Strategies To Reduce Needle Stick Injury Incidence Among Medical Personnel In Emergency Room And Central Operating Theatre At Royal Prima Hospital

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Abstract
One of the most frequent occurrences in the Emergency Room and Central Surgical Installation of a hospital is a Needle Stick Injury. The incidence of needle sticks at Royal Prima Medan during 2020-2021 is known that the risk of infection due to needlestick wounds and sharp objects reaches 1.8%, with varying rates of HIV 2.5%, Hepatitis B and C by 40%. This study aims to analyze how the strategy is to reduce needlestick injuries for medical personnel in the emergency department and the central surgical installation of the Royal Prima Hospital. This type of research is qualitative research. The location of this research was carried out in the ER and the Central Surgical Installation of the Royal Prima Hospital. The research informants were the head of the emergency room and the head of the central surgical installation, medical personnel in the emergency room and the central surgical installation, cleaning staff. Data were collected using participatory observation, in-depth interviews, and activity documentation. The results showed that the strategy to reduce injury was to prepare a needle holder or safety box, needles or sharp objects must be put in the safety box that has been provided, what was done so that officers were not stabbed by needles was that every briefing was always reminded so that the officers did the injection according to the procedure. and so that used needles are immediately put into the safety box so that officers do not experience needle sticks, the cause of needle sticks in the room is that the nurse in the room is tired of her work, so there is negligence in doing the injection so that there is an incident of being stabbed with used needles. This study suggests that the results of this study be used as a reference in making policies to prevent work accidents, add officers to reduce workloads, and disseminate information to all employees about the importance of implementing occupational safety and health.

Keywords: *Strategy, Syringe Injury.*

I. INTRODUCTION

Work safety is an important factor that the hospital must consider and condition. Through good work safety conditions, workers can carry out their work safely, comfortably, and safely. Workers who feel safe, comfortable, and safe while working in the workplace will encourage the achievement of better work results compared to workers who feel insecure, uncomfortable, and unsafe when working in the workplace. Accidents at work are one of the most common occurrences in the world of work. Globally, the International Labor Organization (ILO) in 2019 estimated that around 337 million work accidents occurred each year which resulted in around 2.3 million workers losing their lives. One worker in the world dies every 15 seconds due to a work accident and 160 workers experience work-related illness.The hospital according to Law No. 44 of 2009 is one of the places for service providers in the health sector which is very complex with various kinds of drugs, tests and procedures, tools and technology, as well as various professions that provide patient care for 24 hours continuously. If the diversity and routine of the service are not managed properly, it can lead to Unexpected Events (UE) that threaten the safety of medical personnel and patients.The Emergency Room and Central Surgical Unit environment is one of the most dangerous challenges in the hospital, especially because of the unstructured and rushed environment, with patients experiencing unpredictable problems, with varying patient sizes and urgency levels, and at an unscheduled time. Emergency patient care is a service that requires immediate service, which is fast, precise, and careful to prevent death and disability. This service is important (emergency), so it must serve patients 24 hours a day continuously (Destifiana, 2015).

One of the most frequent occurrences in the Emergency Room and the Hospital's Central Surgical Installation is Needle Stick Injury, which is an injury caused by needles such as hypodermic needles, blood

collection needles, intravenous stylets, and needle sticks from intravenous delivery systems that are accidentally pierced the skin. Needlestick injuries are a potential hazard to people working with hypodermic needles and other needle equipment. These injuries can occur during the process of using, disassembling, and disposing of the needle. If not disposed of properly, needles can get stuck in linen or trash and injure other workers (Tomas Jalu Putranto, *et al* 2019).Needlestick injuries seem like a minor work accident because they are just a needle stick or cut by a sharp medical object. However, it turns out that there is a large potential for transmission of infectious diseases that can be transmitted from used needles/sharp medical objects to patients who then injure the exposed personnel. Therefore, it is necessary to increase self-awareness so as not to experience the incident of needle stick injuries (Sarah, *et al*, 2018).One of the hospitals in the city of Medan which is one of the largest private hospitals and will become a referral center for the community, especially the city of Medan, is the Royal Prima Hospital Medan. Based on reports of needle stick accidents in the Emergency Room and Central Surgical Installation of the Royal Prima Hospital, Medan, the incidence of needle sticks most often occurs in medical personnel due to the high activity of injecting patients and the unit receiving the most patient visits.

