

FACTORS AFFECTING THE COMPLIANCE OF MYANMAR NURSES IN PERFORMING STANDARD PRECAUTIONS

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ABSTRACT

Introduction: Exposure to pathogens is a serious issue for nurses. The literature explains that standard precautions have not been taken consistently in nursing. The purpose of this study was to analyse the factors affecting the compliance of nurses in Myanmar in taking standard precautions. **Methods:** This study used a cross-sectional design. Samples included 34 nurses in Waibagi Specialist Hospital (SHW), Myanmar. The independent variables were the characteristics of nurses, knowledge of standard precaution, and exposure to blood/body fluids and needle puncture wounds. The dependent variable was the performance of standard prevention. Data were analysed using descriptive analysis and logistic regression. **Results:** The results showed that almost respondents (91.18%) had a good knowledge of prevention standards and 73.5% of respondents had good adherence in taking standard precautions. However, in practice, nurses have not been consistent in closing the needles that have been used correctly. The results showed that nurse characteristics did not significantly affect adherence to standard precautions with statistical test results as follows: age ($p = 0.97$), gender ($p = 1.00$), religion ($p = 0.72$), education ($p = 0.85$), work experience at SHW ($p = 0.84$), education training program ($p = 0.71$), knowledge ($p = 0.76$), and needle stick injury ($p = 0.17$). But, there was a significant influence between adherence to standard precautions and the incidence of injury due to needle puncture with p -value = 0.01. **Discussion:** The barriers to applying standard precautions by Myanmar nurses can be reduced by providing basic training, supervision, and improvement of standard operational procedures.

Keywords: Standard precautions, knowledge, obedience

INTRODUCTION

Health care worker (HCW) exposures and potential exposures to pathogens are widespread (Karmon, Mehta, Brehm & Dzurenko, 2013; Henderson, 2012). Globally, in 35 million HCWs, about 3 million receive percutaneous exposures to bloodborne pathogens each year, and about 40% of HBV and 40% of HCV infections and 4.4% of HIV infections in health care workers are attributable to occupational sharps exposure among health care workers (WHO, 2002). Almost all health care workers are at risk of exposure to these pathogens, but among those, nurses are the group that is most affected (Yang *et al.*, 2013). It has been estimated that > 50% of nurses will experience at least one needle stick injury in their careers (Rhode & Dupler, 2013).

Compliance with standard precautions has been shown to reduce the risk of exposure to blood and body fluids (Parkin, 2012). However, some studies show that compliance with standard precautions among nurses is still sub-optimal and inconsistent (Efstathiou, Papastavrou, Raftopoulos & Merkouris, 2011a; Gebresilassie, Kumei & Yemane, 2014; Punia, Nair & Shetty, 2014; Eljedi & Dalo, 2014; Jackson, Lowton & Griffiths, 2014; Takimani, 2015; Abu Bakar, Haruna, Teryila, Hamina & Ahmadu, 2015).

In Myanmar, some studies show that most HCWs in Myanmar have high knowledge and a positive attitude, but compliance with universal precautions/standard precautions is inconsistent (Shwe, 2007). This is a similar finding to that of Thu (2012) who stated that knowledge of universal precautions already high, only (37.4%) of HCWs (including nurses) had a high compliance score at Yangon Orthopedic Hospital and Khine (2007). Thu also found that most nurses had good knowledge levels but only 49.2% of nurses had good adherence to universal precautions in 300 Beds Teaching Hospital, Mandalay, Myanmar.

In Specialist Hospital Waibagi (SHW), the results of an initial collection of data (preliminary study) on 7 to 8 December 2016, showed that around half of the nurses exposed to the blood and body fluids of HIV infectious patients (40%) and needle stick injury during recapping needle within one year was 12.5% among nurses. Through telephone interview with one of the nurses in SHW regarding compliance with standard precautions, it was shown that her experience of nurses' compliance with standard precautions was inconsistent and the major reasons were that they had forgotten to wear gloves and wash hands, available resource storage is a little far from where nursing care is provided, there are time constraints and emergency situations.

There is a very limited previous study analysing the factors affecting compliance with standard precautions among nurses in Myanmar. The results of this study will be applicable in determining a strategy for improving health behaviours and the development of an infection control program to prevent occupational exposure to pathogens. Therefore, the researcher aims to examine nurses' compliance with standard precautions and analyse factors affecting compliance with standard precautions.

