**Research Article**

# OCCUPATIONAL HEALTH AND SAFETY RISK ANALYSIS OF NURSES IN THE EMERGENCY ROOM TK III Dr.R. SOEHARSONO HOSPITAL BANJARMASIN

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**ABSTRACT**
**Background:** Every job has a risk of work accidents or Occupational Diseases (PAK) that arise due to work relationships or those caused by work and the work environment. In essence, Occupational Safety and Health (K3) is an effort to create protection and security from various risks of accidents and hazards, both physical, mental and emotional, for workers, companies, communities and the environment. With K3 control, it is hoped that the workforce will feel safe carrying out their work to increase work results and productivity (Cecep D. Sucipto, 2014). **Purpose:** This study aims to determine language and risks at Tk III Dr R. Soeharsono Hospital Banjarmasin. **Method:** This is analytical descriptive research with a study design using a risk assessment method with qualitative techniques based on AS/NZS 4360: 2004 and risk identification using *Job Safety Analysis* (JSA). The population in this study are the respondents who will be studied and are considered to represent the entire population. The sampling technique used was accidental sampling. This research was conducted in the TK. III Dr. R. Soeharsono Hospital Banjarmasinin March 2023. **Results:** Based on the observations made during the study at the IGD RS Tk.III dr. R. Soeharsono Banjarmasin found that the potential hazards that arise during the work process come from *unsafe actions* and *unsafe conditions*. **Conclusion:** Risk analysis for nurses in the emergency room at TK. III Dr R. Soeharsono Hospital Banjarmasinin has the highest risk level of physical and biological hazards with *a risk level of extreme risk.* Meanwhile, psychological and ergonomic hazards have *a high and moderate risk level*.

*Keywords: risk management, Nurse, Occupational Health and Safety*

## INTRODUCTION

Every job has a risk of work accidents or Occupational Diseases (PAK) arising from work relationships or those caused by work and the work environment. According to the Indonesian Ministry of Health (2008), to increase work productivity, implementing Occupational Safety and Health (K3) in the workplace is one of the efforts to create a workplace free from work accidents or PAK. Therefore K3 must be applied to all elements of workers in the formal and informal sectors.

In essence, Occupational Safety and Health (K3) is an effort to create protection and security from various risks of accidents and hazards, both physical, mental and emotional, for workers, companies, communities and the environment. With K3 control, it is hoped that the workforce will feel safe carrying out their work to increase work results and productivity (Cecep D. Sucipto, 2014).

Potential hazards or so-called hazards are found in almost all workplaces. This hazard can result in accidents or incidents that impact humans, equipment, materials and the environment (Soehatman Ramli, 2010). According to the Minister of Manpower No. 04 of 1993, a work accident is an incident related to work relations, including illnesses arising from work relations and accidents that occur on the way from home to work and return home via usual roads.

According to HW Heinrich (1930) in Soehatman Ramli (2010), the factors that cause work accidents in the "Domino Theory" are unsafe actions from humans (dangerous *acts*) and unsafe conditions ( *unsafe conditions* ). Occurrence of work accidents such as the domino effect that is arranged, if one of them falls, it will cause an accident and cause a loss. According to this theory, the order in which work accidents occur is a lack of control or an imbalance in the management system, resulting in indirect and direct causes. Work accidents that occur will cause significant losses, both material losses and physical losses. Losses that

occur can be in the form of economic failures, such as damage to tools or machines; materials and buildings; medical and nursing expenses; accident allowance; reduced production quantity and quality; accident compensation and labour replacement; as well as non-economic losses, such as the suffering of victims and their families, temporarily stopping work activities, and loss of working time (Anizar, 2009).

*Hazards* Identification, Risk Assessment *and* Risk Control *or* abbreviated HIRARC, are the main elements in the Occupational Safety and Health Management System (SMK3), which are directly related to efforts to prevent and control hazards. HIRARC is used as a method for conducting *a risk assessment*, starting with determining the type of work activity, which is then identified as the source of the hazard so that the risk is obtained. Then a risk assessment and control will be carried out to reduce exposure to hazards in each type of work. From identifying potential hazards and assessing OHS risks, a HIRARC document will be produced, which is very useful for preventing work accidents (Ramli, 2010).

