediatric nurses' knowledge and practices towards HH in pediatric ward at Hospital USM.

H_A : There is significant relationship between pediatric nurses' knowledge and practices towards HH in pediatric ward at Hospital USM.

1.7 Definition of terms (conceptual/operational)

1.7.1 Knowledge

According to The American heritage Medical Dictionary (2015), knowledge is an information, understanding and skill that you have gained through learning or experience. In this study the HH knowledge was identified based on the respondent view about the causes of nosocomial infection, transmission mode of nosocomial infection and time taken to hand wash.

1.7.2 Practices

Practice means a series of action. Practice is to do or to perform something habitually or repeteadly and make it as continous habit (American Heritage Dictionary, 2015). For this study, researcher defined practices as performance of HH among pediatric nurses at the Hospital USM.

1.7.3 Hand hygiene

HH is a general term referring to any action of cleaning hand. HH relates to the removal of visible soil and removal or killing of transient microorganism from hands while maintaining the good skin integrity resulting from hand care program (Malliarou et al., 2013). In this study, researcher defined HH as an action done by pediatric nurses that aimed to clean the hands, for example handwashing, hand antisepsis or uses of an alcohol-based hand rub.

1.8 Significance of the study

According to McGuckin et al., (2014), HH is very important to control the transmission of infection but then only 50% of health care worker who are compliance with HH. There are several factors that showed why health care worker not compliance to HH such lack of infrastructure and equipment to enable hand hygiene to be performed (Allengranzi & Pittet, 2009). Lack of infrastructure and equipment are unreasonable HH cannot be performed because HH is one of the policy in the ward especially in pediatric ward. Thus, because of this neglected can make higher risk of pathogen transmission to patient.

Therefore, from this study, the level of knowledge and practices of HH among pediatric nurses in Hospital USM was identified. This knowledge that could gain in this study would guide nurses compliance to HH which was to reduce nosocomial infection to the patient. This research also gave contribution especially in education, research and in skill regarding protocols and practices on HH in relation to nosocomial infection for best practices in prevention and control nosocomial infection. As a nurse it was their roles to do proper HH which can prevent healthcare associated infections and the spread of antimicrobial to the patient.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Hand hygiene guideline for the health care setting were developed bt the Centers for Disease Control and Prevention (CDC) in 1975 and have been updated to most recently in 2002 (CDC, 2002) as cited in va de mortel (2010a). Previous study and efforts were carried out to find and investigate factors that contribute to adherence of health care workers in health care setting toward practicing HH. Various strategies were introduced and implented to improve HH compliance, but had ended up with limited success. This chapter reviewed some facts related to HH as an infection control measure and factors that influence the compliance of HH among health care workers.

2.2 Hand hygiene

HH is an action of hand cleansing by using soap and water. HH is refer to a process of mechanically removing soil and debris from skin of hand using plain soap and water (Whitby et al., 2007). The way of cleansing hand with antiseptic agent more effective rather than using plain soap and water (Tavolacci et al., 2006). But then hand washing with soap slightly longer than hand washing with water alone.

Nowadays HH has become one of the most vital measures in reducing the transmission of pathogens in health care setting. According to Allegranzi and Pittet (2009), the hand of health care provider was one of the main resources microorganism transferred to the patient in health care setting. Thus will lead to the infection. Skin is a major potential infection source of microbial contamination in the surgical

envirommment. Therefore, HH is an important step in preventing and spreading infections.

Health care providers have been educated for more than a century that hand hygiene must be decontaminated before and after touch with patient. It is because hands are visibly soiled, as well as before wearing gloves and after removing gloves. According to WHO (2009), the current HH guideline recommend that each and every healthcare provider must wear gloves to prevent the transmission of pathogens to the patients thus indirectly reduce the risk of acquiring infection from patients. According to Pessoa-Silva (2005), health care providers are required to use barriers such as gloves when to have contact with patient while taking blood or other potentially infectious materials, mucous membranes and patient with no intact skin. This was also applied during procedures involving vascular, handling or touching contaminated surfaces of items.

Even a small increase in HH compliance by health care staff, it will contribute an improved situation of patient safety then will reduce the risk of infection among patients. According to Huis et al., (2012), HH rates was below than 50% which means low compliance. Thus, the quality of hand washing among nurses should be improved and practice to minimize cross infection occur to the patients.