METHODS

In this study, an explanatory research design was used to explain and explore the affecting factors of compliance with standard precautions. There were two phases with a cross-sectional study to formulate the strategic issues in the first phase of study. The sample size was 34 nurses who are working in SHW and, except for a nursing officer (Matron), they were recruited and this research was conducted during March 2016 to April 2016. The dependent variable was compliance with standard precautions, while the independent variables were characteristics of nurses, knowledge of standard precautions, experienced exposure to blood/body fluids and needle stick injury. The instruments used to measure the level of basic knowledge, and compliance with standard precautions was structured questionnaires. The data were collected and analysed using descriptive and logistic regression with a significance level of $\alpha \leq 0.05$.

Ethical Clearance

The study was approved for protection of human rights and welfare in medical research by the Ethical Committee of the Faculty of Nursing Universitas Airlangga, Surabaya, Indonesia No 120-KEPK and the Department of Health Professional Resource Development and Management, Department of Health, Ministry of Health and Sports Nay Pyi Taw, Myanmar. As this project was part of a Masters thesis, the protocol was reviewed, evaluated and approved by a supervisory committee. The completion of questionnaires was considered as informed consent for participation. The participants were free to participate in or withdraw from the study; anonymity and confidentiality of the

participants' information was strictly maintained.

Data Analysis

The statistical package for the social sciences (SPSS) version 23.0 was used to analyse the data. In descriptive statistics, the scoring of knowledge involves 10 questions, with each question rated as giving 1 mark for the correct response and zero scores for incorrect and no response, and for the score of compliance with standard precautions, it was rated on a Likert scale (1=never, 2=seldom, 3=sometimes, 4=often and 5=always), while for negative statements were the conversely. The categories for knowledge for compliance with standard precautions were: low: ≤ 5.5 , enough: 5.5-7.5, good: >7.5 . For compliance with standard precautions they were: poor: ≤ 90 , good: >90 . In inferential statistics, logistic regression was used with a significance level of $\alpha \leq 0.05$.

RESULT

The Content Validity Index (CVI) was determined and all items were ≥ 0.98 , evidence that a CVI of at least 0.80 is considered to be a good criterion for accepting an item as valid (Davis, 1992). Moreover, the Cronbach's alpha was also determined by the response to all questionnaires by using the Likert-type response format. It was found to be > 0.70 , evidence that the questionnaires had an acceptable level of internal consistency (Bowling, 2009).

Demographic Characteristics of Nurses

Demographic characteristics of 34 participants were age, gender, religion, nursing education, working experiences at SHW, education and training. The mean age of participants ranged from 22 to 57 years and the majority of participants (50%) were in the 26–35 year age group. In terms of gender, almost all (97.1%) participants were females and only one was male. Most of the participants (85.3%) were Buddhist and the remaining participants (14.7%) were Christian. More than two thirds (67.6%) of them were bachelor degree holder and one third had a diploma degree. Total service of participants ranged from less than one year to 19 years and two thirds of participants had 5 to 10 years of service in SHW and only

20.6% attended educational training for infection control locally or internationally.

Compliance with Standard Precautions

For overall compliance with standard precautions, analysis data showed that 73.5% of participants had good compliance and 26.5% participants had poor compliance with standard precautions practice in this study. Specifically, all participants had good practice for hand washing and gloving as 100% of participants reported good compliance in each. On the other hand, practice of safety glasses was very poor since 100% participants described poor practice and no participant always used an eye shield. In wearing a mask and following safety measures for sharp handling practice, only 8.8% and 17.6% responded positively indicating poor compliance (Table 3).

Major Reasons for Non-Compliance with Standard Precautions

Most reasons for non-compliance with standard precautions in this study were emergency situations, workload, recapping needles, that it is unusual to wear eye shields,

that nurses forgot to wear gloves and wash hands, that it is uncomfortable to use personal protective equipment (PPE) and a poor fit, availability of resources storage is a little far from where nursing care is provided, and time constraints. Therefore, factors affecting compliance with standard precautions should be explored to improve nursing staff's compliance with standard precautions.

The Effects of Characteristics of Nurses, Exposure to Blood/Body Fluid, Needlestick Injury and Knowledge of Compliance with Standard Precautions

Statistical test results using logistic regression showed a significant value in exposure to blood/body fluids $p=0.01$, characteristics of nurses such as age $p=0.97$, gender $p=1.0$, religion $p=0.72$, nursing education $p=0.60$, working experience $p=0.84$, and educational training program $p=0.71$, knowledge of standard precautions $p=0.76$, and needlestick injury $p=0.17$, did not show a significant effect on compliance with standard precautions (Table 4).

