

**KNOWLEDGE AND ATTITUDE REGARDING  
NEEDLE STICK INJURY AMONG PEDIATRIC  
NURSES AT HOSPITAL UNIVERSITI SAINS  
MALAYSIA**

**By**

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## LIST OF ABBREVIATIONS

NSI	Needle Stick Injury
SCN	Special Care Nursery
HCW	Health Care Worker
Hospital USM	Hospital Universiti Sains Malaysia
WHO	World Health Organization
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus

**Knowledge and Attitude Regarding Needle Stick Injury among Pediatric Nurses at  
Hospital Universiti Sains Malaysia (Hospital USM)**

**ABSTRACT**

Needle stick injury is a challenging issue among health care workers especially the nurses. Nurses' knowledge and attitude regarding NSI seem affect them to get injury. A cross sectional study, descriptive study was carried out to assess the knowledge and attitude of nurses regarding needle stick injury. Total of 73 nurses in pediatric units completed the questionnaires by purposive selection technique that fits the inclusion criteria. Data was statically analyzed using the software package SPSS version 20.0. Statistical significance was considered at  $p$  value  $< 0.05$ . Among 73 participants, 72 (98.6%) participants had high knowledge, while the remaining 1 (1.4%) participant had moderate knowledge. There were 71 (97.3%) of participants had good attitude, whereas 2 (2.7%) participants had moderate attitude. Fisher's Exact Test showed no significant association between level of education and knowledge level ( $p > 0.05$ ), and attitude level ( $p > 0.05$ ). Besides, Fisher's Exact Test also showed no significant association between work experience and knowledge level ( $p > 0.05$ ) and attitude level ( $p > 0.05$ ). In conclusion, this research finding indicated there was no association between level of education with knowledge and attitude among nurses in pediatric units. Moreover, no association found in this research between work experience with knowledge and attitude among pediatric nurses in Hospital USM. Hence, further research is required to confirm findings and improve the knowledge and attitude among nurses regarding needle stick injury.

**Pengetahuan dan Sikap Jururawat Terhadap Kecederaan Tusukan Jarum dalam  
Kalangan Jururawat Pediatrik Di Hospital Universiti Sains Malaysia (Hospital USM)**

**ABSTRAK**

Kecederaan tusukan jarum adalah satu isu yang mencabar dalam kalangan pakar kesihatan khususnya jururawat. Pengetahuan dan sikap mengenai kecederaan tusukan jarum seolah-olah memberi kesan kepada mereka untuk mendapatkan kecederaan. Satu kajian keratan rentangan, kajian deskriptif telah dijalankan untuk menilai tahap pengetahuan dan sikap jururawat mengenai kecederaan tusukan jarum. Seramai 73 jururawat di unit pediatrik melengkapkan soal selidik dengan teknik persampelan bertujuan yang sesuai dengan kriteria kemasukan. Data telah dianalisis dengan menggunakan pakej perisian SPSS versi 20.0. Kepentingan statistik dianggap pada nilai  $p < 0.05$ . Antara 73 peserta, 72 (98.6%) peserta mempunyai pengetahuan yang tinggi, manakala 1 (1.4%) peserta mempunyai pengetahuan yang sederhana. Terdapat 71 (97.3%) peserta mempunyai sikap yang baik, manakala 2 (2.7%) peserta mempunyai sikap sederhana. Ujian Exact Fisher menunjukkan tiada hubungan yang signifikan antara tahap pendidikan dan tahap pengetahuan ( $p > 0.05$ ), dan tahap sikap ( $p > 0.05$ ). Selain itu, Ujian Exact Fisher juga tidak menunjukkan hubungan yang signifikan antara pengalaman kerja dan tahap pengetahuan ( $p > 0.05$ ) dan tahap sikap ( $p > 0.05$ ). Kesimpulannya, dapatan kajian ini menunjukkan tidak ada kaitan antara tahap pendidikan dengan pengetahuan dan sikap di kalangan jururawat di unit pediatrik. Lebih-lebih lagi, tidak ada kaitan yang terdapat dalam kajian ini antara pengalaman kerja dengan pengetahuan dan sikap dalam kalangan jururawat pediatrik di Hospital USM. Oleh itu, kajian lanjut diperlukan untuk mengesahkan penemuan dan meningkatkan pengetahuan dan sikap dalam kalangan jururawat mengenai kecederaan tusukan jarum.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background of Study

Needle stick injuries mean the introduction of hazardous material such as blood into the body of health care providers during the routine performance of their duties by a hollow bore needle or sharp instruments. Examples of the sharp instrument are needles, lancets and contaminated broken glass. This is because, many pathogens has been transmitted via needle stick injuries such as during clinical practice or research laboratories. In 1990s, between 600,000 and 800,000 needle stick injuries were believed to occur annually with almost 2000 per day, thus resulting in more than 1000 health care workers contracting serious blood-borne diseases, such as HCV or HIV (Waqar, ul Siraj, Razzaq, Malik & Zahid, 2011). In addition, potential exposures are not limited to needle sticks alone, because the manipulation of other sharp instruments or mucous membrane exposure to infected bodily fluids also can result in the transmission of infectious diseases (Siddique, Mirza, Tauqir, Anwar & Malik, 2008).