Based on ISO 45001:2018, identifying potential hazards and risk assessment is one of the requirements that must exist in SMK3. ISO 45001:2018 requires organizations or companies to prepare documents for possible hazard identification and risk assessment for their companies. The HIRARC method is divided into three stages: hazard identification, risk assessment ( *risk control* ), and *risk control*. Activity in the Hospital is never separated from the potential risk of accidents. No matter how small an accident will significantly impact a company or society.

Likewise, hospitals involving humans in carrying out their work can involve a risk of work accidents. Hazard ( *hazard*) is a source, situation or action that has the potential to injure humans or conditions of physical or mental disorders identified as originating from work-related problems (OHSAS 18001:2007). Risk is a combination of the likelihood of a hazardous event or the severity of the injury caused by the event.

According to data from the International Labor Organization (ILO), in 2018, as many as 2.78 million workers died yearly from work accidents and PAK. About 2.4 million (86.3%) of these deaths were due to occupational diseases, while more than 380,000 (13.7%) were due to work accidents. Every year, there are almost a thousand times more non-fatal work accidents than fatal ones. Non-fatal work accidents are estimated to affect 374 million workers yearly, and many have severe consequences for workers' earning capacities (ILO, 2018).

The Social Security Administration Agency (BPJS) for Employment, the number of work accidents in Indonesia in 2017 reached 123,000 cases with claims of IDR 971 billion. This figure has increased from 2016 with a claim value of 729 billion. In 2017 for the Central Java region, the number of work accidents reached 1,468 cases (BPJS Employment, 2018).

OSH risk management in hospitals is critical to ensure the safety of patients, medical personnel and visitors. Hazard identification and OSH risk assessment in hospitals must be made for several reasons. Complex work environment conditions, hospitals have a variety of complex work environments, from operating theatres to patient rooms, thus requiring proper risk assessment to reduce the possibility of accidents and injuries. In addition, there are many types of chemicals in hospitals, such as medicines, cleaners and disinfectants, so proper management and suitable risk assessment are needed to prevent harm from exposure to these chemicals.

The many types of medical equipment are also essential factors in hospital risk management. Hospitals use various medical equipment, such as surgical instruments, patient monitors, and X-ray machines. Proper management and suitable risk assessment are needed to prevent harm from using this equipment. In addition, hospital workers are also vulnerable to the risk of infection, especially during the COVID-19 pandemic, so an OHS risk assessment is critical to prevent the spread of disease.

Based on the description above, the researcher is interested in conducting research related to Occupational Health and Safety Risk Analysis at Tk.III Dr. Hospital. R. Soeharsono Banjarmasin.

## METHODS

This research is a descriptive-analytic study design using a risk assessment method with qualitative techniques based on AS/NZS 4360: 2004 and risk identification using *Job Safety Analysis* (JSA). The population in this study are the respondents who will be studied and are considered to represent the entire population. The sampling technique used is accidental sampling.

This research was conducted in the Emergency Room (IGD) TK. III Dr. R. Soeharsono Hospital Banjarmasin in March 2023. The instrument used to identify risk analysis for nurses in the emergency room of TK. III Dr R. Soeharsono Hospital Banjarmasin is a risk assessment matrix referring to AS/NZS 4360: 2004 and the Job Safety Analysis (JSA) worksheet—data collection techniques using interviews and documentation. Data analysis was done by *editing, scoring, calculating, and classifying.*

