KNOWLEDGE AND PRACTICE OF STANDARD PRECAUTIONS AMONG
NURSING STUDENTS

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This project is submitted in partial fulfillment of the requirements for the degree of
Bachelor of Nursing with Honours

Faculty of Medicine and Health Sciences
UNIVERSITI MALAYSIA SARAWAK
2010
ABSTRACT

During clinical training, lack of clinical experiences and skills predispose nursing students to higher risk of occupational exposure. Compliance of standard precautions among nursing students is important in protecting them from occupational exposure. The objective of this study was to assess the knowledge and practice of standard precautions among nursing students. This study was using quantitative method which used a 27 item self-administered questionnaire. The target group consisted of 65 UNIMAS undergraduate nursing students who already had clinical attachment experience. Data from the questionnaire was analyzed by using Statistical Package for Social Sciences (SPSS) version 17.0. In this study, overall level of knowledge among UNIMAS nursing students was found low as no respondents scored at or above equivalent of 80% of the maximum score and knowledge mean score achieved by respondents was relatively low (4.80 out of 10.0). Highest score was attained for knowledge of hand hygiene (87.7%) whereas low scores were achieved for knowledge about disinfection and sterilization management (6.2%) and basic concepts of standard precautions (16.9%). Overall level of practice of standard precautions was unacceptable as only 50.8% of the respondents exhibited good practice of standard precautions. Example of good practices were discard blood and soiled dressings into clinical wastes (86.2%), discard used needles into sharp bin immediately (78.5%) and wear gloves when doing peripheral vascular access procedures (78.5%) every time during clinical posting. Nursing students were found to
have poor practice in: wearing goggles (87.7%), calling for cleaner (72.3%) and changing
of gloves in between patient care (64.6%) every time in the clinical setting. There were
no significant differences among nursing students of different year of study in their level
of knowledge and practice of standard precautions (p>0.05). Level of knowledge was not
the significant predictor of level of practice of standard precautions among nursing
students. There are other factors that account for poor practice of standard precautions.
In conclusion, it is imperative that continuous reinforcement on standard precautions’
concepts should be implemented throughout the education training to improve knowledge
and practice of standard precautions.
ACKNOWLEDGEMENTS

I would like to forward my gratitude to my research supervisor, Mr Merikan Aren, for his guidance and support throughout the process of doing this study.

Besides, these people are acknowledged for their contribution and support:

- Course coordinator, Dr Zabidah Putit
- Research Ethics Committee of Faculty Medicine and Health Sciences, UNIMAS
- Mentor, Madam Chang Ching Thon
- Friends including Chew Ai Theng, Lydia Zainal Abidin and others.

Lastly, thank you for my beloved family members that accompany me all these while to complete this study.
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INTRODUCTION

Introduction

Health care workers (HCWs) including the staff, medical and nursing students are obliged to be at the frontline combating for patients' health and life without prejudice based on patients’ illness or infectious status. Nature of HCWs’ work subjects them to potential occupational exposure of any infectious diseases. This is proven true by the data unveiled by World Health Organization (2003) that there are 66000 of Hepatitis B Virus (HBV) infections, 16000 of Hepatitis C Virus (HCV) infections and 1000 of Human Immunodeficiency virus (HIV) infections among HCWs worldwide through occupational exposure in each year. Thus, Center of Disease Control, Atlanta recommended the best strategy to prevent occupational exposure is by practising standard precautions guideline that replaced universal precautions in 1996.

Standard precautions are applicable for provision of care to all patients regardless of their perceived infection status because people infected with blood-borne pathogens such as Human Immunodeficiency virus (HIV) can neither be visibly recognized (Centers of Control Disease, 2007) nor be reliably verified via medical history and physical examination as being infected (Sadoh, Fawole, Sadoh, Oladimeji and Sotiloye, 2006). Failure of HCWs in complying with standard precautions may result
in cross infection in the health care setting. Therefore, compliance of HCWs to standard precautions is important to protect both HCWs and patients.