Not only that, health care workers who faced with the hazard of needle-stick injuries (NSI) which can result in serious infections with blood borne pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV) or Human immunodeficiency virus (HIV). It is estimated that 66000 of HBV, 16000 of HCV, and almost 1000 of HIV infections may have occurred in the year 2000 worldwide among health-care workers (Shiva, Sanaei, Shamshiri & Ghotbi, 2011) due to their occupational exposure to percutaneous injuries. Prevalence showed that the attributable to occupational exposure to the sharps is almost 40% refer to the HBV and HCV, and 4.4% refer to the HIV infections (Shiva, Sanaei, Shamshiri & Ghotbi, 2011). More than 80% of the needle stick injuries can be prevented through the use of safety devices and effective safety programs. It shows that through the effective safety programs, the prevalence of needle stick injuries can be reduced from year to year. This is because, needle stick injuries can be prevented by applying “Universal precautions” as a safety measure in doing any procedure that

involved sharp instruments or hazardous mucous in clinical or laboratories (Siddique, Mirza, Tauqir, Anwar & Malik, 2008).

However, the needle sticks injuries may also have association with the level of knowledge of individual or healthcare worker. This is because, the individual's level of knowledge will determine whether someone will think of the rational or impact of something or not. The level of individual's knowledge can be identified through their level of certificates like diploma, degree, master or PhD. According to Habib, Khan, Bhatti, Zafar & others (2011), the knowledge regarding HBV transmission were assessed by asking the possible modes of HBV transmission which included sharing razors, needle stick injuries, oro-fecal route, sexual contact, blood transfusion, splash of blood on eye, respiratory droplet, and eating from same utensils of a positive HBV patient. The result showed that healthcare worker answering at least 5 correct modes of HBV transmission were regarded as knowledgeable. In other study by Elliott, Keeton, & Holt (2005) cited in James (2006) which prospectively assessed medical students' knowledge of sharps-related injuries found that only 14% of medical students could correctly define a needle stick injury and found significant differences in knowledge between first, third, and final year students, with final year students exhibiting the most knowledge and lowest levels of needle stick injuries.

An attitude of individuals also shows that it has relationship with the needle stick injuries. An attitude refers to the feeling or way of thinking that affects a person's behavior. According to Jeffe et al., (1997), the healthcare workers are trying to characterize their attitude toward, and readiness to comply with universal precautions in order to design interventions to improve compliance. There are the five specific precautions which are include the uses of the double glove when exposed to the body fluids, protective goggles or glasses, depositing all sharp instruments that used, reported all needle stick injuries among employee, and being fully vaccinated against HBV, HCV and HIV. All the categories of specific precautions were asked to the respondent because to identify the individuals attitude toward the healthcare worker's compliance.

Moreover there are numerous factors which place healthcare workers at an increased risk of sustaining a needle stick injury. There are the risk factors of needle stick

injuries such as healthcare occupation, healthcare setting, lack of training and/or education on use of sharps devices and injury prevention measures, type of sharps device being used, and as well as type of medical procedure/activity being performed (James, 2006). Regarding the type of sharp devices that being used, Berguer & Heller (2004) cited in James (2006) describe as needles being the most high-risk instrument used in a surgical setting in particular. The reports showed that 59% of needle stick injuries can be attributed to use of hollow-bore needles. Other devices associated with high rates of needle stick injuries include disposable syringes, suture needles, winged steel needles, scalpel blades, IV catheters, and phlebotomy like blood-drawing needles.

In Pakistan a study was done by Siddique et al., (2008) in 300 health care workers at Holy Family Hospital Rawalpindi, revealed their inadequate knowledge about the risks associated with needle stick injuries. While another study concluded that needle stick injuries due to syringe recapping and surgical stitch needle were the frequent causes of injury in doctor (Siddique, Mirza, Tauqir, Anwar & Malik, 2008). The present study will be done to find out the knowledge level and attitude of needle stick injuries amongst pediatrics' nurses in Hospital USM.

## **1.2 Problem Statement**

According to (Santhna et al., 2007) Hospital University Kebangsaan Malaysia (HUKM), the exposure to infectious blood and hazardous fluids was one of the most reported events that happened there (Santhna et al., 2007). Of these 49.3% had incurred needle stick injury at least once, which are 36.7% doctors and 54.9% nurses. There was more researches on compliance with standard precaution emerged but not many research on needle stick injuries among pediatric nurses had carried out. Although there were some research being done to measure knowledge and attitude of nurses toward needle stick injury, but yet there were limited of measuring the knowledge and attitudes among pediatric nurses regarding needle stick injuries.

Sharps injury may cause a number of potentially fatal infections with blood borne pathogens. Examples of blood borne disease are AIDs, hepatitis B and hepatitis C. Stringer et al., (2001) cited in Santhna et al., (2007) have stated that when infected by

needles, the risk can be high depending on the quantity of virus present in the blood of the source person at the time of the injury. Needle stick injuries was explained by Siddique et al., (2008) that needle stick injuries is one issue that need to be addressed for preventing various blood borne disease amongst healthcare workers while providing their services. Furthermore, the level of risk depends on the number of patients with that infection in the health care facility and the precautions the health care workers observe while dealing these patients. The study (Siddique et al., 2008) showed that health care workers were unaware of the fact that Hepatitis B and Hepatitis C can be transmitted by needle stick injury which refer to 13.3% and 10% respectively.

Besides that, attitude among nurses also one of the problem in needle stick injury. This is because nurses' attitude plays a major role in the way how to reduce the incidence of needle stick injury during giving treatment to the patient. According to Santhna et al., (2007), some of the health care workers in HUKM do not report their injuries (Infection Control Unit, HUKM). It is either because they do not know where to report or just ignorant to the dangers of the injury. Lack of the time was listed as the major reason for failing to report the injury (Siddique et al., 2008). The other reasons for not reporting could be due to the fear of disciplinary action due to the negligence on the part of the health care workers, and doubts about their profession on whether they will be allowed to continue giving care to patients if they were confirmed to have the disease (Santhna et al., 2007). Nurses may also not report the injury immediately if the ward is rather busy especially during night shift as they may not have the time to leave the ward.