## RESULTS AND DISCUSSION

### Identification of Potential Hazards with the JSA Method

**Table 1.1 Identification of Potential Hazards**

| Type of work | Danger | | Danger Effect |
|---|---|---|---|
| | *Unsafe Conditions* | *Unsafe Action* | |
| Transferring patients | The patient bed is too low or too high when moving the patient | Awkward position when lifting the patient | Pain in the muscles or low back pain |
| | Feelings of anxiety and fear when lifting a patient whose medical history is unknown | - | Anxiety in nurses can cause work stress in nurses |
| | *branchcard* wheels are unbalanced, so the direction of *the branchcard* is erratic | When pushing *the branch card* , the foot is near the wheel | Foot injury |
| Infusion set | Unsafe or irregular placement of infusion needles ( *abbocath* ) *during infusion* | Do not use personal protective equipment when infusion. The PPE used is gloves | Injured and at risk of disease transmission |
| | Tidy up the tool with the patient's blood still in the syringe | Do not use PPE when tidying up tools. The PPE used is gloves and masks | Infected by viruses and bacteria that can transmit disease |
| | The patient's bed is too high ( *branchard* ) not *adjustable* | *Awkward posture* | Muscle pain and *low back pain* |
| | - | Nurses are overly concerned about contracting a disease during infusion, so they are hesitant to take action | Excessive fear, work stress |
| | - | Do not use PPE when carrying out actions | Infected the patient's disease |
| Administration of injection drugs | Unsafe or irregular placement of the needle at the time of insertion of the needle into the vein | Do not use gloves when giving injection drugs | Injured and if stuck with a used needle the patient is at risk of contracting the patient's disease |
| | Tidying up the tool with blood still on the syringe | Do not use gloves when giving injection drugs | Needle puncture wounds and the risk of disease transmission |
| | - | Nurses are overly concerned about contracting disease when giving injection drugs, so they are hesitant to take action | Excessive fear, work stress |
| Patient history | - | Nurses are overly concerned about contracting a disease during infusion, so they are hesitant to take action | Excessive fear, work stress |
| | - | Do not use PPE when carrying out actions | Infected the patient's disease |
| | There is no special place to do patient history | An awkward position when doing anamnesis | Pain in the muscles or low back pain |

### Risk Analysis

Table 1.2 Risk Analysis

| Type of work | Danger | Danger Effect | *probability* | *Consequences* | *Risk Level* |
|---|---|---|---|---|---|
| Transferring patients | **Physique** | | | | |
| | *the stretcher* wheels while moving the patient | Injuries, wounds to the legs | D | 3 | Moderate Risk |
| | **Ergonomics** | | | | |
| | Injuries or sprains to the back and hip while moving the patient | Work fatigue and MSDs such as muscle aches or *low back pain* | B | 2 | Moderate Risk |
| | Awkward posture ( *awkward* posture) when moving the patient | MSDs are like muscle pain | B | 2 | Moderate Risk |
| | **Psychological** | | | | |
| | Feelings of anxiety and fear when lifting a patient whose medical history is unknown | Work stress on nurses | C | 4 | High Risk |
| Infusion set | **Physique** | | | | |
| | Punctured by a syringe when inserting a needle into a vein | Stab wounds and risk of disease transmission | C | 5 | Extreme Risk |
| | Punctured by a needle while tidying up an infusion device | Stab wounds and risk of disease transmission | D | 5 | High Risk |
| | **Biology** | | | | |
| | Contact with the patient's blood during the procedure | Infected with infectious diseases, Hepatitis, HIV, and AIDS | C | 5 | Extreme Risk |
| | **Ergonomics** | | | | |
| | *Awkward posture* | MSDs are like muscle pain | A | 2 | High Risk |
| | **Psychological** | | | | |
| | Nurses are overly concerned about contracting a disease during infusion, so they are hesitant to take action | Excessive fear of work stress | C | 4 | High Risk |
| Administration of injection drugs | **Physique** | | | | |
| | Needle stick when inserting the needle into the vein | Injured and if stuck with a used needle the patient is at risk of contracting the patient's disease | E | 5 | High Risk |
| | Stabbed by a syringe while tidying up a tool that has been used | Needle puncture wounds and the risk of disease transmission | D | 5 | High Risk |
| | **Biology** | | | | |
| | Contact with the patient's blood when administering injection drugs | Hepatitis, HIV, AIDS, and other infectious diseases | C | 5 | Extreme Risk |
| | **Psychological** | | | | |
| | Nurses are overly concerned about contracting disease when giving injection drugs, so they are hesitant to take action | Excessive fear, work stress | C | 4 | High Risk |
| Patient history | **Physique** | | | | |
| | An awkward position when doing anamnesis | MSDs are like pain in the muscles | B | 2 | Moderate Risk |
| | **Psychological** | | | | |
| | Nurses are overly concerned about contracting a disease during infusion, so they are hesitant to | Excessive fear of work stress | C | 4 | High Risk |