2.3 Nosocomial infection

Nosocomial infection continues to be a major public health concern through out the world. Infections acquired in a hospital are called Hospital acquired infection (HAI). An infection is defined as nosocomial infection when it originates from the hospital envirommment which in not present or incubating admission and which appear 48 hours or more after admission in the hospital (Abdolahi et al., 2012).

The frequency and severity varies depending on the type of patients, the nature of treatment and the duration of stay in hospital. Hospital acquired infection poses a serious threat to all who were admitted to the hospital (Guzman et al., 2014). Pathogens are readily transmitted the healthcare workers hand and HH substantially reduces this from the transmission. The prevalence of hospital acquired infection pediatric ward was 12.5% which was the second highest among ICU, surgical ward and medical ward (Malhotra, Sharma & Hans, 2014). Hospital acquired infections also costly problem both for patient and health service alike (Breathnach, 2013). It is because increased hospital stay and treatment for the patient. Thus, it is important to realize that nosocomial infection can be reduced by practicing hand washing whether before or after touch patient while doing procedures.

2.4 Link between hand hygiene and infection

Negligence of hand washing, incorrect techniques or use of inappropriate hand hygiene agents can contribute to the transmission of microorganism. The transmission of pathogenic microorganism via hands begins when microorganism are transferred from patients's bedside unit to health care worker hands where they can survive for at least several minutes before transmission to another patient through direct contact. The compliance with effective hand hygiene practices seen to be the most important strategy to reduce transmission of pathogens in healthcare setting (Salama et al., 2012). Infection can occur less than two days after admission transmit from one patient to another via the unwashed hand of healthcare workers.

According to Sax et al., (2009) hand hygiene is the most important element necessary for the prevention of nosocomial infection. In 1847, Semmelwiess, a physician as cited in Whitby et al., (2007) had proven the handwashing among healthcare providers using a solution prior to delivering babies reduce maternal mortality from puerperal fever by 90%. This study was an example that clearly demonstrated the role of health care worker's hand in cross transmission of pathogens organism.

2.5 Factors Influence Poor Compliance of Hand Hygiene

However, the benefit of hand washing is limited by the risk of skin infection and hand dermatitis. A study by Randle, Clarke and Storr (2006) found that hydration level of skin can decrease due to frequent hand washing and caused skin barrier function disturbances. This situation might contribute to poor compliance among healthcare worlers. Other reason that might contribute to poor compliance of hand hygiene among healthcare workers were lack of knowledge of clinical situations regarding the benefit for the patient, lack of product or dispensers, hand disinfection agent is not available when it was needed, lack of time due to the increasing workload and over-occupation of wards or under staffing (Alsubaie et al., 2013).

2.6 Hand Hygiene Guidelines in Health Care Setting

Centers fo Disease Control and Prevention (CDC) guidelines for handwashing in health care setting was develop in 1975 as cited in Khawaldeh, Hussami and Darawad (2015). The Association of Professional in Infection Control (APIC) had published the guidelines for hand antisepsis in 1988 and 1955. The aim of the various guidelines up to recent period was to encourage and improve compliances among health care workers to perform hand hygiene. As the development and efficacy of alcohol-based hand rubs

were proven, CDC published the updated guidelines on hand hygiene in 2002. This was to encourage health care workers to clean their hands with an alcohol-based hand rub in many situation due to the time saving.

2.7 Hand washing technique

The main purpose of hand washing is to remowe dirty organic material and transient microorganisms. Nothing can be more effective in preventing the spreading of infection rather than hand washing. It is also less expensive method for decreasing the risk of infection in oneself or amongst others. Contact transmission from the hand of healthcare personnel or the clients themselves is the most common form of contamination because microorganism exist as transient flora until the hands are washed. According to Karaaslan et al., (2014), they agree that hand washing demonstrated to reduce nosocomial infection but compliance typically range between 10% and 60 % only. The effectivenes of hand washing depends on the attitudes of the individual since this basic routine is often taken for granted.