Table 1. Level of Knowledge of Standard Precautions

No	Knowledge	Total frequency	Percentage (%)
1	High	32	94.11
2	Average	2	5.89
3	Low	-	-
	Total	34	100

Table 2. Experienced Exposure to Blood/Body Fluids and Needlestick Injury among Nurses in SHW

No	Structural variables	Category		Total F(%)
		Yes F(%)	No F(%)	
1	Exposure to blood or body fluids	15 (44.12)	19 (55.88)	34 (100)
2	Experienced needlestick injury	5 (14.71)	29 (85.29)	34 (100)

Table 3. Overall Compliance and Specific Compliance with Hand Washing, Gloving, Wearing Mask, Eye Wearing, Safe Sharp Handling

No	Compliance with SP	Good F (%)	Poor F (%)	Total F (%)
1	Overall compliance	25 (73.5)	9 (26.5)	34 (100)
2.	Hand washing	34 (100)	0 (0)	34 (100)
3.	Gloving	34 (100)	0 (0)	34 (100)
4	Wearing mask	31 (91.2)	3 (8.8)	34 (100)
5	Eye wearing	0 (0)	34 (100)	34 (100)
6	Safety sharp handling	28 (82.4)	6 (17.6)	34 (100)

Table 4 The Effects of variables on Compliance with Standard Precautions

Variables	B	S.E	Wald	df	Sig.	95% CI for odds ratio
Age	1.10	1.723	.000	1	0.97	1.01
Gender (male/female)	0 -19.91	40192.99	.000	1	1.00	.000
Religion	0.530	1.453	.133	1	0.72	1.70
Education	3.625	1.202	.271	1	0.60	.535
Service at SHW	4		.816	3	0.84	
Training (yes/no)	0-626	1.698	.136	1	0.71	.535
Exposure (yes/no)	2.559	.993	6.642	1	.010	12.929
Needle Stick Injury (yes/no)	-1.747	1.299	1.808	1	.179	.174
Knowledge (good/average)	-474	1.557	.093	1	.761	.622

DISCUSSION

In this study, regarding overall compliance with standard precautions, almost three-quarters (73.5%) of participants showed good compliance among Myanmar nurses in SHW. In Myanmar, this result compared favorably with other studies that reported 62.6% of nurses had good compliance among 92 participants in Yangon Orthopedic Hospital (Thu, 2012) and 49.2% of Myanmar nurses were found to have good compliance in Mandalay, 300 Beds Teaching Hospital (Khine, 2007). International studies reported that 59.4% of nurses presented a high mean score of adherence to standard precautions in a university hospital in Brazil (Toffan *et al.*, 2011), HCWs (including nurses) had good compliance in Ethiopia (42.9%) (Gebresilassie *et al.*, 2014) In contrast, it is still lower than the rate of compliance reported by 32 hospital nurses in Cyprus (100%) (Efstathiou *et al.*, 2011b), 120 nurses in Iran whose compliance was 97.5% and among 1444 clinical nurses from 18 hospitals in Hunan, China (95%) (Luo, He & Zhou, 2010).

Specifically, with regard to hand washing, all participants (100%) self-reported as having good compliance with hand washing, and only 5.88% participants self-reported that they seldom wash their hands before and after giving care to the patient. These findings strongly approve the statement that hand washing should always be carried out before and after the provision of care as it reduces the count of microorganisms on one's hands, protecting both healthcare professionals and patients from the spread of infection (Apostolopoulou, Raftopoulos, Terzis, Pissaki & Pagoni, 2010).