### Risk Evaluation and Control Recommendations

Table 1.3 Risk Evaluation and control recommendations

| Type of work | Danger | Danger Effect | *Risk Level* | Control Recommendations |
|---|---|---|---|---|
| Transferring patients | **Physique** | | | |
| | *the stretcher* wheels while moving the patient | Injuries, wounds to the legs | Moderate Risk | Controls that can be carried out to minimize this hazard can be done by *communicating hazards* and conducting training |
| | **Ergonomics** | | | |
| | Injuries or sprains to the back and hip while moving the patient | Work fatigue and MSDs such as muscle aches or *low back pain* | Moderate Risk | Engineering engineering such as evacuation aids and *easy move*. Administrative control by conducting training for nurses. |
| | Awkward posture ( *awkward posture* ) when moving the patient | MSDs are like muscle pain | Moderate Risk | Administrative control by providing training and counseling about MSDs |
| | **Psychological** | | | |
| | Feelings of anxiety and fear when lifting a patient whose medical history is unknown | Work stress on nurses | High Risk | Controlling work stress on nurses can be done by increasing motivation such as giving rewards or awards and appreciation to nurses. In addition, to minimize the level of anxiety, nurses can use the complete PPE. |
| Infusion set | **Physique** | | | |
| | Punctured by a syringe when inserting a needle into a vein | Stab wounds and risk of disease transmission | Extreme Risk | The use of complete PPE, such as gloves is very important to prevent disease transmission. In addition, if a nurse is stabbed by a needle, a medical examination should be carried out immediately |
| | Punctured by a needle while tidying up an infusion device | Stab wounds and risk of disease transmission | High Risk | Providing socialization on the handling of used syringes to all medical personnel and getting used to throwing used needles directly into the *safety box*. In addition, nurses must also use complete PPE. |
| | **Biology** | | | |
| | Contact with the patient's blood during the procedure | Infected with infectious diseases, Hepatitis, HIV, and AIDS | Extreme Risk | The use of PPE and infusion in accordance with the SOP play an important role in minimizing this hazard. In addition, provide *an underpad* under the part of the patient's body where the infusion will be installed. |
| | **Ergonomics** | | | |
| | *Awkward posture* | MSDs are like muscle pain | High Risk | Provision of counseling related to MSDs and their handling and prevention. An *adjustable* patient bed also helps minimize this hazard and makes it easier for nurses. |
| | **Psychological** | | | |
| | Nurses are overly concerned about contracting a disease during infusion, so they are hesitant to take action | Excessive fear of work stress | High Risk | Controlling work stress on nurses can be done by increasing motivation such as giving rewards or awards and appreciation to nurses. In addition, to minimize the level of anxiety, nurses can use the complete PPE. |
| Administration of injection drugs | **Physique** | | | |
| | Needle stick when inserting the needle into the vein | Injured and if stuck with a used needle the patient is at risk of contracting the patient's disease | High Risk | The use of complete PPE, such as gloves is very important to prevent disease transmission. In addition, if a nurse is stabbed by a needle, a medical examination should be carried out immediately |
| | Stabbed by a syringe while tidying up a tool that has been used | Needle puncture wounds and the risk of disease transmission | High Risk | Providing socialization on the handling of used syringes to all medical personnel and getting used to throwing used needles directly into the *safety box*. In addition, nurses must also use complete PPE. |
| | **Biology** | | | |
| | Contact with the patient's blood when administering injection drugs | Hepatitis, HIV, AIDS, and other infectious diseases | Extreme Risk | The use of PPE and infusion in accordance with the SOP play an important role in minimizing this hazard. In addition, provide *an underpad* under the part of the patient's body where the infusion will be installed. |
| | **Psychological** | | | |
| | Nurses are overly concerned about contracting disease when giving injection drugs, so they are hesitant to take action | Excessive fear, work stress | High Risk | Controlling work stress on nurses can be done by increasing motivation such as giving rewards or awards and appreciation to nurses. In addition, to minimize the level of anxiety, nurses can use the complete PPE. |
| Patient history | **Ergonomics** | | | |
| | An awkward position when doing anamnesis | MSDs are like pain in the muscles | Moderate Risk | Provision of counseling related to MSDs and their handling and prevention. Provide a special place for patient history. |
| | **Psychological** | | | |
| | Nurses are overly concerned about contracting a disease during infusion, so they are hesitant to take action | Excessive fear of work stress | High Risk | Controlling work stress on nurses can be done by increasing motivation such as giving rewards or awards and appreciation to nurses. In addition, to minimize the level of anxiety, nurses can use the complete PPE. |