According to Jantan (2000) cited in Santhna et al., (2007), most of the sharps injuries were due to the absence of sharps bin at the site of the procedure and neglected needles are left in trays, kidney dishes, among drapes and among trash. It also stated that noncompliance or failure to adhere to guidelines can become a contributory factor to needle stick injuries. Besides that, the sharps are sometimes disposed into ordinary disposal bags which are sometimes used for general purposes instead of disposing them into prepared yellow sharps bins. Disposing of sharps into any container other than the sharps bin is a very irresponsible act which can result in serious injuries to other persons (Santhna et al., 2007).

In addition, according to Siddique et al., (2008) there are some factors that lead the needle stick injuries to happen at Department of Holy Family Hospital, Rawalpindi. The factors included disposal of sharp, recapping needles, lack of safety measures, negligence as well as hasty work. Almost 40% of the needle stick injuries was reported in last year were related to administering of injections which is 19% refer to injecting patient and 17% refer to putting up an intravenous line. These procedures were followed by the process of disposing used needles, which caused about 16% of the injuries (Nsubuga & Jaakkola, 2005). Other factors significantly related with an increase of needle stick injuries were being senior or nursing officer, working on the surgical disciplines, having work experience for less than 10 years, working long hours, and not using gloves (Nsubuga & Jaakkola, 2005).

Knowledge and attitude are two important items to ensure your credibility as nurses are respected. Besides that, when have good knowledge and good attitude, the percentage of needle stick injury decreased (Santhna et al., 2007). Furthermore, when already knowing the factors that may cause needle stick injuries, we can adjust the factors and minimize the injury from happened. Needle stick injury among pediatric nurses was significantly different with adults. This is because, for adult the injury might be happening because of the nurses itself, meanwhile for pediatric nurses the injury might be caused by nurses and also the patient. Most of pediatric nurses did not aware about the risk to get needle stick injury because they are lack of knowledge about precaution of needle stick injury (Asadpour, Arabbaniassad, Bidaki & Shabani, 2012). Besides that, pediatric nurses also did not have good attitude in handling the procedure that used needles. In this research, the conceptual theory that will be use is Multiple Causation Theory which was developed in 1971 by Petersen.

## **1.3 Research Objectives**

### **1.3.1 General Objective**

To identify the knowledge and attitude towards needle stick injuries among pediatrics' nurses at Hospital Universiti Sains Malaysia (Hospital USM).

### **1.3.2 Specific Objectives**

- a. To identify the level of knowledge regarding needle stick injuries among pediatrics' nurses at Hospital USM.
- b. To identify the attitude level regarding needle stick injury among pediatrics' nurses at Hospital USM.
- c. To determine the association between socio demographic data (level of education and work experience) with the level of knowledge toward needle stick injuries among pediatrics' nurses at Hospital USM.
- d. To determine the association between socio demographic data (level of education and work experience) with the level of attitude toward needle stick injuries among pediatrics' nurses at Hospital USM.

## **1.4 Research Questions**

- a. What is the level of knowledge regarding needle stick injuries among pediatrics' nurses at Hospital USM?
- b. What is the attitude level regarding needle stick injury among pediatrics' nurses at Hospital USM?
- c. Is there any association between demographic data (level of education and work experience) with the level of knowledge toward needle stick injuries in pediatrics' nurses?
- d. Is there any association between demographic data (level of education and work experience) with the attitude toward needle stick injuries in pediatrics' nurses?

## 1.5 Hypothesis

1.5.1 H<sub>O</sub>: There is no significant association between level of education and knowledge level regarding needle stick injuries among pediatrics' nurses at Hospital USM.

H<sub>A</sub>: There is a significant association between level of education and knowledge level regarding needle stick injuries among pediatrics' nurses at Hospital USM.

1.5.2 H<sub>O</sub>: There is no significant association between level of education and attitudes' level regarding needle stick injuries among pediatrics' nurses at Hospital USM.

H<sub>A</sub>: There is a significant association between level of education and attitudes' level regarding needle stick injuries among pediatrics' nurses at Hospital USM.

1.5.3 H<sub>O</sub>: There is no significant association between work experience with level of knowledge regarding needle stick injuries in pediatrics' nurses.

H<sub>A</sub>: There is a significant association between work experience with level of knowledge regarding needle stick injuries in pediatrics' nurses.

1.5.4 H<sub>O</sub>: There is no significant association between work experience with attitudes' level regarding needle stick injuries in pediatrics' nurses.

H<sub>A</sub>: There is a significant association between work experience with the attitudes' level regarding needle stick injuries in pediatrics' nurses.

## 1.6 Definition of Term (Conceptual/ Operational)

**Knowledge** - Oxford dictionaries (2014), state that knowledge is the facts, information and skills acquired through experience or education; the theoretical or practical understanding of a subject.

In this study, it refers to the correct responses of the nurses to the knowledge of needle stick injuries.

Attitude - A settled way of thinking or feeling about someone or something, typically one that is reflected in a person's behavior (Oxford dictionaries.com, 2014).

In this study, it refers to the correct responses of the nurses to the attitude of needle stick injuries.

Needle stick injuries - accidental skin punctures resulting from contact with hypodermic syringe needles, IV cannula stylets, needles used to 'piggyback' IV infusions, and needles used for drawing blood or administering parental injections. The contact may occur accidentally during efforts to inject a patient or as a result of carelessly touching discarded medical waste. Such injuries can be dangerous, particularly if the needle has been used in treatment of a patient with a severe blood-borne infection, such as human immunodeficiency virus (The Free Dictionary.com, 2014).