Regarding gloving in practice, there was also good compliance with gloving (100%) in this study. While drawing patient's blood participants (81.2%) always and only (8.8% of the time) sometimes wear gloves. These are not similar findings as one-third of participants reported that they did not always wear gloves when exposure was likely to happen (e.g. during the drawing of blood) among Cypriot nurses (Efstathiou *et al.*, 2011a). However, it was consistent that gloves were used while drawing the blood (81.0%) and during instances when coming into contact with mucous membranes or non-intact skin of the patients (88.3%) (Punia *et al.*, 2014)

In contrast, the practice of wearing safety glasses was very poor since all participants described compliance with safety glasses as there was poor compliance and no participant always used an eye shield during nursing caring procedures that may lead to the splashing of blood and body fluids. Similarly, Takimani (2015) found that only 5.6% of participants used eye protection and the most neglected personal protective equipment in a high-risk procedure is eyewear among nurses in Nairobi. Punia *et al.* (2014) also mentioned that only 22.2% of participants always wear eye protection in an emergency and Trauma Triage Centre from South India. This does not comply with the infection control manual, 2014 that protective eyewear must be worn while performing any procedure where there is a likelihood of splashing or splattering of blood or other body substances (Infection Control Manual, 2014). This practice leads to the greatest hazard in terms of the possibility of splash or splatter to nurses' eyes that can increase occupational exposure.

With regard to wearing a mask, most participants reported satisfactory good practice (91.2%). They may believe that a face mask can prevent the inhalation of air-transmitted microorganisms and they are highly recommended when the exposure to such microorganisms is anticipated (Siegel & Rhinehart, 2007).

Safety sharp handling practice also showed good compliance (82.4%) among nurses in this study. When at work nurses always disposed of all potentially contaminated materials in a red (and/or labeled) bag for disposal as biomedical waste and they always discarded the sharp objects in puncture resistant sharps containers (73.5%). Similarly, the majority (95.7%) of participants answered that nurses always discarded used sharp objects into a sharps container among Cypriot nurses (Efstathiou *et al.*, 2011a) This behaviour is in accordance with the requirements of standard precautions, which require such action to prevent the risk of danger of injury for the safety of all healthcare workers. However, Punia *et al.* (2014) reported improper disposal of sharps among the healthcare workforce in a trauma care setting in South India.

A used needle poses a serious danger from needlestick injury (Schmid, Schwager & Drexler, 2007). Used needles should never be recapped, as this could lead to a needlestick injury. Statistical test results using logistic regression showed significant value in exposure to blood/body fluids $p = 0.01$, ($p \leq 0.05$). Unfortunately, two thirds of participants self-reported that nurses always recapped needles before discarding them in this study. This finding agreed with other studies in Myanmar; it was surprising to find that a significantly large proportion of respondents (94.9%) recapped the needle after use (Shwe, 2007) and 89% recapped and more than half of the respondents had experience of needlestick injury (Thu, 2012).

Some studies from other countries, Punia *et al.* (2014) reported inadequate needle safety precautions among the healthcare workforce in a trauma care setting in South India. Before they discarded needles, 43.7% of the respondents did not always avoid recapping a used needle according to the study of Cypriot nurses (Efstathiou *et al.*, 2011a) and Reda *et al.* (2010) also demonstrated needle recapping (46.9%) by healthcare workers (including nurses) in Ethiopia.

In contrast, the practice of recapping used needles was uncommon, (94.4%) amongst participants disposing of the syringe and needle immediately into puncture resistant containers without recapping among nurses in Nairobi (Takimani, 2015). Abubakar *et al.* (2015) also found that among nurses working at the Federal Medical Centre Gumbo, Nigeria, the majority (76.25%) of the respondents did not recap the needle after use and most respondents (80%) disposed of used syringes and needles in the safety box.

In this study, the practice of recapping needles was not satisfactory. It causes a very dangerous situation for HCWs. Used needles should never be recapped, as this could lead to a needlestick injury. Consequently, it is apparent that recapping a used needle poses a high risk of needlestick injury among nurses in SHW.

The Effects of Characteristics of Nurses on Compliance with Standard Precautions

This current study reported that there was no significant effect between compliance with standard precautions and characteristics of nurses in terms of age, gender, religion, years of experience, nursing education and education training. Osborne (2003) in Australia, Demir (2009) and Hosoglu *et al.*, (2011) in Turkey found that there was a relationship between the low compliance rate and the participant's demographic characteristics in terms of age, gender and religion. This is consistent with Ayed, Equait, Fashafsheh and Ali's (2015) study in Palestine and Fashafaheh *et al.*'s study in Egypt (2015) according to age, gender, years of experience, nursing education, education training but is inconsistent with Ayed *et al.* (2015), Efstathiou *et al.*'s, study (2011a) and Mortada & Zalat's (2013), in terms of gender. Moreover, inconsistently, Abubakar *et al.*'s (2015) study in Nigeria and Efstathiou *et al.*'s (2011a) study in Cyprus showed that the longer years of experience nurses had working, the more frequently they would follow standard precautions.