In the incident of needle sticks at Royal Prima Medan during 2020-2021, it is known that the risk of infection due to needlestick and sharp objects is 1.8%, with varying numbers caused by HIV, Hepatitis B and C, and from sources of infection by known or unknown. The incidence of needle sticks causes an increase in costs that must be incurred by the hospital. These costs include serological examinations for further investigation, consultation, and diagnosis to health workers such as further laboratory examinations on nurses who are at risk of contracting the disease from needles used by previous patients.Based on the above background, this research was conducted to develop a strategy to reduce needlestick injuries to medical personnel in the emergency department and the central surgical installation of the Royal Prima Hospital so that unexpected incidents can be minimized. Therefore, researchers are interested in conducting research with the title "Strategy to Reduce Needle Stick Injuries for Medical Personnel in The Emergency Department and The Central Surgical Installation of The Royal Prima Hospital".

II. LITERATURE REVIEW

2.1. Strategy

According to Argyris in Rangkuty (2001), strategy is a continuous and adaptive response to external opportunities and threats as well as internal strengths and weaknesses that can affect the organization. Meanwhile, according to David (2004), strategy is a way to achieve long-term goals.The concept of strategy according to Stoner, Freeman and Gilbert, Jr. (2015) can be defined based on two different perspectives. Based on the first perspective, strategy can be defined as a program to determine and achieve organizational goals and implement its mission. The meaning contained in this strategy is that management plays an active, conscious, and rational feeling in formulating organizational strategy. Meanwhile, based on the second perspective, strategy is defined as the response or response of the organization to its environment over time. In this definition, every organization must have a strategy even though the strategy has never been formulated explicitly. This view is applied to reactive managers, namely responding and adapting to their environment passively when needed.

2.2. Strategy Formulation

Strategy is defined as a process of determining the plan of top leaders that focuses on the long-term goals of the organization, accompanied by the preparation of a method or effort on how to achieve these goals (Marrus in Umar, 2001).Strategy is specifically defined as an incremental action (constantly increasing) and continuous and is carried out based on the point of view of what is expected in the future (Prahalad in Umar, 2001). Strategy formulation includes determining the company's mission, achieving goals, developing strategies, and establishing policy guidelines.

2.3. Infection Prevention and Control Strategy

Infection Prevention and Control is an effort to prevent and minimize the occurrence of infection in patients, staff, visitors, and the community around health care facilities. Health Care Associated Infections (HAIs) are infections that occur in patients during treatment in hospitals and other health care facilities, when they enter there are no infections and are not in the incubation period, including infections in the hospital but appearing after the patient returns home, as well as occupational infections to hospital staff and health workers related to the process of health services in health care facilities (Haque, et al,2018).

The Infection Prevention and Control Program (IPCP) is very important to protect patients, staff, visitors, and families from the risk of contracting infection due to being treated, on duty, or visiting a hospital or other health care facility. (Regulation of the Minister of Health Number 1691 of 2011). The infection prevention and control strategy consist of (Darmadi, 2021):

1. Increased host resistance, can be in the form of active immunization (eg hepatitis B vaccination), or passive immunization (immunoglobulin). Health promotion in general, including adequate nutrition, will increase the body's resistance.
2. Inactivation of infectious agents can be done by physical or chemical methods. Examples of physical methods are heating (pasteurization or sterilization) and cooking food as needed. Chemical methods include water chlorination and disinfection.
3. Breaking the chain of transmission is the easiest thing to prevent the transmission of infectious diseases, but the results depend on the compliance of officers in carrying out established procedures. These precautions have been arranged in an “Isolation Precautions” which consists of 2 pillars/levels, namely “Standard Precautions” and “Transmission based Precautions”.
4. Post Exposure Prophylaxis (PE) measures against health workers are related to the prevention of infectious agents transmitted through blood or other body fluids, which often occur due to needle stick wounds or other exposures. Diseases that need attention are hepatitis B, hepatitis C, and HIV.

