

Factors influencing sharp injury reporting among healthcare workers in Hospital Melaka

Open
Access

Nik Hasnaa Nik Mahmood^{1,*}, Nur Farhana Hamzah¹

¹ Razak School of Engineering and Advanced Technology, Universiti Teknologi Malaysia, 54100 Kuala Lumpur, Malaysia

ARTICLE INFO

ABSTRACT

Article history:

Received 16 May 2017

Received in revised form 17 June 2017

Accepted 2 August 2017

Available online 8 August 2017

An effective sharps injury prevention program includes several components that must work in concert to prevent healthcare personnel from suffering needlesticks and other sharp related injuries. Sharp injury management program in Kementerian Kesihatan Malaysia (KKM) is currently at surveillance state outlined in the Manual of Sharp Injury Manual Surveillance 2007. Latest data showed that as much as 1405 cases reported in Kementerian Kesihatan Malaysia facilities in 2011. In Hospital Melaka, high sharp injury prevalence was recorded with 25 per 1000 healthcare worker being affected each year. However, according to World Health Organization, surveillance data tend to underestimate the true rate of sharp injuries between 18% and 70%. Although reasons for sharp injury underreporting are well documented in many studies, less is known on what motivates healthcare personnel to report their injury. In order to encourage healthcare workers engagement to prevention program, these motivators need to be determined. Various factors affecting reporting behavior can be divided into organizational factors and health belief. The objective of the study is 1) to determine the level of awareness and compliance on sharp injury reporting among healthcare workers in Melaka, 2) To identify the relationship between awareness of reporting, organizational factors and health belief with sharp injury-reporting behavior among healthcare workers, 3) To determine the impact of awareness on reporting, organizational factors and health belief with sharp injury reporting behavior among healthcare workers, 4) To suggest improvements in sharp injury prevention program. Healthcare workers who reported sharp injury between 2011 and 2015 were invited to answers questionnaires pertaining these factors. Descriptive statistics, mean scores and multiple logistic regression were used for the analysis. Results and recommendation are discussed.

Keywords:

Sharp injury reporting, healthcare workers, health belief, organization safety climate

Copyright © 2017 PENERBIT AKADEMIA BARU - All rights reserved

1. Introduction

One of the most significant occupational hazards among healthcare workers in Malaysia is the sharp injury. The Sharp injury is a penetrating stab wound by sharp objects such as needle and scalpel

* Corresponding author.

E-mail address: [Nik Hasnaa Nik Mahmood \(nikhasnaa.kl@utm.my\)](mailto:nikhasnaa.kl@utm.my)

resulting in exposure to blood and other body fluids. Exposure to blood and bodily fluid leads to bloodborne infection such as Hepatitis B, Hepatitis C, and HIV. Common risk control to prevent sharp injuries and blood borne infection was focusing on personal approach as laid out in the Universal precaution. The World Health Organization had set a benchmark of zero sharp injuries among healthcare personnel. In 2006, WHO Workbook for Designing, Implementing and Evaluating a Sharps Injury Prevention Program was released. This workbook addressed the importance of a prevention program that must work in concert with healthcare personnel suffering sharp injuries. It outlines the integration of complex safety engineering and organization administration driven by performance improvement. This creates a system-based approach for sharp injury prevention. In system-based approach, prevention of sharp injuries among healthcare workers relies on reported data but often hampered by underreporting of cases among the healthcare workers [5,8,13,28,29,30]. Surveillance data tend to underestimate the true rate of sharp injuries between 18% and 70% [50].

Reasons for failure to engage in reporting sharp injuries include 1) Lack of time [7,9,33] 2) Cumbersome procedure [9] 3) Stigma of incompetence [21] 4) Injury too trivial to be reported [7] 5) Perceived low risk of infection [7] 6) No knowledge of reporting procedure [21] 7) No knowledge of risk of infection [21] 8) Perceived no benefit from reporting procedure or poor reporting system feedback [9]. Healthcare workers who tend to not report their sharp injury often emphasized on negative aspects of reporting without undergoing the process of reporting itself [48].

These reasons lie in the first barrier of Webb’s Reporting Filter Model: Individual judgment and injury severity. Based on Pfeiffer Psychological Framework on Factors Influencing the Willingness to Report Incidents, individual reporting barrier can be divided into 2 antecedents; individual and organizational, which influence the individual attitude to the willingness to report.