In spite of the importance of adherence of standard precautions, HCWs showed unsatisfactory adherence to standard precautions (Naing, Nordin & Musa, 2001; Lee & Noor Hassim, 2005; Sadoh, Fawole, Sadoh, Oladimeji & Sotiloye, 2006; Health Protection Agency Centre for Infection, 2008). In England, Wales and Northern Ireland, noncompliance to standard precautions practice remained as the major contributing factor (37% in years of 2004 to 2007) of occupational exposure among health care workers (Health Protection Agency Centre for Infection, 2008). Similarly, in Malaysia, high prevalence of cases and episodes of needlestick injuries among the HCWs in a public teaching hospital in Negeri Sembilan was significantly associated with poor practice of standard precautions (Lee & Noor Hassim, 2005).

Nurses, the largest group of HCWs that provide largest portion of care to patients (Royal College of Nursing, 2009) were found to be the profession that reported most cases of occupational exposure (48%) for the years of 2000 to 2007. This indicates poor compliance to standard precautions guideline among nurses. Besides, a study conducted among 550 nurses in Hospital Universiti Malaysia Sains revealed low compliance (13.5%) of glove utilization for nine different procedures (Naing, Nordin and Musa, 2001). Poor compliance to standard precautions among nurses highlighted the concern regarding effectiveness of educational training in preparing future nurses for better knowledge and adherence to standard precautions.
Problem statement

Being part of the health care team, nursing students are exposed to potential blood-borne pathogens when they start clinical attachment. In fact, lack of clinical experiences and skills predispose nursing students to higher risk of occupational injuries. A study done among a group of undergraduate nursing students in a public Brazilian University highlighted that distraction (22.2%), inexperience (13.9%) and inadequate techniques (9.7%) were the three major contributing factors of occupational exposure among nursing students (Reis, Gir & Canini, 2004). Besides, nursing students were found to be the second most frequently injured HCWs in Hospital of Universiti Kebangaan Malaysia (Santha, Samsiah, Lexshimi, Roshdinom and Hamidah, 2007). After the incidents of occupational injuries, psychological impacts such as worried of contracting the blood-borne pathogens diseases, reduced confidence level and others may lead to students’ poor performance and avoidance of contact with infected patients.

Practice of standard precautions is essential to protect nursing students, however, overall level of practice of standard precautions was found low among nursing students (Logan, 2002; Bamigboye, Abiodun, Adesanya and Abidemi, 2006; Askarian and Malekmakan, 2006). In Malaysia, a study was conducted among medical students and unveiled poor practice of standard precautions predisposed them to high risk of needle stick injuries (Norsayani & Noor Hassim, 2003). Then, how about the level of practice of standard precautions among nursing students in Malaysia? Furthermore, before the clinical training at hospital, nursing students are
equipped with knowledge regarding standard precautions. So, does the institution provide adequate knowledge about standard precautions? What is the level of knowledge of standard precautions among nursing students? According to Health Belief Model, knowledge equipped provides the cues to action (Janjua, Razaq, Chadir, Rozi and Mahmood, 2007). Therefore, does level of knowledge significantly influence level of practice of standard precautions? Owing to paucity of information regarding level of knowledge and practice of standard precautions among nursing students in Malaysia, these questions need to be addressed by conducting a study to assess the level of knowledge and practice of standard precautions among nursing students.
Research questions

Research questions addressed in this study were:

1. What is the level of knowledge of standard precautions among UNIMAS nursing students?

2. What is the level of practice of standard precautions among UNIMAS nursing students?

3. Is there any significant difference between UNIMAS nursing students of different year of study in the level of knowledge of standard precautions?

4. Is there any significant difference between UNIMAS nursing students of different year of study in the level of practice of standard precautions?

5. Is there any significant relationship exist between level of knowledge and practice of standard precautions among UNIMAS nursing students?

