

## ORGANIZATIONAL SAFETY CULTURE AND OCCUPATIONAL ACCIDENTS AMONG REGISTERED NURSES AT A TERTIARY CARE HOSPITAL

Wachira Suriyawong, Pimpan Silapasuwan, Mathuros Tipayamongkhogul  
Faculty of Public Health, Mahidol University, Thailand

### ABSTRACT

Healthcare worker exposure to patients' blood or pathogens found in body fluids through accidental contact in working conditions are on the increase in tertiary care hospital settings.

### Objectives

The purposes of this study were to determine the incident rate of accidental exposure to blood and body fluids (BBF) and to find the association between organizational safety culture, knowledge of safe work practice, compliance with safe practices and accidental exposure to BBF.

### Methods

A cross-sectional study was designed to investigate 452 RNs in a tertiary care hospital in the north of Thailand from May 2014 to July 2014 using self employment questionnaires. Stepwise multiple logistic regression was utilized to analyze factors associated with incidents of accidental exposure.

### Results

The results showed that 36.3% of RNs reported experiences of accidental exposure to patient secretions. Furthermore, nurses' perceptions regarding organizational safety culture and compliance with safe work practices were significantly related to accidental exposure incidents.

### Conclusion

In order to prevent health risks and accidents concerning RNs, organizational safety culture and compliance with safe work practices are in need of improving immediately and hospitals could use these scales to identify problem areas in their blood borne pathogen management program and target specific areas for intervention.

### Keywords

Organization, safety culture, safe work practices, accidental exposure, RN

## BACKGROUND

Exposure to blood borne infections is a serious occupational hazard affecting thousands of health care workers [1]. Most notably, needle stick and sharp instrument injuries have been recognized as one of the occupational hazards among health care workers (HCWs) [2]. The aforementioned are substantial sources of infections with blood borne pathogens able to cause substantial health consequences and psychological stress for HCWs [3]. Numerous studies have found nurses to be the commonest group of HCWs experiencing needle stick injuries as well as the growing incidence rate of accidental exposure to blood borne pathogens and secretions at tertiary care hospitals in (in this case) the north of Thailand [4, 5, 6, 7].

Guidelines preventing the transmission of blood borne pathogens from patients to health care workers and accidental exposure state that these type of incidences are largely preventable through the use of universal precautions and special equipment (primarily systems that reheat needles after use and needleless access devices). Exclusive reliance on these strategies is inadequate, however, for several reasons. First, studies have shown that nurse compliance with universal precautions are affected by the availability of protective equipment [1, 4] combined with the perceived commitment of management to safety [1]. Second, the adoption of needleless technology has been widespread, but it is unlikely that any technology can ever entirely remove the need for health professionals to handle bare needles and sharp instruments. Third, the awareness of professionals is increasing towards needle stick accidents and other reportable incident exposure to BBF in hospitals which may be related to organizational factors such as staffing, working conditions, perception of management, and teamwork climate.

Organizational safety culture has been defined as "the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment of an organization's health and safety management which are derived via 6 factors: teamwork climate; safety climate; perception of management; stress recognition; working conditions and

job satisfaction [9]. Moreover, shown to be important is the correlation of both the adoption and maintenance of safe work practices in reference to workplace injury rates [9]. So, the objectives of the study were to determine the incidence rate of accidental exposure to blood and secretion and the associated organizational safety culture and factors among RNs at a tertiary care hospital in the north of Thailand.

## METHODS

### Subjects

The initial population of the study was 637 full-time equivalent RNs working in outpatient and inpatient departments located at a tertiary care hospital in northern Thailand. Subjects with at least 6 months employment history were recruited to participate. Participants had to be willing to fully cooperate in the survey. Those who could not meet the above requirements were excluded from the study.

### Methods

#### Study design

From May 2014 to July 2014, a cross sectional study was conducted in a tertiary care hospital in the north of Thailand.

#### Sample size and sampling

The sample size was calculated from the Daniel formula [10]. Subjects were 450 RNs. 20% of the calculated sample size was added to minimize type II error; therefore the total sample size was 540 participants. Stratified (by units) random sampling was undertaken with the number selected from each unit proportionate to its size. Within each unit, participants were selected via simple random sampling from the list of staff in each unit.

