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Analysis of Factors that Influence on Needle Stick Injury or Other Sharp Objects at Hospital Royal Prima Medan

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Abstract**—** *Health workers are at risk of contracting diseases from blood/body fluids (bloodborne pathogens) in various ways through needle stick injuries or Needle Stick Injury (NSI). The trouble that can occur if a needle stick can cause HBV infection (Hepatitis B Virus), HCV (Hepatitis C Virus) and HIV (Human Immunodeficiency Virus). The purpose of this study was to determine the factors associated with work accidents involving needle sticks or other sharp objects in nurses at Leuwiliang Hospital, Bogor Regency, in 2018. This study used a cross-sectional study design. The sampling technique used is simple random sampling with a total of 71 respondents. Data collection in this study used a questionnaire and analyzed the data with the chi-square statistical test using statistical application software (SPSS 16). The results showed that there was no relationship between unsafe acts (p-value = 0.461), unsafe conditions (p-value = 0.301, years of service (p-value = 0.757), knowledge (p-value = 0.190), supervision (p-value = 0.090) with a needle stick or other sharp object. As for the other variables, there is a relationship between skills (p-value = 0.010) OR = 0.237 (95% CI: 0.085-0.662), training (p-value = 0.022) OR = 3.566 (95% CI: 1.313-9.688) with accidents stabbed work needles or other sharp objects. This study concludes that the lack of skills and training affects nurses in work accidents because someone in every job needs skills and training to improve their abilities and expertise. so that they can complete tasks properly and can avoid the risk of work accidents*.

Keywords**—** *Health Workers, needle stick injury, training improve*.

I. INTRODUCTION

A hospital is a place that is at risk of injury. This is because various activities in the hospital are closely related to dangerous diseases, critical procedures with sharp tools or objects. WHO (1995) estimates that 10% of health workers experience acute object injuries. (Janjau, 2017). Health workers are at risk of contracting diseases from blood/body fluids (bloodborne pathogens) in various ways through needle stick injuries or Needle Stick Injury (NSI). The risk that can occur if a needle stick can cause infection with HBV (Hepatitis B Virus), HCV (Hepatitis C Virus), and HIV (Human Immunodeficiency Virus) (Janjau, 2017)

The World Health Organization (WHO) shows that around 2.5% of health workers worldwide face HIV exposure, and about 40% face exposure to Hepatitis B and Hepatitis C viruses due to blood exposure in the workplace through various sources of infection. Known or unknown, one of which is through contaminated needle stick wounds (WHO, 2019). In America, about 300,000 work accidents due to needle sticks occur during recapping, which is the most frequent stab injury for nurses. At the same time, in Pakistan, about 50% of injections are done using used syringes. Reuse of used syringes

Can result in the prevalence of Hepatitis B virus and Hepatitis C virus in Pakistan more than 10% (Janjau, 2017).

Accidents at work can be caused by worker negligence, working beyond the limits of ability, or poor ergonomics at work. In the health sector, failure at work can happen to anyone. One of them is being pricked by a needle or sharp object in the hospital. Syringes and sharp medical instruments are medical devices that come into direct contact with the patient's body tissue and blood. Negligent health workers can be infected through needles contaminated with the body fluids of infected patients. Health workers are at risk of being exposed to infected blood and body fluids (bloodborne pathogens) that can cause infection with HBV (Hepatitis B Virus), HCV (Hepatitis C Virus), and HIV (Human Immunodeficiency Virus) through various means, one of which is through needle-stick wounds or other infections—known as Needle Stick Injury or NSI (Hermana, 2016).

Wounds or injuries due to needle sticks or other sharp objects are important things to pay attention to. If a health worker is accidentally injured by a needle stick that has been contaminated with the body fluids of a sick person, there is a risk of transmission of at least 20 potential pathogens. Two hazardous pathogens are Hepatitis B (HBV) and Human Immunodeficiency Virus (HIV). Hepatitis B (HBV) is an infection of the liver or liver. This disease is common and spreads 100 times faster than HIV, and can cause death.

Kurniawati et al. (2015), in their research results, showed that the highest score was 14 times the number of respondents who had a needle stick accident in the last one year. The bivariate analysis results showed that implementing Standard Operating Procedures (SOP) was associated with the incidence of needle stick accidents (p-value 0.002 and r value 0.649).

Sylvia (2018) said in her research there is a relationship between skills (p-value = 0.010) OR = 0.237 (95% CI: 0.085-0.662), training (p-value = 0.022) OR = 3.566 (95% CI: 1.313-9.688) with a needle stick or other sharp object. Lack of skills and training affects nurses in work accidents because someone in every job needs skills and training to improve their abilities and expertise to complete tasks properly and avoid the risk of work accidents.