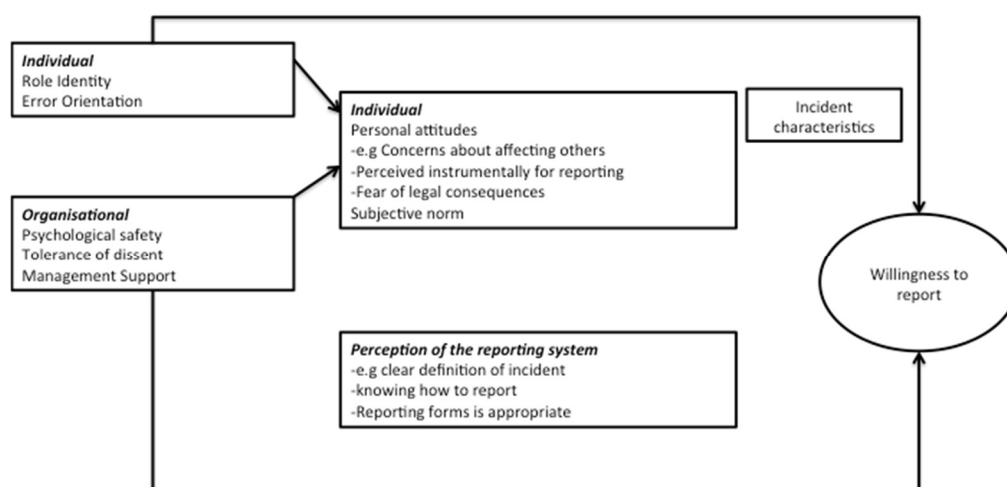


Fig. 1. Pfeiffer’s Psychological Framework on Factors Influencing the Willingness to Report Incidents

Health Belief Model predicts factors at the individual level and does not integrate other external factors [28]. In magnet hospitals where all organizational factors are favorable, the decision to report relies on healthcare workers' perception barrier [36]. Tabak reported that healthcare workers who are compliance to reporting have a high level of knowledge on blood borne infection, higher perception on the susceptibility of contracting disease, the severity of disease and benefit of reporting compared to non-compliers. Perception of reporting efficacy has the greatest compliance with the duty to report [48].

Several studies on organizational factors influencing reporting behavior showed that there are fewer total accidents reported and lesser underreporting in a good safety climate [44]. A similar emphasis was seen in the presence of supervisor enforcement of safety [44], good coworker support and positive peer pressure [9,10,20,41], minimal workload or less production pressure [9,8,47]. Boden combining all these 3 factors: organization safety practice, staff adequacy and co-worker support in his study reported that good perception of safety practice is a predictor for reporting sharp injuries. Coworker support and staff adequacy have only substantial correlation [6]. The authors suggest that they other factors might have a complex interplay in stages of injury reporting.

The authors address the importance of reporting sharp injuries as the vital activity in promoting sharp safety among healthcare workers. Determining factors that affect a sustained injury to be reported is essential to encourage participation of healthcare workers to contribute their opinion, insight, and experience in tailoring the prevention program.

1.1 Objectives

This study is designed to study organizational factors and health belief factors that influence healthcare workers to report a sustained sharp injury. This can be achieved from the following research objectives;

- 1) To determine the level of awareness and compliance on sharp injury reporting among healthcare workers in Melaka.
- 2) To identify the relationship between awareness of reporting, organizational factors and health belief with sharp injury-reporting behavior among healthcare workers.
- 3) To determine the impact of awareness on reporting, organizational factors and health belief with sharp injury-reporting behavior among healthcare workers.
- 4) To suggest improvements in sharp injury prevention program

2. Methodology

2.1 Data

This is a quantitative questionnaire-based survey. It was conducted between September 2016 and November 2016. Name, age, gender, working duration, department and contact number were extracted from 329 OHU/SIS-II forms in Hospital Melaka. All 329 subjects were contacted based on contact number given in the OHU/SIS-II form and invited to participate in this survey. Only 189 were contactable and 82 responded. All 82 questionnaires were completed and included in the analysis. This is a 43.3% response rate representing 24% of total available data for reported cases. Respondents were allowed to choose between paper-pencil and the online questionnaire.