2.4. Needle and Sharps Injuries

The Canadian Center for Occupational Health and Safety (CCOHS) in 2020 states that needlestick injuries and sharp objects as wounds that penetrate the skin due to being pierced by needles or other sharp medical objects can inadvertently transmit infectious diseases, especially blood pathogenic viruses such as HIV, Hepatitis B, and Hepatitis C.The National Institute for Occupational Safety and Health (NIOSH) defines needlestick and sharps injuries caused by needles such as hypodermic needles, blood collection needles, intravenous stylets, and needles used to connect parts of the intravenous system. Injuries to needles and sharps have been recognized as one of the occupational hazards among health care workers or health workers.Some of the causes of needle and sharp object injuries include a) overuse of needles and unnecessary sharp objects; b) lack of supply of single-use syringes and object disposal containers; c) lack of access for immediate disposal of sharps after other sharp injections.Health care workers who suffer from needle stick wounds and sharp objects have the potential to become infected with blood pathogens. Health care workers who suffered the most injuries from needle sticks were nurses. Injuries from needles and other sharp devices used in health care facilities and laboratories are associated with the occupational transmission of more than 20 pathogens. HBV, HCV, and HIV are the most commonly transmitted pathogens during patient care.

2.5. Syringe and Sharps Injury Prevention Strategy

In November 2008, the United States passed the Federal Needlestick Safety and Prevention Act as a law on the protection of health care workers from being pricked by needles and sharp objects through safety engineering, namely the use of needles and other sharp objects. The characteristics of safe syringes are as follows;

1. The tool is equipped with a barrel or a retractor or a needle collection mechanism manually or automatically.

2. Utilizing a needleless injection system for certain medical applications. In addition to the protection law, CDC health officials also stated that sharps containers can reduce the incidence of needle sticks and sharp objects by throwing used syringes into the sharp container.
3. The use of thick latex gloves, a needle-resistant apron, and shoes with safety features that do not penetrate dropped needles. The use of PPE before taking actions related to needles and sharp objects is very important to prevent needle sticks and sharp objects from occurring.

In Indonesia, Kepmenkes No. 1087/Menkes/SKNIII/2010 concerning hospital Occupational Health and Safety Standards (OHSS) requires hospital managers and hospital human resources to strive for occupational safety and health through OHSS so that the risk of Occupational Diseases (OD) and Occupational Accidents (OA) at the hospital can be avoided. There are three efforts to prevent needle stick and sharp object injuries, namely training and education, safe management, and the use of injection equipment with a safety design. The engineering strategy for safety syringes generally includes the following steps: a) elimination of the need for injection needles (substitution); b) isolation of the syringe so that it does not have a hazard; and c) adding syringe isolation after use.

III. METHODS

The type of research used in this study is a qualitative analytic study that aims to find a pattern of strategies in reducing needlestick injuries. The research was conducted in the Emergency Room and the Central Surgical Installation of the Royal Prima Hospital with the implementation time from January to February 2022. Informants in this study were divided into three categories, namely:

1. Key informants have comprehensive information about the problems raised by the researcher. The selected informants are the Head of the Emergency Room and the Head of the Central Surgical Installation.
2. Main informants: people who know technically and in detail about the research problem to be studied. The main informants in this study were medical personnel in the emergency room and the central surgical installation.
3. Supporting informants: people who know technically and in detail about the research problem to be studied. Supporting informants are medical personnel in the emergency room and the central surgical installation.