In this study, it refers to the problems that happened in the hospital area where mostly all the healthcare worker was experienced about the needle stick injuries.

### **1.7 Significance of Study**

Needle-stick injuries are an important and common occupational injury among healthcare workers. In a UK report, 37% of nurses reported that they have sustained a needle-stick injury at some stage during their career (Yang & Mullan, 2011). The result showed that there was slightly a lot of percentage regarding needle stick problem among nurses. The problems regarding needle stick injury among pediatric nurses has association with the level of knowledge, the attitudes toward needle stick injury among them as well as the factors that caused needle stick injury.

Moreover, knowledge's level of individual has relationship with the individual practices such in treating the patient (Santhna et al., 2007). This is because, the individual's level of knowledge were determined whether someone do something with

think the rational or effect of something that have been done or not. According to Alam (2002), showed that 21% and 30% of health care workers respectively were unaware about the fact of that AIDS and hepatitis C can be transmitted by needle stick injuries. So that, it is important the current study was done because most of the nurses in pediatric ward did not know how to treat the patient because it involving children not adult.

Attitude also has association with the problems of needle stick to happen. Attitude refers the way of someone thinking or feeling about something (Oxford dictionaries.com, 2014). This is because through attitude, we can identify weather individual follow the policy in the institution or not. Individual that have good attitude will follow the rules and regulation in the institutions or working area. Examples are recapping needle after use, and remove needle or sharp in biohazard dustbin. According to Nsubunga & Jaakkola (2005), although encouragement was given to the nursing staff not to recap the needles, but it was still common practice in their work. This is can be proven, almost 50% of the participants were recapping most or all the time (Nsubunga & Jaakkola, 2005). In the pediatric ward, the nurses need to recap the needle before and after for doing something. This is because, to avoid giving harmful to the patient. Besides that, nurses also should friendly with patient to get cooperation when doing any procedure toward patient.

There are some factors that lead to the needle stick injury which included gender, age, working hour and work load (Nsubunga & Jaakkola, 2005). There are important for nurses to know the factors that related with needle stick injury to reduced and minimize the incidence of needle stick injuries. This is because, when we know the factors, we can avoid the injury or incidence. Especially during long working hour. The risk for patient to get injury is high because the nurses cannot fully concentrate on the procedure that has to be done. For age and work load, this factor has relationship to get needle injury weather among nurses or patient especially in pediatric. Nurses that age more than 50 years old and above tends to get needle stick injuries especially when facing pediatric patient (Siddique et al., 2008). This is because, individual that 50 years old and above might have eye problems such as long sightedness, and this can cause injury toward children such as dislocated the intramuscular (IM) injection and others. That's why important for nurses to know the factors that can cause the needle stick injury.

In addition, there is not much research of needle stick injury that has been done among pediatrics' nurses in Malaysia. More research focused on the universal precaution among health care workers. Even though many research was carried out regarding universal standard precaution and many guidelines are provided, but there are not similar with the needle stick injuries. This is because needle stick injury in the current research was focused among pediatric nurses about their awareness, attitudes and knowledge about the needle stick injuries in pediatric. Therefore, nurses should take more effort to understand the factors that related to needle stick injury in pediatric patient. Besides that, to prevent unnecessary harmful for own self as well as patient, the nurses should gain and increase more knowledge, attitudes and practices regarding needle stick injury before perform any procedure towards pediatric patient in the hospital.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

In this chapter, the literature reviews consists of needle stick injuries, level of knowledge, attitudes' level regarding needle stick injuries, and factor that associated with needle stick injuries

#### 2.2 Review of Literature

##### 2.2.1 Needle Stick Injuries

Needle stick injuries among healthcare workers are common. They are one of the main ways of transmitting large numbers of pathogenic micro-organisms in healthcare institutions. According to Polish law (Alam, 2002), such incidents, if followed by the symptoms of infectious disease, meet all the criteria of accidents at work which are work-related, caused by external factors, and result in bodily harm, illness or death of an employee. The high incidence of such accidents, together with the transmission risk characteristic of a given pathogen and the incidence of a given micro-organism in patients are the primary risk factors for blood borne infections (Bilski, 2005). Most of these accidents happened during an attempt to remove a needle from a syringe, less commonly, while trying to place a used needle in a full medical waste container. In almost half of the cases (44.9%), the accidents occurred between the second and the fourth hour of the shift, which was probably due to a typically heavy workload in those hours, particularly on a morning shift. In the great majority of cases (84%), the nurses were wearing protective gloves at the time of accidents (Bilski, 2005).

A vast majority of exposures to contaminate with infectious material were notified in a "book of needle stick injuries" which is 87.8%, and several accidents in the nurses' reports is 50.0% of all the accidents were orally reported to superiors which included a doctor, a ward nurse, an epidemiological nurse. For example, Ippolito et al., (1993) cited in Bilski (2005) have shown that more than 75% of injuries occur while

performing everyday activities of patient care and that most of the injuries are self-inflicted (84%), while only 5% are caused by colleagues and 11%, by patients. In the analysis, the circumstances, this entailed particularly high risk of injury, which are improper handling of used needles, removing needles from syringes, and attempts at “saving” room in containers for infectious medical waste. These circumstances typically lead to frequent needle stick injuries. It is alarming that needle stick injuries are often caused by hollow-bore needles, associated with statistically higher risk of infection than that induced by solid tools (Bilski, 2005).