2.2 Instruments and Measurements

The instrument was measured by Likert scale where 1= strongly disagree and 5= strongly agree. The safety practice was an 8-item scale adapted from Organizational Policies and Practice Questionnaire measuring safety measures and management at the workplace [2].

Perceived staff adequacy measurement was a 5-item scale based on the Revised Nursing Work Index by focusing on staff availability, adequate time to discuss cases, skills nurturing and the need to cover duty out of job scope [1]. Perceive coworker support measurement was a 5-item scale based on Job Content Questionnaire measuring relationship and team works between doctors and nurses

and availability of colleague support when needed [15]. Health belief measurement was adapted from Rosenstock's Health Belief Model (1959). This section consists of 24 questions divided into 5 subtopics: perceived susceptibility of disease, perceived severity of disease, perceived benefit of reporting, perceived disadvantage of reporting, overall maintenance of health.[34]The compliance reporting a sustained sharp injury in the future was measured by the level of compliance. This section consists of seven-item statements to assess workers compliance to duty to report a sustained sharp injury in the future adopted from Haridi [12].

2.3 Data Analysis

Reliability of the construct is assessed using Cronbach Alpha Coefficient. Descriptive analysis was applied to characterize the frequency of distribution of variables. Demographic data and frequency tables were compiled from the returned questionnaires. The level of awareness and compliance is described using mean score and percentage, divided into categories "Good", "Moderate" and "Poor". Using inferential statistics, the relationships between independent factors (awareness, organizational safety practice, and health belief) with the dependent variable (level of compliance) were analyzed by correlation and regression analysis at significant level $p < 0.05$. Frequency analyses and correlations are conducted using The IBM SPSS Version 23.

3. Results and Discussion

3.1 Demography

As shown in Table 1, the majority age of healthcare workers (HCWs) among survey respondents was less than 30 years old (79.3%) and predominantly female (68.7%). Of the respondents 80.5% were doctors and 14.6% were nurses. HCWs with less than a year and 1-5 years working experience have about the same percentage of reporting, 40.2%, and 43.9% respectively. Despite being the busiest department in the hospital, the most sharp-injuries came from Medical Wards, followed by Emergency and Orthopedics Department. Interestingly, we found no report came from the surgical department. Demography showed that young HCWs are more likely to be exposed to sharp injury as compared to their seniors. Consistent with the previous study [2,31], it was found that young female HCWs who experience sharp injury were more likely to report an injury. It is important to recognize that young HCW had long career path. Early exposure to bloodborne infection affects work productivity and at childbearing age, this might be passed on to their offspring.

3.2 Level of Awareness and Compliance to Sharp Injury Reporting

Table 2 presents the mean and standard deviation for awareness and compliance level to sharp injury reporting. As can be seen, there is a high level of awareness of sharp injury reporting (mean = 4.3 SD= 0.540) (Table 2) similar to previous studies [6,8,47]. These HCWs were aware that reporting system exists, the person to report the injury, the risk of blood-borne infection and the importance of post-injury prophylaxis. None the less, awareness alone does not contribute to willingness to report [8]. Those who complied to with the duty to report did not have and overall higher knowledge and than the non-compliers [8,48]. Suggesting that various other factors come into play before the decision to report was made. Interestingly, there is a shifting trend among healthcare workers from poor knowledge to universal precaution and blood borne infection [14,33,39] to fair to high knowledge and practice of universal precaution and blood borne infection [5,32,32].

91.5% respondents agree to report any future sharp injury (mean 4.45, SD= 0.538), which is higher than another study, Tabak had a compliance rate of 63.6%,[48], Cutter had a compliance rate of 54.9%[8]. This may be because of selection bias in the sample. Since there is no similar study conducted in Malaysia, there is no national benchmark for the author to compare. Positive reporting attitude is characterized by the feeling of responsibility and seeking prophylactic treatment and to contribute to improvement program. This finding is consistent with Probst and Graso, who reported that individual with positive reporting attitude despite getting injured less frequently, they are more likely to report their injury [47].