The efficacy of a hand wash depends on the duration and the technique. Hart and Opara (2011) reported that the average duration to wash hand between 8-20 seconds. Meanwhile the greatest reduction was achieved within the first 30 seconds. This technique was introduced as standard technique when testing antiseptic hand washes and become a routine hand wash technique that can be used everyday. Finally hands are rinsed with fingertips up and the water catiously shaken off. This procedure should be take not less than 30 seconds. After washing the hands are dried with a disposable towel rather than by the freshly washed hand. Thus the greater concern is how to motivate personnel to wash their hand in the first place, because hand washing practices wtill remain suboptimal (Walker et al., 2014).

2.8 Antiseptic agents

Hand washing with soap and water has been considered a measure of personal hygiene. The concept of cleansing hands with aseptic agent probably emerge in the early 19th century (Adams et al., 2005). Hand disinfection refers to any action where and antiseptic solution is used to clean hands, either medicated soap or other related products. Alcohol are the most rapid bactericidal action of all antiseptic. It was also the preferred agent hygienic handrub whereas Iodophors, chlorhexidine gluconate and triclosan are as other hand disinfectant (Bloomfield et al., 2007).

Triclosan is phenoxyphenol antimicrobial which was has some antiviral and antifungal (Aiello, larson & Levy, 2007). It act as inhibitor to the growth of gram-positive and gram-negative. The example of gram-negative is *Pseudomonas aeruginosa* and *Serratia marcescens*. Thus, antiseptic agents are necessary to earn a stronger reduction or elimination of bacteria if compared to plain soap and water which can only physically decrease the load microorganism to a certain level.

According to Karaaslan et al., (2014), hand hygiene with unmedicated soap and water removed some of transient flora mechanically. Not only transient flora mechanically removed but also chemically killed contaminating and colonizing flora with long term residual. It is important to recall that disinfection is significantly more efficient compared to the standard handwashing with soap and water.

2.8.1 Plain soap

Soap is detergent based products that contain esterifies fatty acid and sodium or potassium hydroxide (Burton et al., 2011). It is available in various forms including bar soap, tissue, leaflet and liquid preparation. The cleaning activity can be attributed to the detergents properties which result in the removal of dirt, soil and various organic

substances from hand. Plain soap has minimal any of the antimicrobial activity. In the other hand, hand washing with plain soap also can remove loosely adherent transient flora. According to Riaz, Ahmad and Hasnain (2009) hand washing with plain soap and water can reduces bacterial counts on the skin 65% to 85%.

According to Burton et al., (2011), antimicrobial soap is better and more effective in removing bacteria from hand rather than hand washing with plain soap and water only. Antimicrobial soap act as removal dirt as well as act as killing of bacteria. Meanwhile, hand washing with plain soap can result in paradoxical increases in bacteria counts on the skin whereas hand washing with water alone also are not reduced the bacteria on hands substantially.

2.8.2 Alcohol hand rubs

The majority of alcohol based hand antiseptics contain isopropanolol, ethanol, n-propanolol or a combination of both of these products (Bloomfield et al., 2007). Alcohol based hand rub undergone a global renaissance. Alcohol act as preventing the spread of infection in health care. Alcohol hand rubs kill a wide range of potentially harmful microbes. According to Tavolacci et al., (2006), alcohol is superior to soap and water with regards to the ability to reduce bacterial contamination.

The use of these products can reduce the count bacteria in the healthcare workers skins if the rubs are introduced and used corectly (Stout, Ritchie & Macpherson, 2007). Alcohol hand rubs is not panacea and it is will never replace the need for staff to perform a soap and water hand wash. Hand washing will always be necessary when hands look dirty to the naked eye though alcohol is an excellent method for reducing transient microbes on the hands of health care workers to a safe level for the patient (Salmon et al., 2015).

According to Malhotra, Sharma & Hans, (2014), found that gram negative bacili were transfered from a colonized patient's skin to a piece of catheter material via the hands of nurses in 17% of experiments after using an aseptic hand rub with an alcohol based hand rinse. In contrast, the transfered of organisms occurred in almost 92% of experimental model indicated that when the hand of health care workers were heavily contaminated. This shown that an antiseptic hand rub using an alcohol based rinse prevented pathogen transmission more effectively than hand washing with plain soap and water.