Meanwhile, according to the Waqar, ul Siraj, Razzaq, Malik & Zahid (2011), needle stick injuries were reported by health care workers which included doctors, nurses, laboratory technicians and operation theater technicians. Needle stick injury is one such issue that should be addressed to prevent blood borne diseases in health care workers in Pakistan. All individuals who have occupational exposure to blood are at increased risk for acquiring blood-borne infections. The level of risk depends on the number of patients with that infection in the health care facility and the precautions that the health care workers observe while dealing with these patients. Occupational health and safe medical practice is coming up as an issue in developing countries including Pakistan. In this study only 13% workers were aware about safe medical practices regarding a needle stick injury which is Universal precaution guidelines.

Needle-stick injuries are an important and common occupational injury among healthcare workers (Yang & Mullan, 2011). In UK, 37% of nurses reported that they have sustained a needle-stick injury at some stage during their career. In Australia, the rate of reported needle-stick injuries is 1 in 5 occupied beds per year which equates to an annual sharps-related injuries incidence (Yang & Mullan, 2011). Needle-stick injuries have been widely recognized as a source of exposure to blood borne pathogens for workers in healthcare occupations.

### **2.2.2 Level of Knowledge Regarding Needle Stick Injury**

Hepatitis B viral (HBV) infection is a well-recognized occupational risk for health care workers. As per World Health Organization (2002) cited in Habib, Khan, Bhatti, Zafar & others (2011), globally 40% of HBV infections among health care workers were due to occupational exposure. In health care settings, most exposures are caused by blood or body-fluids especially due to needle stick injuries which carry substantial risk. The knowledge, beliefs and practices regarding HBV transmission vary widely among health care workers. If initial assessment of knowledge and beliefs of health care workers are available, appropriate interventions may be taken. In the study by Habib et al., (2011) the knowledge and beliefs of the health care workers at a public tertiary care hospital were assessed regarding HBV transmission as well as the role of needle stick injuries in relation to its transmission. Knowledge regarding HBV transmission was assessed by asking the possible modes of its transmission which included sharing razors, needle stick injuries, oro-fecal route, sexual contact, blood transfusion, splash of blood on eye, respiratory droplet, and eating from same utensils of a positive HBV patient. When asked about knowledge regarding possible mode for HBV transmission, 95% reported through blood transfusion, 92% through needle stick injuries, 82% by sharing razors, 78% through sexual contact, 28% from splash of blood on eye followed by transmission by oro-fecal route (27%) and eating from same plates used by a person infected by HBV (11%). It is encouraging to note that the overall knowledge regarding HBV transmission was adequate but on the contrary only around half of the participants were found vaccinated. Many health care workers had attended sessions on HBV awareness in the past but due to non-availability of funds they could not complete immunization course. This piece of information highlights that the educational activities that have been organized previously has an impact on the knowledge (Habib et al., 2011).

According to study by Waqar, Siraj, Razzaq, Malik, & Zahid, (2011), mode of spread of HBV and HCV was known in 384 (77%) workers while 116 (23%) did not know it. Only 144 (29%) health care workers knew about post exposure prophylaxis while 356 (71%) did not know what prophylaxis were to be taken following an accidental needle stick injury. None of the cases of needle stick injuries were reported to hospital

authorities. Only 64 (13%) workers knew about universal guidelines regarding precautions about needle stick injuries. Though 444 (89%) health care workers said that they always used disposable sharps but only 20 (4%) workers always used gloves while putting Intravenous (IV) lines always and 30 (6%) used gloves often but not always. The aim of study by Alam, (2002) was to assess the knowledge, and attitude among health care workers on needle stick injuries. These health care workers are normally directly exposed to blood products and needle-stick injuries while dealing with patients. Only 43 (61%) were aware of universal precaution guidelines, while only 50% of subjects had adequate knowledge of new needle devices and the safety features. This survey revealed that knowledge of health care workers about the risks associated with needle-stick injuries and use of preventive measures was inadequate.

### **2.2.3 Attitudes' Level Regarding Needle Stick Injury**

The previous study demonstrates considerable scope for improvement in attitudes towards, and reported compliance with Universal Precaution (Stein, Makarawo, & Ahmad, 2003). It is disturbing that the majority (71%) of doctors reported they did not regularly wear gloves when taking blood although 83% believed it very important or important to do so. Once again, nurses exhibited a much better attitude about, and reported better compliance with, this procedure.

As in previous study by Michalsen, Delclos, Felknor et al., (1997) cited in Stein, Makarawo, & Ahmad (2003), a glove interfering with duties was the most frequently cited reason for poor compliance. Nurses were more likely almost never, or never, to re-sheath needles manually. This result shows better compliance than that in a study conducted in the US where only 35% almost never, or never, re-capped needles after use. Many respondents in our study cited a lack of conveniently located sharps containers as the reason for re-sheathing needles. That study obtained data on health care workers who reported that they had suffered a needle stick injury but who may not have reported it formally.

The researchers (Stein, Makarawo & Ahmad, 2003) did not attempt to find out the reasons for not reporting needle stick injuries because a common reason is the belief that

the needle stick injury does not constitute a risk. Non-reporting of incidents not only potentially compromises the HCWs' health but also the ability of the employing institutions to protect employees through monitoring practices, equipment, and incident situations (Stein, Makarawo, & Ahmad, 2003). Senior staff needs to lead by example. Some studies (Moore, Goodwin, Grossberg, Toltzis, 1998; Michalsen, Delclos, Felkner et al., 1997) cited in Stein, Makarawo, & Ahmad (2003), indicate that age is indirectly related to compliance with Universal Precautions, in that older HCWs seem to be less compliant. Furthermore, junior staff and students are likely to follow an incorrect example set by their role models, thus perpetuating the cycle. The study by Stein et al., (2003) have shown that nurses and junior doctors generally tend to be more compliance with Universal Precautions than senior doctors, possibly due to periodic performance appraisals that monitor their practices.