Table 1
 Demographic data of respondents

Variables	Percentage
Gender	
Male	31.7%
Female	68.7%
Age	
20-25 year old	36.6%
25-30 year old	42.7%
31-40 year old	15.6%
41-50 year old	4.9%
Occupation	
Doctor	80.5%
Nurse	17.1%
Others	2.4%
Working Duration	
Less than 1 year	40.2%
1-5 year	43.9%
6-10 year	11.0%
More than 10 years	4.9%
Departments	
Medical	41.5%
Orthopedic	17.0%
Accident & Emergency	13.4%
Obstetrics & Gynecology	8.5%
Pediatric	3.7%
Operation theater/ICU/HDU	2.4%
Anesthesiology	2.4%
Others	11%
N = 89	

Table 2
 Descriptive statistics: awareness and compliance to sharp injury reporting

Variables	Mean Score	Standard deviation	Mean Score Percentage (%)		
			Poor (1.00-2.33)	Moderate (2.34 – 3.66)	Good (3.67 – 5.00)
Awareness to Sharp Injury Reporting	4.3	0.540	0	6.1	93.9
Compliance with Sharp Injury Reporting	4.45	0.538	0	8.5	91.5
N = 89					

3.3 Relationship between Awareness, Organizational Factors and Health Belief with Compliance to Sharp Injury Reporting

Referring to Table 3, level of awareness ($r= 0.278$ $p<0.05$), perception on organization safety practice ($r= 0.265$ $p<0.05$), staff adequacy ($r= 0.459$ $p<0.05$), coworker support ($r= 0.276$ $p<0.05$), susceptibility of infection ($r= 0.224$ $p<0.05$), severity of infection ($r= 0.391$ $p<0.05$), benefit of reporting ($r= 0.254$ $p<0.05$) and overall health motivation ($r= 0.377$ $p<0.05$) have a low to moderate correlation with compliance to sharp injury reporting. Perception to barrier of reporting ($r= -0.79$ $p<0.05$), has no correlation to compliance to report.

Table 3

Correlation between independent variables with compliance to sharp injury reporting

Independent Variables	Compliance with Sharp Injury Reporting	
	Pearson Correlation	Sig (2-tailed)
Awareness to Sharp Injury Reporting	0.278	0.012
Perception on organization safety practice	0.265	0.016
Perception on staff adequacy	0.459	0.000
Perception of co-worker support	0.276	0.012
Perception on susceptibility to infection	0.224	0.043
Perception of severity of infection	0.391	0.000
Perception on benefit of reporting	0.254	0.021
Perception on barriers of reporting	-0.79	0.479
Overall Health Motivation	0.377	0.000
		N = 89

This study explored a model for predictor for sharp injury reporting. Using multivariable logistic regression, it was showed that this model contributes 30% to the level of compliance to sharp injury reporting ($R^2= 0.306$) (Table 4). The F-test value is 4.9777 ($p <0.05$) signifies the model is the best fit to the population sampled to predict compliance to sharp injury reporting (Table 5).

Table 4

Model Summary

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.619 ^a	.384	.306	84

Table 5

Anova

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	8.984	9	0.998	4.977	.000 ^b
Residual	14.440	72	0.201		
Total	23.425	81			

Multivariable impact analysis using logistic regression showed that perception on staff adequacy ($B= 0.280$, $p<0.05$) give the most contribution to compliance with sharp injury reporting, followed by overall motivation of health ($B = 0.239$, $p<0.05$) and perception of severity of infection ($B= 0.231$, $p <0.05$) (Table 6). This further clarified earlier findings from the previous study and confirm that

awareness or organizational factors or health belief alone does not contribute to sharp injury reporting, rather there is a complex interplay between these factors.

Table 6

Multivariable impact analysis using logistic regression analysis of organizational factors and health beliefs as predictors of compliance with the duty to report needlestick injury

Model	Standardize Coefficients Beta	T	Sig.
Awareness to Sharp Injury Reporting	.009	.084	.933
Perception on organization safety practice	.116	1.066	.290
Perception on staff adequacy	.280	2.215	.030
Perception of co-worker support	.017	.149	.882
Perception on susceptibility to infection	.084	.809	.421
Perception of severity of infection	.231	2.084	.041
Perception on benefit of reporting	.058	.545	.587
Perception on barriers of reporting	-.039	-.395	.694
Overall Health Motivation	.239	2.245	.028
N = 89			

This study proved findings of the previous study that awareness to reporting alone do not influence sharp injury reporting [14]. In this particular group of respondents, positive reporting attitude was influenced by 1) organizational factors; staff adequacy 2) individual level; perception to overall health motivation and severity of an injury.