Research objectives

General objective of this research was to assess knowledge and practice of standard precautions among UNIMAS nursing students.

The specific objectives of this research were:

1. To assess UNIMAS nursing students’ level of knowledge of standard precautions

2. To assess UNIMAS nursing students’ level of practice of standard precautions
3. To examine if there is significant difference between UNIMAS nursing students of different year of study in the level of knowledge of standard precautions.

4. To examine if there is significant difference between UNIMAS nursing students of different year of study in the level of practice of standard precautions.

5. To examine if a significant relationship exists between knowledge and practice of standard precautions.

**Significance of the study**

It is essential to examine level of knowledge and practice of standard precautions among nursing students as the data may provide an insightful view on readiness of this group of future nurses in combating for known or unknown lethal infectious disease. If the level of knowledge of standard precautions is found poor among nursing students, educational interventions should be implemented to enhance nursing students’ knowledge of standard precautions. Furthermore, finding of the level of practices of standard precautions among nursing students may reflect the impact of current infection control training for nursing students. Subsequently, strategies can be implemented to either help students in sustaining or improving their practice of standard precautions. Besides, relationship between knowledge and practice of standard precautions may give a view on types of strategies that are necessary to enhance nursing students’ adherence to standard precautions. All in all
helps to reduce the rate of occupational exposure and cross-infection in the health care setting.

**Operational definitions**

**Knowledge**

Specific information about standard precaution that is perceived discovered or learned through study.

**Practice**

The habitual or customary act of using standard precautions measures which can be measured based on the frequency of using standard precautions.

**Standard precautions**

Official OSHA terminology which denotes the infection control guideline to be practiced in handling all body fluids except sweat regardless of patients’ diagnosis and perceived infection status, consisting of six recommended practices namely hand washing, use of Personal Protective Equipment (PPE), house keeping and management of spillages, disinfection and sterilization of patient-care equipment, management of soiled of contaminated linen and lastly disposal of sharps or infectious waste.
Universal precautions

Common terminology used before standard precautions guideline proposed which denotes the infection control guideline to be practiced when providing care to all patients but does not apply to faeces, nasal secretions, sputum, sweat, tears, urine or vomitus unless they contained visible blood.

Nursing students

Undergraduate students enrolled in nursing course.
LITERATURE REVIEW

Health care workers (HCWs) are exposed and reinforced with knowledge of standard precautions since student training and on-the-job training. However, occupational exposure resulted from noncompliance still remained a problem (Health Protection Agency Centre for Infection, 2008). Thus, it is imperative to assess level of knowledge and practice of standard precautions among HCWs especially nurses as they are reported as the largest portion of HCWs (Royal College of Nursing, 2009). This section will review related literature which is done on standard precautions. Aspects such as knowledge and practice of standard precautions are discussed in this section.

Knowledge of standard precautions

Studies have been conducted among HCWs to investigate their level of knowledge and practice of standard precautions (Bamigboye et al., 2006; Motamed, BabaMahmoodi, Khalilian, Peykanheirati and Nozari, 2006; Janjua, Razaq, Chadir, Rozi and Mahmood, 2007). These studies revealed overall low level of knowledge of standard precautions measures among HCWs which included small amount of student HCWs.
Motamed et al. (2006) conducted a study in university hospitals of Iran to assess knowledge of and practices towards universal precautions among 540 HCWs and medical students. The findings unveiled overall low understanding of precautions except concerning disposal of sharps, contact with vaginal fluid, use of mask and gown or clearing up spilled blood. This study also showed that respondents demonstrated good practices of hand washing, disposal of needles and glove, mask and gown usage. A significant relationship existed between respondents' knowledge and practice of universal precautions in Hospital B. However, finding of this study contradicts with a recent study of Oliveira, Marziale, Paiva and Lopes (2009) that assessed knowledge and attitude of HCWs regarding their practice of standard precautions at a public emergency service. Oliveira et al. (2009) reported that HCWs possessed good knowledge of standard precautions and there was no significant relationship between knowledge and practice of standard precautions. The differences in the findings of these two studies can be justified by the difference of work setting as Oliveira et al. focused their study among HCWs in the public emergency service. Though study of Motamed et al (2006) didn’t include nursing students as their respondents, it involved majority (64.3%) nurses holding bachelor degree in nursing. Thus, this study gives an insight on the qualifying nursing students' pattern of practice upon graduation.