#### **2.2.4 Risk Factors for Needle Stick Injuries**

Training was found to be the crucial factor in predicting the occurrence of needle stick injuries among the nursing staff in study by Waqar et al., (2011). Those nurses who had not attended any training on prevention and management of needle stick injuries in their workplace were at a significantly greater risk of sustaining such injury compared with those who had attended some kind of training. This finding has great importance for planning preventive measures in developing country environments, where arranging proper training is a more feasible target than buying expensive equipment. According the study (Nsubuga & Jaakkola, 2005). Mulago Hospital, Uganda had a policy concerning precautions to prevent transmission of infections and guidelines that included hand washing after patient contact, use of personal protective equipment, such as gloves, and minimization of manual manipulation of sharp instruments and devices and safe disposal of used sharp items. However, a high proportion of nurses (75%) in the study (Nsubuga & Jaakkola, 2005) were not aware of the existence of a hospital policy on needle stick injuries, a fact that also suggests insufficient training at the workplace. Some earlier studies have shown that additional training at work increases compliance with some precautionary measures (Shahab & Jabbarani, 2012).

Only 16% out of 800 nurses in Mulago Hospital, Uganda had attended workplace training on needle stick injuries, so most depended on their skills improving with experience, in addition to the knowledge they had acquired from school. Consistent with this, nurses who had been in service for less than 10 years were at a higher risk of sustaining needle stick injuries compared with those with more than 10 years of work experience. Working long hours was also a significant predictor of the risk of needle stick injuries, and has been previously associated with recapping and poor compliance with precautions (Duthie, 2006), but it has not been linked directly to the occurrence of needle stick injuries. Working excessive hours can result in stress and emotional and physical exhaustion, which are likely to increase the chance of human error and contribute to a tendency towards risky behaviours, such as recapping needles and poor compliance with the precautions in general. Somewhat surprisingly, researcher found a higher injury rate among those attending to less than 35 patients per day compared with those attending to more patients. It is possible that those who were doing invasive procedures accompanied by a higher risk for needle stick injuries were attending to fewer patients.

Besides that, the study (Basinska et al., 2011) showed a significantly increased risk of needle stick injuries among those who were recapping needles most or all of the time compared with those who were not recapping. Almost 50% of the participants were recapping needles most or all of the time, while only 21% did not recap needles at all. Location of the sharps containers may explain a part of this high rate of recapping needles. Among those who had sustained at least one needle stick injury, 11% reported there was no safe container available when their last injury occurred and 4% reported that the nearest sharps container was on the next ward at the time of their last injury. Use of gloves while handling sharp instruments is a precautionary measure recommended and compliance with this seemed to be an indicator for risk behavior (Duthie, 2006). Those nurses who used gloves only sometimes or not at all were at a significantly greater risk of sustaining needle stick injuries than those who were using them regularly. Recapping of needles, placing sharps containers and not using protective gloves are factors that could be improved by training, but lack of protective equipment and safe needles are common in many developing countries and can partly explain such risk behaviour among nurses (Bilski, 2005).

Lack of training at the workplace was identified as the strongest risk factor for needle stick injuries. Other risk factors included long working hours, factors related to working habits (i.e. recapping of used needles, not using protective gloves), short experience in nursing profession, and other work-related factors such as working on surgical disciplines, being a senior or nursing officer (Nsubuga & Jaakkola, 2005).

### 2.3 Conceptual / Theoretical Framework

The multiple causation theory was developed from the Heinrich domino theory which was structured on theory that an accident were caused by a single cause. However, Petersen was developed a model based on management system rather than individual on 1971. Petersen believed that there are two major features of the events which leading to an accident, namely an unsafe act (behavior factors) and an unsafe condition (environmental factors). However, there are more than single cause which contribute or lead to both unsafe act and unsafe condition and finally occurrence of an accident (Shahab & Jabbarani, 2012).

In addition, unlike simplified theory of domino, there are causes and sub-causes when an accident happens. Through identification of these multiple contributing causes of accident, the unsafe acts and unsafe conditions should be prevented from arising (Strank, 2007). Figure 2.1 show the real model of multiple causation theory.

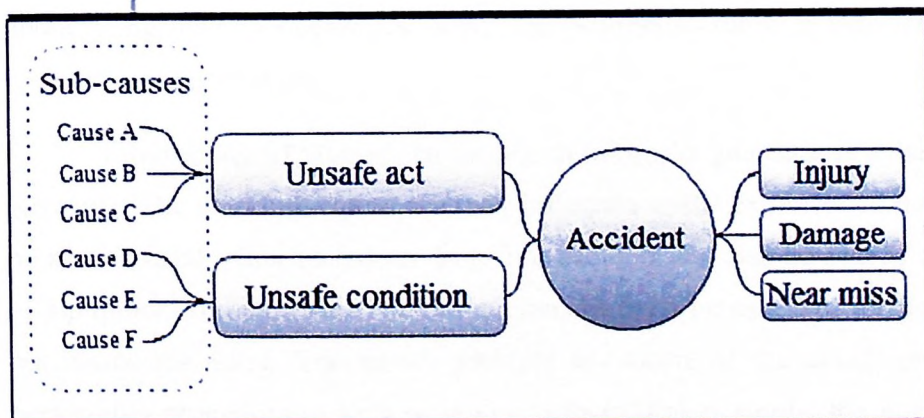


Figure 2.1 Multiple Causation Theory. *Note* From “Human factors and behavioral safety” by Petersen, 1971 cited in Stranks, 2007.