The level of staffing will reflect workload in a workplace. High workload not only produce poor reporting attitude but it also creates a climate where reporting accidents brought about negative consequences [51]. Respondents in this study showed that good perception on staff adequacy was characterised by well-managed staffing by ward leaders, good teamwork between colleague, not having to do the job outside respective job-scope, good network support between colleague and opportunity work in a skill-nurturing environment.

This study partially supports the findings in [51] that likelihood of contracting and infectious disease, the severity of infection and efficacy of reporting mostly contributed to compliance to reporting. Those who reported sharp injuries had higher health belief scores than those who do not and that non-compliers tend to emphasize on the negative aspect of reporting [48]. Reporting barrier mostly concerned with the interference of duty [36]. Tabak also noted that perceived efficacy of reporting has the greatest contribution to compliance to with reporting than perceiving the severity of an injury, this population is vice versa [48]. This is particularly true in this study. The barrier to reporting had no significant relationship or contribution to compliance with reporting sharp Injury. This means healthcare workers with the good attitude of reporting do not perceive reporting as a problem to comply.

In contrary to this findings, Boden reported a significant association between age and safety practice with compliance with the report while diminishing the effect of coworker support and staff adequacy. This may be attributed to Boden's small sample size and based on self-reported population [6].

3.4 Limitation of the study

While the current findings provide and empirical insights and guidance regarding several significant factors influencing healthcare workers motivation in reporting sharp injury it relies on a

single sample of respondents obtained from the sharp injury registry Hospital Melaka. Limitation of the study includes;

1. There is a discrepancy in data provided by JKN and actual data obtained from hospital Melaka. There were 329 OHU/SIS-3 forms obtained from OHS registry in Hospital Melaka for 2011 to 2015. However, a descriptive study published by Jabatan Kesihatan Melaka in April 2016 reported a total of 309 cases in all KKM facilities in Melaka between 2011 and 2015 [31]. Another descriptive study published by OHS unit in Hospital Melaka reported a total of 169 cases from the year 2013 to 2015 [2] whereas authors had 254 cases for a similar duration.
2. There was low response rate compared to the number of total cases. Some respondents were not contactable from the only phone number available in OHU/SIS-II form. Some number is unreachable or reached a wrong person. Due to time limitation, respondents follow-up were not complete and unreachable subjects were not tracked down.
3. Responses were collected from healthcare workers in the sharp injury registry. Hence the data usage is limited to description and correlation and cannot be compared with the whole population.

4. Conclusion and Recommendation

Based on the findings, ensuring adequate staffing in each department will help increase the rate of reporting. Strengthening safety committee and safety policy need to precede improvements in other organizational factors and health belief perception. Educating healthcare workers to concern sharp injury as an occupational injury that needs to be reported and promoting sharp injury reporting as ways to improve compliance with reporting.

This study can be furthered by tracking down subjects and respondents and a complete survey of all reported cases in the registry. Conducting comparative study between compliers and non-compliers to sharp injury reporting will give the whole picture of the actual situation. In-depth interview among compliers and non-compliers will give further understanding on the reason for underreporting.

Complete reporting of sharp injuries is a prerequisite for the identification of risky procedures and to ensure optimal treatment of the affected healthcare workers. It is a complex interplay between awareness, organizational factors, and health belief. The main purpose of this study is to determine the factors that influence sharp injury reporting among healthcare workers. The research study was focusing mainly whether the level of awareness, organizational factors, and health belief has a direct effect on compliance to reporting. There were positive relationships between independent variables (awareness, organizational factors, and health belief) and the dependent variable (compliance to reporting) based on the correlation and regression analysis. Staff adequacy, perception to the severity of bloodborne infection and overall health motivation influence sharp injury reporting in this study. Ensuring adequate staffing, strengthening safety policy and committee and educating healthcare workers on sharp injuries as occupational hazard will help to improve the rate of reporting.