Next, there are six studies that mainly involved student HCWs such as medical students and nursing students as their respondents in examining knowledge and practice of standard precautions (Logan, 2002; Sax, Pernerger, Hugonnet, Herrault &
Chrait, 2005; Wu, 2006; Bamiboye et al., 2006; Tavolacci, Ladner, Bailly, Merle, Pitrou & Czernichow, 2008; Garcia-Zapata, Souza, Guimaraes, Tipple, Prado, Garcia-Zapata, 2010). Studies of Bamiboye et al. (2006), Sax et al. (2005) and Logan (2002) revealed low understanding of standard precautions whereas Garcia-Zapata et al. (2010), Tavolacci et al. (2008) and Wu (2006) revealed that their respondents' knowledge was of satisfactory level.

Study of Bamiboye et al. (2006) and Tavolacci et al. (2008) are similar as both studies assessed knowledge and source of information regarding standard precautions among health care students that consist of medical students and nursing students. Both studies have similar finding namely nursing students were found to have higher level of knowledge of standard precautions compared to medical students. However, nursing students in the study of Bamiboye et al. had primary source of information of standard precautions from nursing officers or matrons whereas nursing students in the study of Tavolacci et al. had primary source of information from teaching during curriculum. In addition, nursing students’ knowledge scores were poor in the study of Bamiboye et al. but nursing students’ knowledge scores were considered as acceptable in the study of Tavolacci et al. Contradiction of these findings infers the fact that failure of an institution in integrating concepts of standard precautions into the curricular contents may contribute to poor knowledge level of the nursing students. Findings from the study of Bamiboye et al. were limited by the small sample size of nursing students involved (23 respondents) whereas sample size of
nursing students (78 respondents) was considered acceptable in the study of Tavolacci et al.

In contrast, both Wu (2006) and Logan (2002) conducted their studies among nursing students only in a larger sample size (ranged from 175 to 710 respectively) to examine nursing students' level of knowledge of precautions measures. Furthermore, the merit of both studies is that they requested expert reviewers to examine the appropriateness of items in addressing crucial aspects of objectives and hypotheses. Then, they further tested their instrument's reliability by conducting pilot study.

Although Wu (2006) and Logan (2002) conducted their studies on standard precautions, they emphasized in the different aspects of standard precautions. Logan (2002) focused her study on knowledge and practice of recommended precautions for needle stick injury whereas Wu's educational intervention study emphasized on the requirement for Taiwanese nursing students to manage infectious disease outbreak. Wu (2006) revealed that nursing students having moderate level (scored 8 to 10 out of 15 questions) of understanding regarding standard precautions. Contrarily, study of Logan (2002) found that both bachelor degree and associate degree nursing students' scores in knowledge of standard precautions were below level of mastery. Possible reasons for this contradiction lie in the differences between the populations such as institutional factors and prior clinical placement experiences.
Practice of standard precautions

Practice of standard precautions among HCWs is crucial as it helps to prevent occupational exposure to infectious diseases. However, poor practice of standard precautions measures among HCWs is affirmed by a range of studies (Logan, 2002; Wenzel & Edmond, 2003; Hesse, adu-Aryee, Entsua-Mensah & Wu, 2006; Askarian & Malekmakan, 2006; Bamigboye et al., 2006; Janjua et al., 2007; Askarian & Assadian, 2009). For example, Logan (2002) revealed that almost half of the number of nursing students’ compliance level to standard precautions was below the expectation level.