Apart from the model, researcher used the multiple causation theory to help identify the variables which was to determine the knowledge and attitude level regarding needle stick injury among pediatric nurses. According to this theory, the contributory factors can be grouped into the following two categories which are the behavioral and environmental factors. Behavioral factors, which include factors pertaining to the worker, such as improper attitude, lack of knowledge, lack of skills and inadequate physical and mental condition. Environmental factors which includes improper guarding of other hazardous work elements and degradation of equipment through use and unsafe procedures. The major contribution of this theory was to bring out the fact that rarely, if ever, an accident the result of a single cause or act. This is because, an accident occur because of many sub-cause.

The behaviors of employees are frequently shaped by the safety culture and are reflected in the unit-based climate (Duthie, 2006). It was commonly known that not everyone experiences occupational overload syndrome. This depends largely on the individual's attitude to professional requirements. Consequently, researchers started to ponder whether, in the face of increasing professional requirements, there are any types of behavior at a workplace with a positive and negative effect on health (Basinska et al., 2011). The behaviors of the nurse may also results from lack of skills that pose a higher rate of nurse's accident. The nurse's safety were also explained by mental condition. They might encounter injury because they cannot focus on doing work due to thinking about being mad by doctor just now. The laziness to throw needle into sharp bins also included under behavior.

Environmental factors can be due to improper guarding of other hazardous work elements. The working experience may influence as the experienced nurse usually expert on how to handle this hazardous drug. The accident can also be caused by the degradation of equipment through use. The old equipment must be assessed for its quality so that it not harms the nurse. The nurses who are not aware of the unsafe environment during performing procedure can cause injury to them. For example, the nurses administer the medication through intravenous (IV) line to patient during the patient was crying, surely patient doesn't want and this situation can lead to give harmful to patient as well as to

nurses. As a result, the nurse suffered from physical injury. The nurse who does not take notice of the sharps item after giving medication to throw out into the sharp bins also might experience the same thing. The figure 2.2 shows how researcher adopted with the origin multiple causation theory.

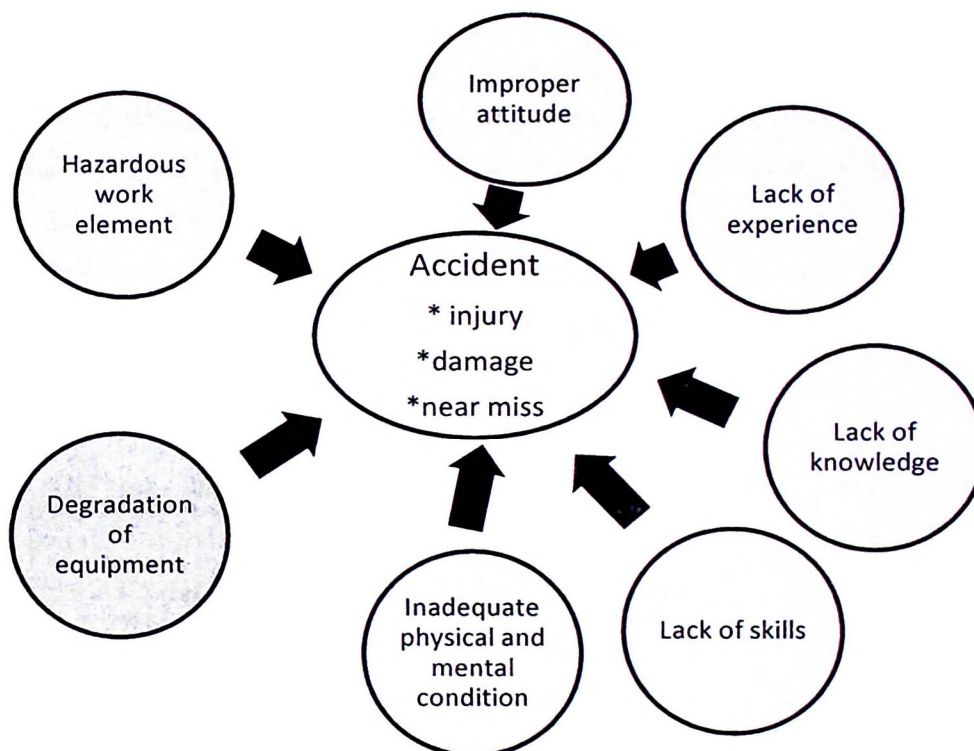


Figure 2.2 Conceptual Framework adapted from Multiple Causation Theory by Petersen, 1971 cited in Strank, 2007.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

This was a cross-sectional and quantitative study. Quantitative methods emphasize on objective measurements and numerical analysis of data collected through polls, questionnaires or surveys. Quantitative research focuses on gathering numerical data and generalizing it across groups of people (Labaree, 2014). Meanwhile, cross-sectional study design will be used because this design took shorter time to collect data. The objective of choosing this design was to explore information on the level of knowledge and attitude regarding needle stick injury among pediatric nurses in Hospital USM. Then, the data was collected from December 2014 until January 2015.

#### **3.2 Population Setting**

The study was conducted on all pediatric nurses who worked in the pediatric ward in Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan which are special care unit (SCN), 2 Selatan, 6 Selatan and 6 Utara. Hospital USM was selected because it was not only provided clinical education and training to the future and current doctors, nurses and other health professionals, but this hospital also had a commitment to research and a center for experimental, innovative and technically sophisticated services.

#### **3.3 Sampling Plan**

The samples in this study were registered nurses who are working in SCN, 2 Selatan, 6 Selatan and 6 Utara.

##### **3.3.1 Sample**

When conducting a research, certain inclusion and exclusion criteria will be applied.