## Discussion

Based on the results of observations made by the emergency room nurses at Tk. III dr. R. Soeharsono Banjarmasin uses the JSA worksheet, and several potential hazards are identified in the work process. The hazard potential is then analyzed using the AS/NZS 4360:2004 analysis table.

## Hazard Identification

Hazard identification is a way to find out and process of finding out what the hazards and risks are in work activities. Without a hazard identification process, it cannot correctly determine risk control. Identifying these hazards is crucial for workers and policymakers to discover the dangers and risks in each work process to reduce work accidents and occupational diseases in the hospital environment. Nurses are health workers with the most significant risk of experiencing danger, because nurses are always dealing with patients who predominantly suffer from infectious diseases.

Based on the results of observations made during the study at the IGD RS Tk.III dr. R. Soeharsono Banjarmasin found that the potential hazards that arise during the work process come from *unsafe actions* and *unsafe conditions*.

**Table of Distribution of *Unsafe Actions* and *Conditions* in the Work Process of IGD Nurses at Hospital Tk.III dr. R. Soeharsono Banjarmasin**

| Stages of labour | *Unsafe Action* | *Unsafe Conditions* |
|---|---|---|

| | n | % | n | % |
|---|---|---|---|---|
| Transferring patients | 2 | 40 | 3 | 60 |
| Infusion set | 5 | 62.5 | 3 | 37.5 |
| Administration of injection drugs | 3 | 60 | 2 | 40 |
| Anamnesis | 3 | 75 | 1 | 25 |

Table 4.4 above shows the results of identifying potential hazards at the stages of the work process for the IGD nurse at Tk.III Hospital Dr R. Soeharsono Banjarmasin significantly differs in the number of *unsafe actions* and *conditions.* In transferring patients, there are more potential hazards, namely *dangerous conditions.* In the installation of infusion, the potential for danger is more unsafe.

*An unsafe condition* often encountered in the work process is an awkward bending posture when doing work. Awkward postures often occur, an ergonomic risk caused by the nurses themselves where they do not get up and down the available bed when acting. *Low back pain* occurs due to risk factors such as age, weight, height, length of work, work habits, and wrong posture when lifting patients.

*Unsafe actions* carried out by nurses while working in the emergency room, namely when carrying out the action process, personal protective equipment is not used. Occupational accidents and diseases can occur due to unsafe behaviour by nurses because they do not use personal protective equipment according to the specified standards. The problem often found in healthcare institutions today is needle stick injuries. If a nurse is stabbed by a syringe injected into a patient's body tissue, the nurse can be at risk of contracting at most minuscule 20 pathogens (Fauziyah, 2021).

Based on the research results, the following is the identification of potential hazards in each work stage in the emergency room:

a. Transferring patients

The process of moving the patient starts from the ambulance to the stretcher. From this process, there is a potential hazard in the form of an ergonomic risk; a heavy burden collects in the middle of the waist and hands, carried out in a bent or bent position (in an awkward position). And there is a potential psychological hazard when moving patients, namely nurses feel anxious and afraid when moving patients who enter the ER with no known history of the patient illness. After moving the patient to a bed in the emergency room, the potential hazard of this process is almost the same as when moving a patient from a car to a *stretcher* and the danger when pushing a patient from the emergency room to the inpatient room, which creates the potential to be stepped on by the stretcher wheels.