References

- [1] Aiken, Linda H., and Patricia A. Patrician. "Measuring organizational traits of hospitals: the Revised Nursing Work Index." *Nursing research* 49, no. 3 (2000): 146-153.
- [2] Abdullah A., Azhar MS., Zulraini J. and Farhana Adila S. (2016). Occupational sharp injury among healthcare workers in Hospital Melaka 2013 - 2015: a descriptive study. *Malaysian Journal of Public Health Medicine*, 16 (4), 43.

- [3] Azmi Mohd Tamil (1992). Komplians terhadap amalan pencegahan universal dikalangan kakitangan perubatan Jabatan Kemalangan dan Kecemasan, Hospital Kuala Lumpur. *Master Study, Universiti Kebangsaan Malaysia*. Retrieved from <http://www.pubhealthcollo.org/ff2613/KAP-UniversalPrecautions.pdf> on 15 June 2016.
- [4] Amick, Benjamin C., Rochelle V. Habeck, Allan Hunt, Anne H. Fossel, Alice Chapin, Robert B. Keller, and Jeffrey N. Katz. "Measuring the impact of organizational behaviors on work disability prevention and management." *Journal of occupational rehabilitation* 10, no. 1 (2000): 21-38.
- [5] Bhardwaj, A., N. Sivapathasundaram, M. F. Yusof, A. H. Minghat, K. M. M. Swe, and N. K. Sinha. "The Prevalence of Accidental needle Stick Injury and their reporting among healthcare Workers in orthopaedic Wards in General hospital Melaka, Malaysia." *Malaysian orthopaedic journal* 8, no. 2 (2014): 6
- [6] Boden, Leslie I., Yolanta V. Petrofsky, Karen Hopcia, Gregory R. Wagner, and Dean Hashimoto. "Understanding the hospital sharps injury reporting pathway." *American journal of industrial medicine* 58, no. 3 (2015): 282-289.
- [7] Boden, Leslie I., and A. L. Ozonoff. "Capture-recapture estimates of nonfatal workplace injuries and illnesses." *Annals of epidemiology* 18, no. 6 (2008): 500-506.
- [8] Cutter, Jayne, and Sue Jordan. "The systems approach to error reduction: factors influencing inoculation injury reporting in the operating theatre." *Journal of nursing management* 21, no. 8 (2013): 989-1000.
- [9] Smith, Derek R. "Safety climate and its relationship with needlestick and sharps injuries among Japanese nurses." (2008).
- [10] Pransky, Glenn, Terry Snyder, Allard Dembe, and Jay Himmelstein. "Under-reporting of work-related disorders in the workplace: a case study and review of the literature." *Ergonomics* 42, no. 1 (1999): 171-182.
- [11] Webb, G. R., S. Redman, Claire Wilkinson, and R. W. Sanson-Fisher. "Filtering effects in reporting work injuries*." *Accident Analysis & Prevention* 21, no. 2 (1989): 115-123.
- [12] Haridi, Hassan Kasim, Abdalmohsen Saud Al-Ammar, and Moazzy Ibraheim Al-Mansour. "Compliance with infection control standard precautions guidelines: a survey among dental healthcare workers in Hail Region, Saudi Arabia." *Journal of Infection Prevention* 17, no. 6 (2016): 268-276.
- [13] Himmelreich, Heiko, Holger F. Rabenau, Matthias Rindermann, Christoph Stephan, Markus Bickel, Ingo Marzi, and Sabine Wicker. "The management of needlestick injuries." *Deutsches Ärzteblatt International* 110, no. 5 (2013): 61.