### Inclusion Criteria

- Registered nurses working in pediatric ward including SCN, 2 Selatan, 6 Selatan and 6 Utara.
- Registered nurses who are working in pediatric ward.
- Willing to participate in this study.
- Able to understand English.

### Exclusion Criteria

- Registered nurses who are working in areas other than SCN, 2 Selatan, 6 Selatan and 6 Utara.

#### **3.3.2 Sampling Method**

Sampling is a process of selecting a portion of population to represent the entire population. The samples of this study include the registered nurses in SCN, 2 Selatan, 6 Selatan and 6 Utara in Hospital USM. Purposive sampling was used in this study to select sample from a population which contains certain characteristic or criteria. Convenience sampling enabled the researcher to focus on particular characteristics of population and thus answered the research questions (Ccnmtl.columbia.edu, 2014).

#### **3.3.3 Sampling Size**

The population size for registered nurses in pediatric ward is 107 participants. Raosoft Sample Size Calculator (Raosoft, 2004) was used to calculate the sample size and to ensure the accuracy of the sample by avoiding sampling error. The margin of error is 5%, the confidence level of 95% and the response distribution of 50% will be used to determine sampling size. The recommended sample size for pediatric nurses was 84 participants. The type 1 error probability associated with this test of this null hypothesis was  $p < 0.05$ .

To counter for the dropout rate of this study, 10% of the calculated sample size was added. Therefore, total participants required for this study was 94 participants.

Therefore, the sample size required is:

$$n = 84 \pm \text{dropout of } 10\%$$

$$= 84 \pm 10$$

$$\sim 94 \text{ participants}$$

### **3.4 Variables**

There are two types of variables in this study which namely independent and dependent variable. The independent variables in this study were the socio demographic data which includes the level of education and work experience. On the other hand, the dependent variables were the level of knowledge and the attitude level regarding needle stick injury among pediatric nurses. All of the variables was collected through self-administered questionnaire which includes socio-demographic data, knowledge level and attitudes level regarding needle stick injury.

#### **3.4.1 Variables Measurement**

The independent variables are selected based on the socio demographic data. The demographic data includes level of education and work experience that was measured according self-reporte. Besides that, dependent variables are selected base on the level of knowledge and attitude level. Moreover, in order to evaluate the level of knowledge and attitude among the respondents in this study, the level of knowledge and attitude was assessed by using dichotomous scale. The respondents were asked to answer yes and no. The answer of yes showed that the respondents had knowledge and good attitude in minimize the needle stick injury toward pediatric. The answer of no shows the respondents did not had knowledge and bad attitude in minimize needle stick injury toward pediatric.

## **3.5 Instrumentation**

### **3.5.1 Instrument**

There was a set of self-administered questionnaire used for data collection. In consideration of cultural background and educational background among respondents, the questionnaire was developed by Anil (2008) in English version. Moreover, the self-administered questionnaire has 3 sections, which fulfilled the objectives of the research. The questionnaires were distributed to the nurses who work in pediatric ward in Hospital USM.

The first section (Section A) of the questionnaire consists of the socio demographic data such as level of education and work experience. Section A consist four questions. In second section (Section B), the questionnaire consists of nine questions to determine the level of knowledge among respondents. The dichotomous scale which consists yes and no were used to evaluate the knowledge of respondents toward needle stick injury. For each question that answers yes represented one score and no represented zero score. Total score for section B was nine score. Participant that scored 7-9 considered having high knowledge, 4-6 score as moderate knowledge, and 0-3 considered to have poor knowledge. The third section (Section C), the questionnaire consists of nine questions to determine the attitude level among respondents. For this section, the dichotomous scale was also used. The dichotomous scales which consist yes and were used to evaluate the attitude of respondents toward needle stick injury. For each questions that answer yes represented one score and no represented zero score. Total score for section C was nine score. Participant that score 7-9 considered have good attitude, 4-6 score represent have moderate attitude and 0-3 represent have poor attitude. Section B and C was modified from a set of questionnaire by Anil (2008).

### **3.5.2 Translation of Instruments**

The questionnaire was in English version. Researcher found that there was no need to translate the questionnaire because the questionnaires were distributed to the

nurses at high level of education. The terms used in the questionnaire are also used in the medical area and they are easy to understand by the participants.

### **3.5.3 Reliability**

To establish the reliability, instrument was an important part of demonstrating the rigor of the study. The instrument that was used in this study must be capable to provide an accurate and valid measurement of the study on participants' knowledge and attitude level of needle stick injury in Hospital USM. After that, a pilot study had been done on ten pediatric nurses based on the drop out of 10% from recommended sample size to ensure the reliability of the questionnaire. The Cronbach's alpha for each domain were calculated. The Cronbach's alpha for knowledge domain and attitude domain were 0.750 and 0.844 respectively.

### **3.6 Ethical Considerations**

The participants' right and privacy must be guaranteed during a research. So that, it is important for researcher to fully observe the guidelines stated in the Ethics Research Board of USM before conducting this study. The approval was obtained from Research Ethics (Human) Committee, USM and permission from the Director at Hospital USM including the Head of Pediatric Department, Hospital USM to perform this study. This study was begun after written approval from respective areas obtained.

All the registered nurses are free not involved in complete the questionnaire if they wished. In addition, all participants who are willing to take part were asked to sign a written consent after the aim and content of study was explained to them. All participants were informed that their participation was voluntary and all transcripts were remain confidential and anonymous to ensure that this research were conduct ethically and putting no risk for the participants.

### **3.7 Data Collection Plan**

Data collection was performed after obtaining approval from the Research Ethics Committee (Human), USM and Director, Hospital USM. Written consents were sought