S. Mapanawang et al. (2017) in their research results show that the results of the chi-square test analysis are obtained with

p-value = 0.042 <α = 0.05), which indicates there is a significant relationship between knowledge and the incidence of needlestick injuries in nurses in hospitals Liu Kendage. The results of this analysis also obtained an OR value of 2.130 which indicates that nurses who lack good knowledge have a chance of 2.1 times experiencing needle stick injuries at the Liun Kendage Hospital compared to sound knowledge.

II. Literature Review

2.1. Definition of Occupational Health and Safety

Occupational Health and Safety is one form of effort to create a safe and healthy workplace, free from environmental pollution to protect and be free from work accidents, which in turn can increase work efficiency and productivity. (Irzal, 2016).

The definition of occupational health and safety, according to the International Labor Organization/World Health Organization, is an effort to maintain and improve the highest degree of physical, mental, and social well-being for workers in all positions, prevention of health deviations among workers caused by working conditions, protection of workers. In their work from risks due to detrimental health, placement, and maintenance of workers in a work environment adapted to physiological and psychological capabilities; and summarized as a job adaptation.

2.2. Occupational Illness

Occupational diseases are diseases caused by work or the work environment. (Suyati D, da Trial 2015). Diseases due to work in hospitals can attack all workers, both medical and non-medical personnel. (Anies. 2005)

(1) Non-medical personnel

Radiologists who are at risk of radiation exposure. Radiation is a well-known hazard risk in the hospital environment, and efforts to overcome it have been carried out. Hospitals should have officers responsible for the safety of the area around radiation and the protection of their staff.

(2) Medical personnel

Nurses, daily direct contact with patients for a long time (6-8 hours/day) so that there is a high risk of being exposed to pathogenic microorganisms. It can be a carrier of infection from one patient to another or other nurses, known as nosocomial disease.

Doctors can be infected and transmit disease to patients. Diseases often contagious are tuberculosis, hepatitis B, Human Immunodeficiency Virus/Acquired Immuno Deficiency Syndrome., rubella cytomegalovirus, hepatitis C. In addition, doctors are also at risk of being exposed to dangerous chemicals in low doses, resulting in exposure to anesthetic gases in daily services.

2.3. Work Accident

Work accidents are accidents related to work relations, including diseases that arise due to work relationships and accidents that appear on the way from home to work and returning home through the usual or customary road. Trial 2015).

Commonly known as "Dual Causes of Accidents" or Domino Theory" or "Loss of Causation Model," the aim is to identify and determine the factors that cause an accident. The sequence according to the order of this theory is:

1) Lack of Control Management (lack of management control)
(a) Whether or not a program exists
(b) Whether or not a procedure exists
(c) If so, are these programs and procedures implemented?
2) Basic Cause (Basic Cause) Personnel factors (Human Factor)
3) Lack of knowledge, skills, and experience
4) Lack of motivation
5) Physical and mental problems
6) Job factor (Factor of Job Type)
7) Lack/no standard
8) Inadequate design and maintenance, etc.
9) Immediate Cause (Direct Cause/Symptom)
(a) Sub Standard Act (Unsafe Actions)
(b) Sub Standard Condition (Unsafe condition)
10) Incident (woe)

It occurs due to the inequalities of the three elements above, and if there is a contact that exceeds the Threshold Limit Value, an accident will likely happen. (Riswan D.2016). Summer in his book, divides the causes of work accidents broadly into two factors, namely:

(a) Mechanical and environmental factors include everything other than humans, including circumstances. Unsafe environment, mechanical and environmental factors can still be divided into several groups, among others, according to the type of accident and its causes.

(b) The human/worker factor is related to the existence of a tendency to harm the human itself (Accident Pronensess). And the tendency of each worker is different from one another. (Summer. 2009).

III. Methods

3.1. Types of Research

This type of research is quantitative correlative research with an analytic observational cross-sectional approach. This research was carried out in the Emergency Unit, Care Unit Installation, and Central Surgery Installation at RSU Royal Prima Medan. The selection of this research location is based on the fact that no research has been conducted on the factors that influence the work accident of needle stick injury or other sharp objects at RSU Royal Prima Medan.

3.2. Data Measurement Method

Measurement of the variable needle puncture wounds or injuries caused by other sharp objects in the last 6 (six) month period that occurred to nurses, provided that the score "ever" was given a score of 1 and "never" 0. Categorized as follows:

1. Punctured: If you have ever had a needle or sharp object injury.
2. Not punctured: If you have never experienced a needle stick or sharp object injury.