Three potential sources of danger were identified from the working stages of lifting patients: physical, ergonomic and psychological. Of the total potential hazards, five *were found, each impacting nurses' health and safety*. One of the riskiest potential hazards in the work process of lifting patients is the process of moving patients from an ambulance to *a stretcher*, where there is a heavy workload that collects in the middle at the waist and hands, which are carried out in a bent or bent position (awkward position). In line with this, research (Mallapiang et al., 2021) explains that movements repeated and carried out in uncomfortable situations impact the nervous system and soft tissue trauma. The trauma appears to be caused by chronic pressure on one of the body's tissues.

b. Infusion set

Before administering an infusion to a patient or nurse, they can determine the type of infusion fluid or medication the patient needs. The health worker or nurse then cleans the part to be injected using alcohol. Next, the nurse injects the infusion into the vein area. Then adjust the fluid rate of the infusion patient so that it is under control. And lastly, the nurse will tidy up the tools that have been used in installing the infusion.

From the infusion process, eight *potential hazards were identified*, each with a risk to the health and safety of nurses in the emergency room. The potential hazards during infusion that are most at risk are physical hazards and ergonomic hazards, namely being pricked by a syringe when inserting an infusion needle into a blood vessel which can cause potential transmission of diseases that are transmitted from hands or sharp medical

objects then injure nurses and be exposed to the disease.

Health workers can be at risk of being exposed to blood and body fluids *(bloodborne pathogens) through various means, for example, needle stick wounds or other sharp objects, causing Hepatitis B (HBV), Hepatitis C (HCV) and Human Immunodeficiency Virus* (HIV) infections ( Mapanawang et al. al., 2018).

The potential dangers in the infusion process are ergonomic hazards when placing the infusion, the position of the nurse's body in a bent state, for quite a long time, especially in patients whose veins are complicated to find. This can cause pain or pain in the spine due to abdominal muscles that experience pressure, resulting in *low back pain* or muscle pain. This is in line with research (Mallapiang, 2019) that incorrect work posture, namely bending, causes a feeling of soreness in the waist, back, wrists, upper arms. as well as wrists.

c. Administration of injection drugs

First, the medical staff cleaned the puncture site using an alcohol swab. Instruct the patient to make a fist on the hand and open the fist several times, then use the thumb to press the vein where the needle is punctured, then aspirate, then slowly insert the drug into the vein. The hand is removed from the vein, and after that, place The puncture is closed using sterile gauze.

Five potential hazards were identified from administering injection drugs, each of which has a risk to the health and safety of nurses in the emergency room. One of the potential risks when administering injection drugs is a biological hazard, namely contracting hepatitis, AIDS and HIV, which results from the patient's blood. This is in line with research (Silambi et al., 2020), which shows that health workers in the emergency room have the potential for biological hazards quite significant for occupational diseases. This is because the patient's condition and disease have not been detected. Still, medical personnel in the emergency room are responsible for providing assistance and treatment to patients to cure them.

d. Anamnesis

Anamnesis is a communication activity carried out between medical personnel as examiners and patients who aim to obtain information about the disease being suffered and other related information so that it can direct the diagnosis of the patient's condition. Complaints submitted by a patient who is cared for will help determine the diagnosis of a disease.

Four potential hazards were identified from the anamnesis process, each of which has a risk to the health and safety of nurses in the emergency room. One of the risky potential hazards during anamnesis is the danger of ergonomics, namely *awkward posture* when doing anamnesis. This can happen because there is no particular place to do anamnesa. So far, taking Anamnesa to the emergency room at Tk.III hospitals, dr. R. Soeharsono performed at the reception desk for patients who could still sit. Whereas for patients already limp, anamnesis is done on the patient's stretcher. *Awkward posture* can cause soreness in several limbs, such as the back, arms, and wrists (Mallapiang, 2019).