- [14] Kerr, Hui-Ling, Nicola Stewart, Alistair Pace, and Sherief Elsayed. "Sharps injury reporting amongst surgeons." *The Annals of The Royal College of Surgeons of England* 91, no. 5 (2009): 430-432.
- [15] Lee, Lai Kah, and Ismail Noor Hassim. "Implication of the prevalence of needlestick injuries in a general hospital in Malaysia and its risk in clinical practice." *Environmental health and preventive medicine* 10, no. 1 (2005): 33-41.
- [16] Karasek, Robert, Chantal Brisson, Norito Kawakami, Irene Houtman, Paulien Bongers, and Benjamin Amick. "The Job Content Questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics." *Journal of occupational health psychology* 3, no. 4 (1998): 322.
- [17] Kessler, Chad S., Marcella McGuinn, Andrej Spec, Jessica Christensen, Rashmi Baragi, and Ronald C. Hershow. "Underreporting of blood and body fluid exposures among health care students and trainees in the acute care setting: a 2007 survey." *American journal of infection control* 39, no. 2 (2011): 129-134.
- [18] Petitta, Laura, Tahira M. Probst, and Claudio Barbaranelli. "Safety culture, moral disengagement, and accident underreporting." *Journal of Business Ethics* 141, no. 3 (2017): 489-504.
- [19] Rampal, Lekhranj, Rosidah Zakaria, Leong Whye Sook, and Azhar Md Zain. "Needle stick and sharps injuries and factors associated among health care workers in a Malaysian hospital." *European Journal of Social Sciences* 13, no. 3 (2010): 354-362.
- [20] Azaroff, Lenore S., Charles Levenstein, and David H. Wegman. "Occupational injury and illness surveillance: conceptual filters explain underreporting." *American journal of public health* 92, no. 9 (2002): 1421-1429.
- [21] Aiken, Linda H., Sean P. Clarke, Douglas M. Sloane, and International Hospital Outcomes Research Consortium. "Hospital staffing, organization, and quality of care: cross-national findings." *International Journal for quality in Health care* 14, no. 1 (2002): 5-14.
- [22] Ducharme, Lori J., and Jack K. Martin. "Unrewarding work, coworker support, and job satisfaction: A test of the buffering hypothesis." *Work and occupations* 27, no. 2 (2000): 223-243.
- [23] Unruh, Lynn Y., and Myron D. Fottler. "Patient turnover and nursing staff adequacy." *Health services research* 41, no. 2 (2006): 599-612.
- [24] Zaidi, Moazzam Ali, Salem Arifi Beshyah, and Robin F. Griffiths. "Needle stick injuries: An overview of the size of the problem, prevention and management." *Ibnosina Journal of Medicine and Biomedical Sciences* 2, no. 2 (2009): 53-61.
- [25] Gillen, Marion, Davis Baltz, Margy Gassel, Luz Kirsch, and Diane Vaccaro. "Perceived safety climate, job demands, and coworker support among union and nonunion injured construction workers." *Journal of safety research* 33, no. 1 (2002): 33-51.