Respondent's knowledge was measured based on the answers to the questions contained in the questionnaire. The number of questions is 10 with the provision of scoring,

namely "true" is given a score of 1 and "false" 0, the highest score is 10. They are categorized as follows: a. Sound: If the total score is > from the average value. b. Not Good: If the total score is of the average value.

Where Skills are measured based on the answers to the questions contained in the questionnaire, the number of questions is six, while the provisions for scoring are "yes" given a score of 1 and "no" 0, the highest score.

3. According to the number of values obtained by respondents, namely: a. Sound: If the total score > average value. b. Not good: If the total score is the average value.

4 Training

The measurement of the training/training variable participated in by the respondent in the last 6 (six) month period, with the provision that the scoring of "ever" was given a score of 1 and "never" 0. Categorized as follows:

a. Ever: If the respondent attended training in the last 6 (six) months.

b. Never: If the respondent has not attended the training in the last 6 (six) months.

3.3. Obedience

Compliance is measured based on the answers to the questions contained in the questionnaire. The number of questions is eight, while the provision for scoring is "yes" given a score of 1 and "no" 0, the highest score is 8. According to the number of scores obtained by respondents, namely:

a. Good: If the total score > average value.

b. Not good: If the total score is the average value.

IV. ANALYZED AND RESULTS

4.1. Hospital

Royal Prima Hospital Medan is one of the largest private hospitals. It is a referral center for the community, especially the city of Medan and the people of North Sumatra in general. On May 17, 2011, the Deputy Minister of National Education of the Republic of Indonesia, Prof. Dr. Fasli Jalal, Ph.D. laying the groundwork for the construction of the Royal Prima Hospital (Royal Prima, 2014).

On February 14, 2013, the Head of the North Sumatra Provincial Health Office issued a Temporary Operational Permit to the Royal Prima Hospital Medan No. 440.442/1641/II/the YEAR 2014 (Royal Prima, 2014).

Then on February 16, 2014, Royal Prima Hospital Medan was inaugurated by the Deputy Governor of North Sumatra Province, Bpk. Ir. H. Tengku Erry Nuradi, M.Si with a Permanent Operational Permit from the North Sumatra Provincial Health Office signed by the Head of the North Sumatra Provincial Health Office, dr. Siti Hatati Surjantini, M.Kes. After that, it began to operate commercially in 2014 (Royal Prima, 2014).

Based on the company's articles of association, the scope of activities of Royal Prima is to engage in health services. The largest shareholder of Royal Prima Hospital is I Nyoman Ehrich Lister, with a percentage of Ownership of 64.58%. Its primary business activities are currently in hospital services, clinics, polyclinics, maternity hospitals, and clinics for mothers and toddlers. Specialist polyclinics include eye, ENT, skin, mental, lung, and cancer polyclinics and related business activities. Royal Prima has two hospital networks, Royal Prima Hospital (Medan) and Royal Prima Jambi Hospital, with a target total capacity by the end of 2018 of +/- 1200 beds (Royal Prima, 2014).

4.2. Position, Duties, and Functions

Hospital health agencies carry out health efforts by prioritizing prevention, healing, and rehabilitation efforts in a harmonious and integrated manner in the health sector. To carry out the tasks referred to above, the hospital has the following functions: (Royal Prima, 2014).

a. Implementation of hospital administration and household affairs.

b. Preparation of annual, medium-term, and long-term work programs.

c. Provision of medical services and medical support.

d. Implementation of midwifery and nursing services and care.

e. Organizing medical rehabilitation, prevention, and improvement of health status.

f. Implementation of the competence of health workers.

g. Implementation of referral services.

h. Implementation of research and development.

i. General administration and finance and

j. Implementation of coordination with other relevant agencies and institutions in the field of health services.

4.3. Description of Research Results

Univariate analysis was carried out to see the frequency distribution, which included: Age, Last Education, Years of Work, Needlestick Wounds or Other Sharp Objects, Number of Needle Punctures or Other Sharp Objects, Causes of Needlestick Wounds or Other Sharp Objects, and Types of Risky Actions Causing Needlework or Other Sharp Objects.

Based on the interval class, the distribution of respondents according to age can be seen in table 1 below.