**Risk Analysis**

After identifying potential hazards using Job Safety Analysis (JSA), then each potential threat is analyzed based on the value of opportunity *(probability)* and severity *(consequences),* which produce a level of risk *(risk level).* The following are the results of a risk analysis carried out on emergency room nurses at Tk.III hospitals, dr. R. Soeharsono Banjarmasin:

a. Transferring patients

Using AS/NZS 4360:2004, the risk analysis results show that ergonomic hazards have a *moderate risk level.* Nurses are most likely to experience MSDs that result in minor injuries such as back or arm pain. This follows research conducted by Dewi (2019), based on the results of this study stating that nurses have a risk of MSDs, because of the activities they carry out, one of which is pushing patients from the ER to the ward in an awkward position.

Nurses feel anxiety and fear when lifting patients who enter the emergency room with no known history of the patient's illness, so there is a slight possibility that nurses experience the risk of work stress. This is in line with research (Lai et al., 2020). Health workers will share high risk in the form of mild anxiety and even severe stress because of the

many pressures they face. The fear experienced when exposed, infected and allowed to infect people around them becomes a burden for health workers.

b. Infusion set

By using AS/NZS 4360:2004, the results of the risk analysis obtained, the physical hazard at the time of insertion of an infusion, namely needle sticks, which has a *probability* that can occur many times and *the consequences* can cause *fatality*, meaning that the worker has an *extreme risk level.* In line with a study (Puspitasari&Ginanjar, 2019), which stated that needle stick accidents have a sizeable magnitude *of the problem, workers who are most susceptible to needle stick injuries are health workers.* One hospital in the United States in 2008 found that out of 70 sharp object injuries, 0.7% were due to needles, 10% were due to gunshots, and 23% were due to other injuries. The study reports on *needlestick injuries* in health workers have been carried out in various parts of the world. *The Center for Disease Control (CDC)* every year, there are 385,000 incidents of stab wounds due to sharp objects contaminated with blood in health workers in hospitals in America (Safetysyringes 2011 in Alifariki&Kusnan, 2019).

Biological hazard at this stage has a reasonably high possibility of an impact that can cause death, meaning that this hazard has an *extreme level of risk.* Hence, it needs to be controlled immediately. These results are in line with research (Silambi et al., 2020) in the emergency room, there is a potential biological hazard that can be transmitted through the air, namely in the triage room and can be infected through infusion needles and injections if stabbed by a former patient who has an infectious disease.

c. Administration of injection drugs

The risk analysis results obtained based on AS/NZS 4360:2004 administration of injection drugs has an *extreme risk level.* Physical hazards such as needle sticks and biological threats such as contact with patient's body fluids can have a fatal impact on the health of emergency room nurses. Administration of injection drugs, there is a biological hazard in the patient's blood. Exposure to this blood will cause infectious diseases such as Hepatitis, AIDS, and HIV (Fauziah, 2021).

Physical danger, needle sticks to nurses can occur many times and result in nurses needing medical treatment because it has the impact of contracting disease and even death. This follows research conducted by Ramdan and Rahman (2018), which states that nurses contract the condition when injecting patients due to needle sticks.

Biological hazards, contact with the patient's body fluids, such as the patient's blood, when giving injection drugs also has the impact of contracting the disease and even death. Based on these results, it is in line with research (Putri et al., 2017) in the injection drug administration stage, there is a biological hazard in the patient's blood. If exposed to blood, it will cause infectious diseases such as Hepatitis, AIDS, and HIV.

c. Anamnesis

Work facilities that are not ergonomic allow nurses to have the possibility of frequent awkward postures, *so* the risk of nurses having MSD disorders is also high. This non-ergonomic facility is because the nurse takes the patient's history at the reception desk with the patient sitting and the nurse standing. When checking blood pressure, temperature, and patient complaints, the nurse's position is standing and sometimes bending, so nurses often complain of getting tired quickly and experiencing back pain.

The risk of MSDs will be higher if the body's position is farther from the centre of gravity. One of the MSDs is Low back pain. This disease starts in the musculoskeletal which is not treated quickly and causes abnormalities in the muscles and skeleton of the body. The cause of *low back pain* is not specific, but the mechanism has long been known. *Low back pain* can occur because of several factors, namely work done with force and repeatedly, stationary or even motionless positions for long periods of time, bending and twisting work positions, and workers' overtime and lack of rest ( Nurhafizhoh, 2018).