The efficacy of alcohol based hand hygiene pruducts is affected by several factors including the type of alcohol used, concentration of alcohol, contact time, volume of alcohol used and the hands condition either wet or dry when the alcohol is applied. Appliying small volumes (eg: 0.2-0.5mL) of alcohol to the hands is not more effective than washing hands with plain soap and water. According to Bloomfield et al., (2007) 1 mL of alcohol is less effective than 3mL.

2.8.3 Chlorhexidine gluconate (CHG)

Chlorhexidine gluconate is one of the antiseptic agent which is act as degerming agent. Chlorhexidine base is only minimally soluble in water but the gluconate form is water soluble (Adams et al., 2005). The antimicrobial activity of chlorhexidine is likely attributable to the attachment to and subsequent disruption of cytoplasmic membrances, resulting in precipitation of cellular contents. Chlorhexidine also has good activity against gram positive bacteria which is less activity against gram negatives and fungi thus only minimal activity against tubercle bacilli (Breathnach, 2013).

According to Karaaslan et al., (2014), CHG is nontoxic even when used on the skin of newborn infants. The level of skin absorption is minimal. Although the antibacterial activity of CHG is nor rapid as alcohols but it is good reductions in flora after 15 seconds hand wash (Akyol, 2007). It is speed on antibacterial effect is classified intermediate. CHG also resulted in a lower reduction of bacterial counts that did the same to the povidone-iodine pruduct.

One of the most important attributes of CHG is strong affinity for the skin which is remaining chemically active at least 6 hours (Adams et al., 2005). After a few days of daily use of products that contain CHG, bacterial yield from hands is as low as that after the use of alcohol based products. CHG has been incorporated into a number of hand hygiene preparations. Aqueous or detergent formulations containing 0.5% or 0.75% chlorhexidine are more effective than plain soap, but then less effective than antiseptic detergent preparations containing 4% chlorhexidine gluconate. Meanwhile preparations with 2% CHG are slightly less effective than those containing 4% chlorhexidine (Hart & Opara, 2011).

The activity of CHG is particularly formula dependent and may be influenced by individual's differences in skin pH, secretions and moisture level. Although efficacy data are difficult to interpret in terms of clinical impact but the user may wish to compare the data on reduction of flora when deciding which formulation to use. The potential development of bacterial resistance to CHG seems low. Chlorhexidine has a good safety record. If any absorption of the compound occurs at the skin, care must be taken to avoid contact with eyes when using chlorhexidine because the agents can cause conjuctivitis and severe corneal damage.

2.9 Conceptual/ theoretical framework

Many studies about preventive health behavior are based on the principles of the Health Belief Model (Rosenstock, 1974). The Health Belief Model (HBM) attempts to explain why, in the absence of overt symptoms of illness, people engage in preventive health behaviors. Preventive health behavior is defined as any activity undertaken by an individual for the purpose of preventing illness, detecting illness in an asymptomatic stage, or improving health (Rosenstock, 1974). Originally the HBM was developed to determine why some patients visit their doctor. Since then, the HBM has been applied to predict behaviors such as visiting a doctor.

The basic premises of the HBM are that for an individual to take health action to avoid an illness include perceive that he was personally susceptible to the illness, the occurrence of the illness would have at least moderate severity on some component of his life, taking health action would be beneficial by reducing his susceptibility to the illness or, if the illness occurred, by reducing its severity and taking action would not require overcoming psychological barriers, such as embarrassment and cultural taboos (Rosentock, 1974).