TABLE 1. Distribution of Respondents Frequency by Age Group at RSU Royal Prima Medan in 2017

No	Ages (th)	Frequency (Peoples)	Percent (%)
1.	< 25	0	0
2.	25-35	11	23,9
3.	> 35	35	76,1
	TOTAL	**46**	**100**

Based on table 1 it can be seen that the number of respondents based on the age of respondents <25 years, there are 0 people (0%), 25-35 years old are 11 people (23.9%), and >35 years are 35 people (76.1%).

Bivariate analysis was conducted to determine the relationship between Knowledge, Standard Operating Procedures, Skills, Universal Precautions, and Training with the Occurrence of Needle punctures or Other Sharp Objects. The relationship between the level of knowledge and the occurrence of needle stick injuries or other sharp objects in ICU and IBS nurses at Royal Prima Hospital Medan can be seen in Table 2 below.

TABLE 2. Relationship of Knowledge with Occurrence of stab wounds Needles or Other Sharp Objects

No	Variables	Stab wound Needle or Object Other Sharp		(*Value*)
		Yes	No	
1.				
		14	7	21
Good		(35.9%)	(100%)	(45.7%)
	Knowledge			0,002
	Not good	0	25	
Good		(64.1 %)	(0%)	(54.3%)
	Total	**39 (100%)**	**7 (100%)**	**46 (100%)**

Based on table 2 after statistical tests on knowledge with the occurrence of stab wounds due to needles or other sharp objects, by using the Chi-Square test, the Chi-Square value is calculated at 9.829 while the Chi-Square table value is at a significance of 5%, with n=2 (df=r-1=1) then the obtained value is of 3.84. So that H0 is rejected and H1 is accepted, so it can be concluded that there is a significant relationship between knowledge and the occurrence of needle stick injuries or other sharp objects.

The relationship between the level of universal alertness factor and the occurrence of needle stick injuries or other sharp objects in ICU and IBS nurses can be seen in table 3. below.

TABLE 3. Correlation of Universal Precautions with the Occurrence of Needle Puncture or Other Sharp Objects

No	Variables	Stab wound Needle or Object Other Sharp		(*Value*)
		Yes	no	
		18	7	25
1. OK		(46.2%)	(100%)	(54.3%)
Vigilance				
		21	0	21
Universal				0,008
		(53.8%)	(0%)	(45.7%)
2.Bad				
Total		**39 (100%)**	**7 (100%)**	**46 (100%)**

Based on table 3, after carrying out statistical tests on universal precautions with the occurrence of stab wounds due to needles or other sharp objects, using the Chi-Square test, the Chi-Square test value is 6.935 while the Chi-Square table value is at a significance of 5%, with n=2 (df= r-1 = 1) then obtained a value of 3.84. So that H0 is rejected, and H1 is accepted, so it can be concluded that there is a significant relationship between universal precautions and the occurrence of needle stick injuries or other sharp objects.

V. CONCLUSION

Based on the results of research that has been carried out regarding the factors associated with the occurrence of stab wounds in IBS and ICU nurses at RSU Royal Prima Medan, it can be concluded that the study is as follows:

1. The number of IBS nurses who suffered needle stick injuries and other sharp objects was more significant (94.1%) than the number of ICU nurses (79.3%) who suffered needle stick injuries or other sharp objects.
2. Needle puncture wounds or other sharp objects, mostly in IBS nurses, were caused by hypodermic needles (16.7%), spinal or epidural needles (20.0%), and surgical needles (heating needles) (46.7%). While in ICU, nurses caused by hypodermic needles (69.6%), and glass objects (ampoules, vials, infusion bottles, glass pipettes, others) (30.4%).
3. The type of unsafe action that IBS nurses mostly carried out was stitching the wound (53.6%) and injecting (17.9%). Meanwhile, for ICU nurses, the types of actions that are at risk of causing needle stick injuries or other sharp objects are mostly when they inject (34.6%), and break drug ampoules/vials (26.9%).
4. Nurses with good knowledge have a lower risk of needling or other sharp objects than nurses with poor knowledge
5. Nurses who apply the standard of injection, infusion, and management of sharps properly have a lower risk of needling or other sharp objects than nurses who do not apply work standards when performing injections.
6. Nurses with good skills have a lower risk of needle stick injuries or sharp objects than nurses with poor skills.
7. Nurses who have attended training on how to work safely in preventing needle stick injuries or other sharp objects have a lower risk of needle stick injuries or other sharp objects than nurses who have never attended the training.
8. Nurses with suitable universal precautions have a lower risk of needling or other sharp objects than nurses with inadequate universal precautions.
9. The infrastructure for injecting at the Dr.Pringadi Hospital, Medan City, is still lacking, especially on faulty work safety equipment such as safety boxes and safety shoes.\

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