### Instruments

Questionnaires were distributed by the researcher during working hours. The survey measured 5 major constructs: (1) demographics, (2) organizational safety culture including 33 items with a five-point Likert scale adapted from Sexton et al. 2006 [9] (scale reliability was 0.92), (3) self-reported compliance to safe work practice including 15 items with the response of 5 rating scale adapted from Clark 2006 [1] (scale reliability 0.87), (4) knowledge of safe work practice including 20 items with multiple choice adapted from Yang et al. 2010 [10] (scale reliability 0.81), and (5) exposure history within the previous 6 months. The questionnaire was completed by 452 of 540 registered nurses surveyed producing a response rate of 83.7%.

### Statistical analysis

Stepwise multiple logistic regression was used to identify

### Correspondence

Wachira Suriyawong

Add: Faculty of Public Health, Mahidol University, 420/1 Ratchawithi Rd., Ratchathewi District, Bangkok 10400, Thailand

Email: dekmor\_100@hotmail.com

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organizational safety culture, compliance to safe work practice and knowledge of safe work practice correlated with accidental exposure incidents.

#### Ethical considerations

Informed and voluntary consent for participation was obtained from all study subjects prior to study enrolment. Approval by ethics committees at both the Faculty of Public Health, Mahidol University and a tertiary care hospital in the north of Thailand prior to the collection of data.

#### RESULTS

164 RNs (36.3%) reported accidental experiences at work. Prevalence of needle stick injury was 48.78% followed by direct contact/splash to blood/body fluid (32.32%), sharp instrument injury (8.54%), Needle stick and direct contact/splash to blood/body fluid (6.70%), needle stick and sharp instrument injury (2.44%), needle stick and sharp instrument injury and direct contact/splash to blood/body fluid (1.22%). These results are shown in table 1 below:

**Table 1. Reported accidental exposure incidents in the previous 6 months (RNs) (164/452)**

Exposure incident type	n (%)
Needle stick injury	80(48.78)
Direct contact/splash to blood/body fluid	53(32.32)
Sharp instrument injury	14(8.54)
Needle stick and direct contact/splash to blood/body fluid	11(6.70)
Needle stick and sharp instrument injury	4(2.44)
Needle stick and sharp instrument injury and direct contact/splash to blood/body fluid	2(1.22)

Stepwise multiple logistic regression analysis showed that accidental exposure incident occurrence was significantly lower when compliance to safe work practice was rated highly (OR = 0.221, 95%CI = 0.113-

0.435) and when subjects reported an appropriate organizational safety culture (OR = 0.95, 95% CI, 0.937-0.974). These results are shown in table 2.

**Table 2. Factors correlated with accidental exposure incidents**

Variables	Adjusted OR	p-value	95%CI
Compliance to safe work practice	0.221	< 0.001	0.113 - 0.435
Appropriate organizational safety culture	0.946	<0.001	0.929-0.963

#### DISCUSSION

The incidence of accidental exposure among registered nurses in the course of this study carried out in 2014 was 36.30%. The overall incidence rate of needle stick injury was 17.70% (80/452). Similar results were reported in terms of needle stick injury in other studies [2, 6, 7, 12]. This study discovered that registered nurses working with lower perception of organizational safety culture were substantially more likely to experience accidental exposure incidents. This finding is similar to those of others [4, 14, 15] since employees' perceptions regarding the organizational safety culture in the workplace is an important contextual factor that can influence the adoption of safer behaviors in the workplace. The mechanisms explaining these effects involve a multifaceted impact of organizational safety culture on decisions pertaining to safety-related resources, safety-mindedness among registered nurses as well as a more direct influence of individual levels and working conditions on the way risky procedures are carried out. This study revealed the negative correlation between safe work practice and accident exposure incidents. It has been similarly reported that compliance

to safe work practice can reduce the likelihood of accidents or injury at work [13]. As human behavior or unsafe acts are the primary cause of most accidents. Unsafe acts by workers include: failure to follow proper job procedure; failure to use appropriate personal protective equipment such as gloves and goggles - which can lead to yet more accidents. So, the events of accidental exposure such as needle stick injury or exposure to blood or secretion can be reduced by following *universal precaution guidelines* [8].

#### CONCLUSIONS

The outcomes of this study suggest that organizational safety culture and compliance to safe work practice are useful in terms of blood borne pathogen management. Importantly, hospitals could use these scales to identify problem areas in their blood borne pathogen management program and target specific areas for intervention. Given the seriousness of the problem, it is important for hospital administration to evaluate employees' perceptions regarding their risk-management programs and to address any shortcomings whenever feasible. Study limitations: a cross-sectional study design which was unable to determine causal

relationships. In addition, self limitations in reporting were likely to occur.

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