Occupational exposure such as needle stick injuries remained a problem among HCWs. For example, studies of Askarian and Malekmakan (2006) and Reis, Gir and Canini (2004) showed that occupational exposure among students HCWs occurred due to recapping of used needles (10.8% and 4.2% respectively). A similar finding was reported in a study conducted in Malaysia whereby nursing students were the second group of HCWs that most frequently injured (Santha, Samsiah, Lexshimi, Roshdinom, Ho & Hamidah, 2007).

Furthermore, Sadoh. W., Fawole, Sadoh, A., Oladimeji and Satiloye (2006) conducted a study among HCWs (n=426) to examine their practices of standard precautions. One-quarter of the respondents in each group of HCWs (doctors, trained nurse, auxiliary nurse, laboratory scientists and domestic staff) were selected. This contributes to the merit of this study as better coverage and representativeness of the
population are emphasized. A large proportion (94.6%) of respondents always practice hand washing after handling patients. This finding contradicts with result (41.1%) of another study which conducted among student HCWs by Bamigboye et al. (2006). Possible reason for this might be inexperience among student HCWs. Both Sadoh et al. (2006) and Bamigboye et al. found that almost half (49.5% and 51.9% respectively) of the respondents were still practicing recapping of needles after used. Limitation identified in the study of Sadoh et al. is that respondents' use of gloves, aprons, gowns and protective glasses were examined collectively. This results in failure to assess respondents’ use of each of the Personal Protective Equipments (PPE) separately.

Janjua et al. (2007) conducted study that investigated knowledge about blood borne pathogens (BBP) and use of standard precautions among HCWs. The result is very few HCWs practice standard precautions. More than 50% of the respondents never used gloves in procedure with potential blood or body fluid exposure. This finding concurs with result of the study conducted by Naing, Nordin and Musa (2001) that only 13.9% of nurses reported full compliance with glove utilization. Another poor practice identified in this study is that majority (59.3%) of HCWs always recapped used needles. Practices such as hand washing, use of masks, protective glasses, management of spillage and contaminated linen were omitted in this study. Thus, shortcoming of this study is that the only four items tested (Hepatitis B virus vaccination, recapping of used needles and use of gloves and gowns) are not enough to generalize the actual practice of standard precautions.
A recent study of Askarian and Assadian (2009) was carried out to assess knowledge, attitude and practice among Iranian dental health care professionals (n=152) towards standard isolation precautions. The results denoted that respondents had poor practice of standard isolation practices. Respondents (69.7%) were found to show poorest practice in wearing gown during procedures with potential blood or body fluid exposure. Inconsistency in instrument used and data analysis were found in this study. This study also showed that knowledge of standard precautions did not have any impacts on compliance of the precautions measure.

In a recent study of Garcia-Zapata et al. (2010), a descriptive observational study was performed to compare the level of knowledge and practice of standard precautions among health care students in a teaching hospital of Brazil. The merit of this study is the use of observational method to assess the practice of standard precautions whereby the true picture of students' level of practices can be reflected better. Garcia-Zapata et al. highlighted that health care students were knowledgeable on hand hygiene practices but knowledge equipped was inadequate to make them comply with this practice. Similar finding is found in other studies (Janjua et al., 2007; Kagan, Ovadia & Kaneti, 2009; Oliveira et al., 2009) that there was no significant relationship between health care workers' level of knowledge and practice of standard precautions. Janjua, et al. (2007) and Logan (2002) provided further evidence that knowledge about mode of transmission of diseases and the work experience were the significant predictors of practice of standard precautions rather than knowledge of standard precautions.
In conclusion, through literature reviewing process, aspects such as knowledge and practice of standard precautions among HCWs were discussed. Since compliance of standard precautions measures is crucial in protecting both the clients and HCWs, further studies regarding factors such as improved knowledge of standard precautions to improve compliance should be conducted.