Data collection techniques were carried out through three methods, namely participatory observation, interviews, and documentation of documents and activities. Processing and analysis of research data were carried out before entering the field, during the field, and after completing the field. Before collecting research data, the researcher made initial observations to the ER and the Central Surgical Installation of the Royal Prima Hospital to obtain initial data on the activities of medical personnel who use syringes. The data analysis used in this study is the Miles and Huberman model with steps of data reduction, data presentation, and conclusions/verification.The tool used to analyze qualitative data in this research is using the NVivo 11 Plus software. NVivo is a qualitative data analysis software developed by Qualitative Solution and Research (QSR) international. In Nvivo, the data sources analyzed can be divided into four, namely internal writing data sources, external writing data sources, writing notes during data collection (memos), and matrix frameworks. Internal sources in this context are all sources of qualitative writing data that can be included in Nvivo, for example, recordings, interviews, interview transcripts, notes during writing, photos, survey data tables, contents of certain websites, databases, and videos. External sources are written materials that cannot be included directly in Nvivo, for example, reference books from libraries or printed journals. The memo is a source of writing data in the form of author notes during writing. Framework matrices are a summary of the results of observations of certain participants and themes in the project that have been made in a matrix table (Bandura, 2016).

IV. ANALYZE AND RESULT

4.1. Description of Research Site

Royal Prima Hospital Medan is one of the largest private hospitals and will become a referral center for the community, especially the people of the City of Medan and North Sumatra. On February 16, 2014, Royal Prima Hospital Medan was inaugurated by the Deputy Governor of North Sumatra Province, Ir. H. Tengku Erry Nuradi, M.Si with a permanent operating 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.

4.2. Use of Tools Equipped with Barrels or Syringe Collection Retractors, Manually or Automatically

Needle Stick Injury (NSI) is a wound caused by a medical needle stick. According to the results of the study, NSI is a big problem in the emergency room and the central surgical installation of the Royal Prima Hospital, mainly because of the risks that arise not only from injuries to the punctured part but also severe infections that may infect NSI victims, especially medical personnel in the emergency room and central surgical installation. Royal Prima Hospital. These infections can include exposure 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).Based on the results of the researchers' observations, the use of syringes used by health workers in the emergency department and the central surgical installation of the Royal Prima Hospital with high-quality standards still need to be improved. Needle safety is very important. Safe syringes have engineering characteristics such as a syringe equipped with a barrel or a retractor or a needle collection mechanism that can be operated manually or automatically.

4.3. Strategies to Reduce Injury by Utilizing the Medical Application Needleless Injecting System

Based on the results of research in the Emergency Room and the Central Surgical Installation of the Royal Prima Hospital, it is known that most of the wounds caused by sharp objects in the hospital are in the operating room, that is located on knives and sewing needles which are often used in the operation process. Stab wounds can occur in all places where medical procedures and/or treatments are performed, and waste management is facilitated, such as in the emergency room and the central surgical installation of the Royal Prima Hospital. The place where the NSI occurs is closely related to the process after the use of health instruments to the management of the waste. It also provides an implicit description of the timing of the occurrence of NSI which in general can occur between immediately after the use of health instruments on patients to the time of managing the waste of these health instruments. Meanwhile, in particular, the possible time for NSI to occur can be segregated based on the group that can experience NSI itself.

On the other hand, NSI can occur because this work involves humans, health instruments, and the environment. The human factor is a potential hazard that is quite large, especially if humans do the work when they are not in the good condition, both physically and psychologically. The factor of health instruments is a potential hazard contained in work equipment in the environment. Environmental factors are potential hazards that exist or come from the environment. These three things influence the occurrence of NSI in that process.In addition to the law on protecting health workers, the CDC also states that sharp containers can reduce the incidence of needle sticks and sharp objects by throwing used syringes into the sharp container. The requirements for a good sharp container are tightly closed, rigid, and not easily penetrated by syringes and other sharp objects. In addition, sharp containers must also be given a yellow biohazard label with red writing and placed in an easily accessible place. The availability and easy access of sharps containers can also reduce the occurrence of injuries due to needle sticks and other sharp objects.