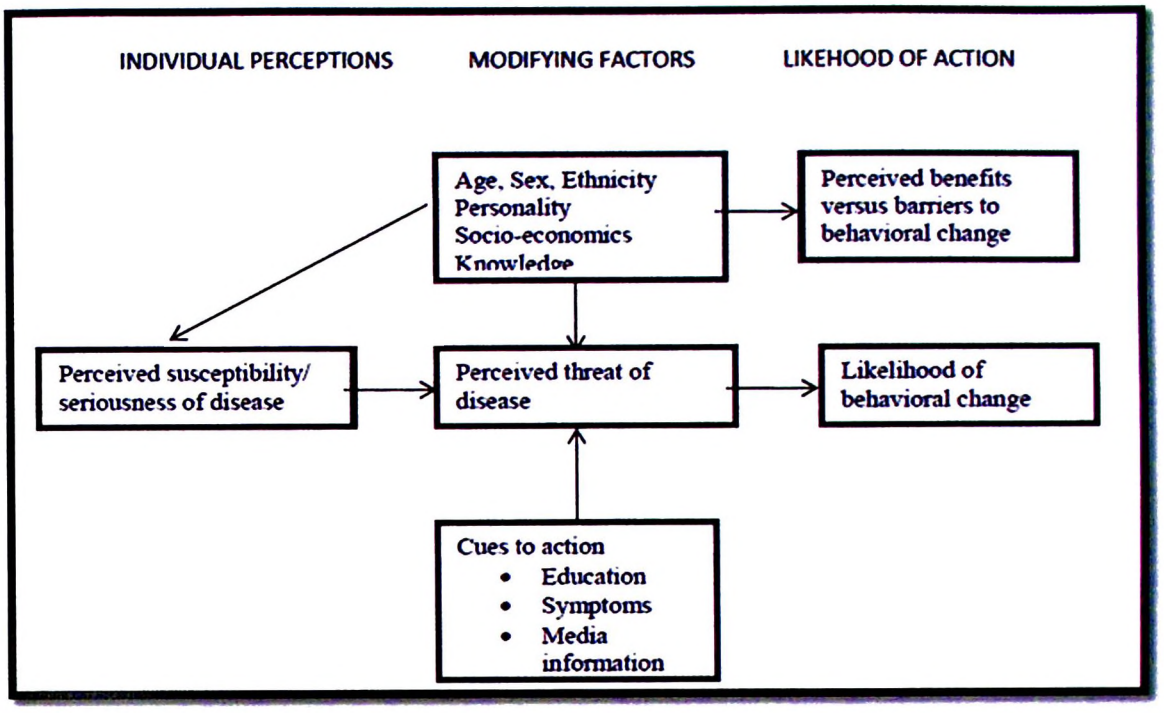

Figure 2.1 : The conceptual framework for the behaviour toward hand hygiene practice.

(Adopted from Nutbeam & Harris, 1999)

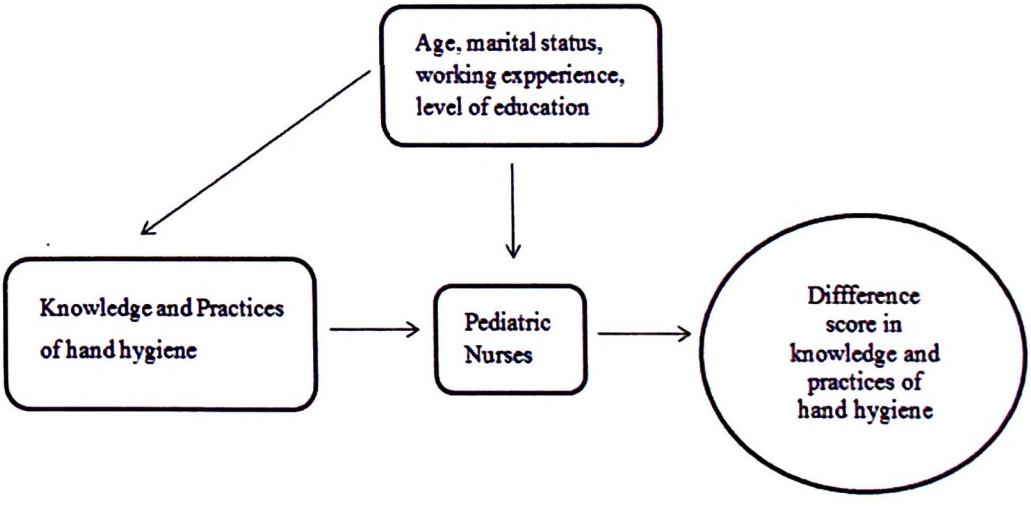

Figure 2.2: A conceptual framework for knowledge and practices of hand hygiene among pediatric nurses at Hospital USM.