- [26] Adib-Hajbaghery, Mohsen, and Mohammad Sajjad Lotfi. "Behavior of healthcare workers after injuries from sharp instruments." *Trauma monthly* 18, no. 2 (2013): 75.
- [27] Mohd Faid, A. R., M. A. Zainudin, M. Yusmah, M. Norizah, and I. Rosmah. "Needle stick injuries among health care workers in Negeri Sembilan." *Malaysian Journal of Public Health Medicine* 5, no. 2 (2005): 10-14.
- [28] Galizzi, Monica, Petra Miesmaa, Laura Punnett, and Craig Slatin. "Injured workers' underreporting in the health care industry: an analysis using quantitative, qualitative, and observational data." *Industrial Relations: A Journal of Economy and Society* 49, no. 1 (2010): 22-43.
- [29] Yousafzai, Mohammad Tahir, Amna Rehana Siddiqui, and Naveed Zafar Janjua. "Health belief model to predict sharps injuries among health care workers at first level care facilities in rural Pakistan." *American journal of industrial medicine* 56, no. 4 (2013): 479-487.
- [30] Vaz, K., D. McGrowder, R. Alexander-Lindo, L. Gordon, P. Brown, and R. Irving. "Knowledge, awareness and compliance with universal precautions among health care workers at the University Hospital of the West Indies, Jamaica." *The international journal of occupational and environmental medicine* 1, no. 4 October (2010).
- [31] Normazura M., Shameera S. and Khairul A. (2016). Retrospective Study of Sharp Injuries among Healthcare Workers in Hospital and Health Clinic in Melaka. *Malaysian Journal of Public Health Medicine*, 16 (4), 111.
- [32] Nagandla, Kavitha, Krishna Kumar, Amit Bhardwaj, Chan Yhmin, Lee Wei Lun, Weng Wei Shi, and Nurul Izzati B. Abd Razak. "Prevalence of needle stick injuries and their underreporting among healthcare workers in the department of obstetrics and gynaecology." *International Archives of Medicine* 8 (2015).
- [33] Juni, Muhamad Hanafiah, J. H. Ng, S. J. Wong, and Faisal Ibrahim. "Perception regarding needle stick and sharp injuries among clinical year medical students." *International Journal of Public Health and Clinical Sciences* 2, no. 1 (2015): 69-80.
- [34] Ng, Y. W., and I. Noor Hassim. "Needlestick Injury Among Medical Personnel in Accident and Emergency Department of Two Teaching Hospital." *Medical Journal of Malaysia* 62, no. 1 (2007): 9.
- [35] Norsayani, Mohamad Yaakob, and Ismail Noor Hassim. "Study on incidence of needle stick injury and factors associated with this problem among medical students." *Journal of occupational health* 45, no. 3 (2003): 172-178.
- [36] Osborne, Sonya. "Perceptions that influence occupational exposure reporting." *AORN journal* 78, no. 2 (2003): 262-272.
- [37] Anita Abdul Rahman, Biological Hazard and Needle Stick Injury (NSI)". Department of Community Health, Faculty of Medicine and Health Science University Putra Malaysia.
- [38] Rosenman, Kenneth D., Alice Kalush, Mary Jo Reilly, Joseph C. Gardiner, Mathew Reeves, and Zhewui Luo. "How much work-related injury and illness is missed by the current national surveillance system?." *Journal of Occupational and Environmental Medicine* 48, no. 4 (2006): 357-365.
- [39] Santhna, L., M. Samsiah, R. Raja Lexshimi, R. Roshdinom, S. Ho, and H. Hamidah. "Sharps injury in Hospital Universiti Kebangsaan Malaysia (HUKM): experiences of health care workers and students." *Medicine and Health* 2, no. 1 (2007): 86-92.
- [40] SR.Jafree, R.Zakar, MZ.Zakar and Florian F. (2016). Nursing perception of organizational cultures and its association with the culture of reporting. *BMC Health Services Research*, 16(3), 1-13. doi 10.1186/s12913-015-1252-y
- [41] Tucker, Sean, Dayle Diekrager, Nick Turner, and E. Kevin Kelloway. "Work-related injury underreporting among young workers: prevalence, gender differences, and explanations for underreporting." *Journal of safety research* 50 (2014): 67-73.
- [42] Clarke, Sharon. "The relationship between safety climate and safety performance: a meta-analytic review." (2006): 315.
- [43] Siti, M. "ASSESSMENT OF THE MANAGEMENT OF SHARPS INJURIES IN GOVERNMENT HOSPITALS: THE MALAYSIAN SITUATION." *Buletin Penelitian Sistem Kesehatan* 14, no. 2 Apr (2011).
- [44] Probst, Tahira M. "Organizational safety climate and supervisor safety enforcement: Multilevel explorations of the causes of accident underreporting." *Journal of applied psychology* 100, no. 6 (2015): 1899.
- [45] Probst, Tahira M., and Armando X. Estrada. "Accident under-reporting among employees: Testing the moderating influence of psychological safety climate and supervisor enforcement of safety practices." *Accident Analysis & Prevention* 42, no. 5 (2010): 1438-1444.
- [46] Probst, Tahira M., Claudio Barbaranelli, and Laura Petitta. "The relationship between job insecurity and accident under-reporting: A test in two countries." *Work & Stress* 27, no. 4 (2013): 383-402.
- [47] Probst, Tahira M., and Maja Graso. "Pressure to produce= pressure to reduce accident reporting?." *Accident Analysis & Prevention* 59 (2013): 580-587.
- [48] Tabak, Nili, Amal Musaa Shiaabana, and Shaul ShaSha. "The health beliefs of hospital staff and the reporting of needlestick injury." *Journal of clinical nursing* 15, no. 10 (2006): 1228-1239.
- [49] Arora, V., and T. J. Kamalanabhan. "Linking Supervisor and Coworker Support to Employee Innovative Behavior at Work: Role of Psychological Conditions." (2010).

-
- [50] Rapiti, Elisabetta, Annette Prüss-Üstün, and Yvan JF Hutin. "Sharps injuries: assessing the burden of disease from sharps injuries to health-care workers at national and local levels." (2005).
Pfeiffer, Yvonne, T. Manser, and Theo Wehner. "Conceptualising barriers to incident reporting: a psychological framework." *Qual Saf Health Care* 19, no. 6 (2010): e60-e60.