4.4. Strategies to Reduce Injury Using PPE

PPE is very necessary to prevent NSI. PPE that must be present includes thick latex gloves, a needle-resistant apron, and safety shoes that cannot be penetrated by needles. Various factors for the occurrence of Needle Stick Injury (NSI) are caused by the health workers themselves. Lack of discipline towards Occupational Health and Safety (OHS) regulations make NSI more common. Various types of unsafe actions

carried out by health workers are not using gloves, placing various medical equipment on the table, excessive workload, and lack of skills. Another factor is the state of the hospital itself. The situation that causes NSI is a situation where Personal Protective Equipment (PPE) is not always available.Personal Protective Equipment or PPE is also very influential in reducing the incidence of needle stick injuries and sharp objects. PPE consists of the use of thick latex gloves, a needle-resistant apron, and shoes with safety features that do not penetrate dropped needles. The use of PPE before taking actions related to needles and sharp objects is very important to prevent needle sticks and sharp objects from occurring.

The application of a control hierarchy in industrial hygiene suppresses the elimination and reduction of the use of needles and other sharp objects as best practices. When isolation and reduction are not possible, PPE is required at the last resource. In addition, the lack of universal precautions is also a factor that causes injuries from needle sticks and sharp objects. This can be seen from the number of people who have not properly practiced universal precautions when doing work related to needles, sharp objects, blood, and other infectious materials. OSHA (Occupational Safety and Health Act) requires leaders to make safety and health efforts for employees, and on the other hand, employees are required to maintain the safety and health of themselves and others. Engineering safety design is needed to improve injection safety to prevent needle sticks and other sharp objects. The engineering strategy for safety injection equipment generally includes the following steps; a) elimination of the need for a syringe (substitution), b) isolation of the syringe so that it does not have a hazard, and c) adding isolation of the syringe after use.Another engineering control is the use of sharp containers to store used syringes and other sharp objects. This storage device is an important element and a core element of efforts to prevent needle stick injuries and other sharp objects. According to OSHA and the CDC, universal precautions with emphasis are as important as the use of PPE and control of work management so that it will be more effective in preventing wound exposure to blood pathogens 2,26. Standard procedures for universal precautions when working with needles include:

a. Using PPE (Personal Protective Equipment) in the form of aprons, gloves, and impervious shoes;
b. Not covering the syringe after injecting/taking blood (non-recapping);
c. Storing used syringes in sharp containers;
d. Washing hands before and after wearing gloves;
e. Washing hands before and after clinical contact with patients;
f. Washing hands after using syringes;
g. Checking basic serology for hepatitis B, hepatitis C, and HIV, Hepatitis B immunization for health workers;
h. Checking hepatitis B antibody levels for health care workers;
i. Checking serology regularly for hepatitis B, hepatitis C, and HIV;
j. PEP (post-exposure prophylaxes) hepatitis B in the form of HBIG given within 72 hours after exposure; and
k. PEP HIV in the form of a combination of Anti Retro Virus (ARV) tablets given between one and two hours after exposure.

In 2001, the American Nurses Association (ANA) used a hierarchy of controls to prevent needle stick injuries and other sharp objects, namely:

a) Elimination of hazards;
b) Replacing injections with oral drugs;
c) Inhaled or transdermal;
d) Replacing the syringe with a jet injector;
e) using an intravenous system without a needle; and
f) Engineering control.

Policy limits exposure to hazards. The allocation of resources related to the safety of health care workers is through the establishment of a needle stick injury prevention agency, exposure control programs, elimination of unsafe medical devices, and training in the use of safe medical devices.

V. CONCLUSION

Based on the results of the research entitled "Strategies for Reducing Needlestick Injuries in the Emergency Room and the Central Surgical Installation of the Royal Prima Hospital", it can be concluded that:

1. The strategy to reduce injury is to prepare a needle holder or safety box, needles or sharp objects must be put in the safety box that has been provided
2. What must be done for the officers to not get stabbed by needles is to remind officers at every briefing to take injections according to procedures and used needles must be immediately put into the safety box so that officers do not experience needles sticks.
3. The cause of the needle stick incident in the room was the condition of the nurse who was tired of her work, resulting in negligence in doing the injection and the incident of the needle sticking occurred.

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