Based on the Health Belief Model, the researcher modified and adopted a conceptual framework which recognized knowledge in the research process. Knowledge consists of understanding of the conceptual components. Knowledge in one of the main factor that affecting individual practice (Rosenstock, 1974). This study also pondered nurses practices on HH. The researcher focused more on comparing the different perception about hand hygiene which maybe affected by mediating factors such as demographic variables (age, marital status, working experience and level of education). Mahfouz et al., (2013) shown that healthcare worker has lack of knowledge and practice towards HH. However, for this study, the researcher had no idea regarding the knowledge and practice towards HH among pediatric nurses at Hospital USM. Then, the researcher had conducted a study to determine level of knowledge and practice among pediatric nurses at Hospital USM.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the researcher discussed the research design that had been used to conduct in this study, describe the target population and setting, sample size calculation, explanation on instumentation, the measurement of variables, ethical consideration, data collection methods, data analysis and the expected outcomes.

3.2 Research Design

This was a descriptive, quantitative cross sectional study to determine the hand hygiene knowledge and practices among pediatric nurses' at Hospital USM. Data were collected over a period of three months from December 2015 until February 2016.

3.3 Population and Setting

The study was conducted in Hospital USM at the Pediatric ward (2 Selatan, 6 Utara & 6 Selatan). The total populations participated were 70 nurses.

3.4 Sample

3.4.1 Sample Size

Sample size was calculated by using Raosoft formula (refer Apendix E). In this study, the researcher used Raosoft sample size calculation software to calculate the sample size and to ensure the accuracy by avoiding sample error during representatives and parameters of the sample. The margin error that can be tolerated amount 5% and confidence level 90%. Therefore, the appropriate sample size was 60.

Then, the drop out for this study, 10% of calculated sample size is recorded. Therefore, the total respondents involved for this study will be :

= 60 + drop out 10%

= 60 + 6

= 66 respondent

3.4.2 Sampling Method

Respondents were randomly selected by using the simple random sampling method via purposive sampling technique.

3.4.3 Inclusion and Exclusion Criteria

Respondents for this study were from Pediatric ward who met the study criteria :

3.4.3.1 *Inclusion Criteria*

- Registered Nurses who were working in pediatric wards of Hospital USM (2 Selatan, 6 Utara and 6 Selatan) during the data collection period.
- Agreed to participate in this study via the written consent.

3.4.3.2 *Exclusion Criteria*

- Not consentted to participate in the study.

3.5 Instrumentation

3.5.1 Instrument

Self-administered questionnaire was used as an instrument to conduct this study. The Hand Hygiene Questionnaires was adopted from a study by Askarian et al., (2005). The original questionnaire consists information on demographic, HH knowledge (9 items) and HH practices (9 items). The questionnaire consists of three main sections;

- **Section A : Socio-demographic data**

  This section consists of age, marital status, level of education, and years of experience. Age consists of range less than 30 years olds, 31-40 years old, 41-50 years old and more than 50 years old. Marital status consists of married and single. Meanwhile, working experience consists of range less than 10 years, 11-20 years, 21-30 years and 31-40 years of experience. Level of education consists of SPM, Diploma and Degree. It is also consist of In-serving training or not.

- **Section B : Knowledge of hand hygiene**

  This section consist of nine questions which is about knowledge of HH. The question was about knowledge regarding the number of bacteria when wearing ring, glove use when touch patient, the grams negative bacteria, suggested time for hand washing, length of stay at hospital, factor that cause nosocomial to the patient which is intravenous injection and the severity of the disesase.

- **Section C : Practice of hand hygiene**

This section was important to identify the statistic nurses who practice hand hygiene in the ward. It is involved nine questions regarding about hand hygiene practices. This question consists of wear ring while working, changing the gloce when to touch patient during different procedure, inappropriate length of nails, wash hand when touch different patient, using soap when hand washing, wearing gloves when needed during treatment involve body fluids and practicing hand washing in daily life.

3.5.2 Measurement of Variables

The independent variables were selected based on the socio-demographic data. The socio-demographic data that were used are age, marital status, years of experience, level of education.

The dependent variables were knowledge and practice score towards hand hygiene by using 5-point Likert Scale which was '1= Strongly Disagree', '2= Disagree', '3= Not Sure', '4= Agree' and '5=Strongly Agree'. Percentage score were calculated for each question. For the knowledge score, there are nine question. The score of each question were calculated as a percentage of total score. The total score below 51% were classified as poor knowledge. 51-65% were classified as moderate knowledge meanwhile 66-80% were classified as good knowledge. Lastly for 81-100% were classified as having an excellent knowledge (Askarian et al., 2005).