In addition, Efstathiou *et al.* (2011a) showed that educational programs can influence nurses' compliance levels and persuade them to use standard precautions more frequently. According to Luo *et al.*, (2010), the education and health promotion needed to make nurses comply with standard precautions are constant

training and provision of continuous seminars especially if these training sessions become a compulsory requirement for nursing staff in hospitals.

CDC (2013) also asserted that education on the basic principles and practices for preventing the spread of infections should be provided to all health care professionals. Furthermore, the CDC (2014) stressed that education and training should be conducted on a regular basis (e.g., annually) to maintain competency. In this study, only less than one-fifth of participants received educational training about infection control workshops. This is a very small amount of education programs for nurses in SHW who are caring for patients with HIV and AIDS, with opportunistic infections such as Tuberculosis, Hepatitis B, Hepatitis C and other contagious diseases.

Concerning Effect of Knowledge, Exposure and Needlestick Injury

Almost all (91.18%) of the participants were found to have a high level of knowledge, and this satisfactory knowledge was found to be higher than the similar report before. A study by Thu (2012) in Myanmar revealed that 68% of participants were reported to have high knowledge of standard precautions. Ayed *et al.* (2015) in Palestine found about three quarters (76%) of the respondents had good and fair knowledge of standard precautions. And Abu Bakar *et al.* (2015) in Nigeria reported that 28.75% of the participants had good knowledge of the components of standard precautions.

This study also demonstrated that knowledge of compliance with standard precautions and needle stick injury were not statistically significant on compliance with standard precautions. In contrast, different studies have indicated that a high level of knowledge of standard precautions was a significant predictor of better compliance with standard precaution practices (Hinkin & Cutter, 2014; Mitchell, Say, Wells Wilson, Cloete and Matheson, 2014). The influence of knowledge and training were the predictors for nursing students' compliance with standard precautions among nursing students in China (Cheung *et al.*, 2015). Moreover, it should be the nurse who has experienced needlestick injuries, the fear of lethal infection who is more frequently willing to follow the precautions and more careful to protect their life from hospital infections. It is

urgently necessary to improve nurses' behaviour that is at high risk of getting exposed to blood-borne infections (HIV, HBV and HCV).

The results of parameter estimations indicated that there is a statistically significant effect of exposure to blood/body fluids on compliance with standard precautions ($p = 0.01$, $p \leq 0.1$). Inconsistently, Efstathiou *et al.* (2011) and Mortada & Zalat (2014) also stated that their study detected a high level of self-reported exposure to blood and body fluids that was significantly different among noncompliant compared with compliant participants. In agreement with another study among HCWs in Ethiopia (Reda *et al.*, 2010) the regression model indicated that HCWs who regularly apply standard precautions reduced their exposure to incidents by 20%.

In this study, almost half of the nurses in SHW had exposure to blood/body fluids. Even though nurses were exposed to infected blood/body fluids, nurses still attributed risk perceptions. Nurses did not always use PPE and focused on work accomplishment rather than their own safety.

However, there are some limitations that dictate caution in the interpretation of the results of this outcome data. Even though the samples size is strongly and completely representative for all nurses in Specialist Hospital Waibagi, it cannot be generalised to all hospital settings. While collecting the data, there were some nurses leaving for vacation and going back home, causing separate data collection which leads to a possibility of data collection bias.

CONCLUSION

The results of this study showed that nearly all respondents had a good knowledge of the standards for prevention and the majority of respondents had good adherence to standard precautions, but the prevention of injuries from needle puncture still low among Myanmar nurses in SHW. The characteristics of nurses such as age, gender, religion, nursing education, working experience and educational training programs, knowledge of standard precautions and needlestick injury did not significantly affect compliance with standard precautions. Nurses who have experience of being exposed to a needle prick when performing nursing actions provide significant results in terms of compliance.

Nurses should always be alert for infections, prohibited from recapping used needles, anticipate all personal protective equipment and need to take part in continuous education and advance knowledge.

Nurse managers and senior nursing officers need to continuously remind HCWs to follow compliance with standard precautions and update information on CNE (continuing medical/nursing education) about infection control and get feedback from all nurses every month.

Health authorities should provide adequate human and material resources, mandatory seminars/workshops and internal and external motivations for quality health care, a safe occupational environment and reducing identified standard precaution barriers. Assessment of exposure, and checkup for all HCWs needs to be introduced at SHW.

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