**Risk Evaluation and Control**

The stages of risk analysis have been carried out to obtain the level of risk in each action of the ER nurse. After that, compare the

results with the risk criteria previously set by AS/NZS 4360:2004. Then the risk level that has been obtained is given control recommendations.

a. Transferring patients

Using AS/NZS 4360:2004, the risk analysis results obtained, the level of physical hazard risk at this stage is moderate, meaning that management must be responsible for handling *this* hazard. Control recommendations that management can carry out are administrative controls such as carrying out *hazard communication,* training, stretching muscles before and after work and exercising regularly to increase the flexibility of the muscles supporting the spine.

The risk of psychological harm at this stage is *high. T*he administrative control hierarchy that is given first seeks a reward system or rewards the performance of nurses. Rewards can be in the form of material or appreciation so that nurses' work motivation increases.

b. Infusion Installation

By using AS/NZS 4360:2004, the risk analysis results obtained at this stage are physical hazards with *extreme risk levels.* The level of risk with *undue risk* means that it requires treatment as soon as possible. The control can be carried out wholly and correctly using PPE; sometimes, nurses forget to use excellent gloves in a hurry. In addition, several nurses also stated that they felt more comfortable working without gloves. The application of SOPs related to infusion also needs to be considered again. In the existing SOPs, there is no information on PPE that nurses must use.

There are also biological hazards with an extreme risk level at this stage. The use of PPE and implementation of SOPs are also recommended to address this hazard. In addition, the hospital should conduct regular health checks for nurses. Nurses are very vulnerable to contracting infectious diseases due to contact with the patient's body fluids or accidentally being pricked by a needle.

Ergonomic hazards in infusions have a *high level of risk,* so they need attention from management. One of the things that the direction must consider is the posture of the nurse doing the infusion because not all brassards in the emergency room are adjustable. This results in nurses working with uncomfortable poses and can cause *low back pain.*

c. Administration of injection drugs

Based on AS/NZS 4360: 2004, risk analysis at the injection drug administration stage has a physical hazard with a *high-risk level.* The hospital's control recommendation is to use PPE when administering injection drugs. PPE that is recommended for use in administering this injection drug is gloves and masks.

In addition to physical hazards, this stage has biological hazards with *extreme risk levels.* Controls that can be carried out are using PPE and applying SOPs related to administering injection drugs. In addition, when administering injection drugs, you should use an underpad to minimize contact with the patient's body fluids.

There is also a psychological hazard in administering injection drugs, namely the nurse's anxiety when taking action. This hazard is classified as having a *high-risk level of danger. C*ontrolling *high-risk risks* is management control. One thing that the hospital can do is increase nurses' work motivation by giving rewards, both physical and appreciation.

d. Anamnesis

Based on AS/NZS 4360: 2004, risk analysis at the anamnesis stage has an ergonomic hazard with a *moderate risk level.* The hospital's control recommendation is to conduct counselling on the dangers of MSDs. In addition, the hospital should also provide a special place to take patient history so that the patient history is not done at the reception desk.

In addition to ergonomic hazards, this stage also has psychological dangers with a *high level of risk.* Control recommendations for this hazard that the hospital can carry out are seeking a reward system or giving awards to nurse performance. Rewards can be in the form of material or appreciation so that nurses' work motivation increases.

**CONCLUSION**

Based on the results of observations and the results of the analysis carried out in the

emergency room at Tk. III dr. R. Soeharsono Banjarmasin, the following conclusions are obtained:

1. Hazard identification for nurses in the emergency room of Tk Hospital. III dr. R. Soeharsono Banjarmasin is a potential physical, biological, ergonomic, and psychological hazard. The physical danger nurses receive is when using sharp equipment, namely syringes, infusion needles and sewing needles. Meanwhile, biological hazards are obtained from exposure to viruses, bacteria and germs from patients, which can be transmitted through droplets, saliva and faeces, body fluids, etc. Furthermore, the ergonomic hazards from lifting and moving patients and non-ergonomic work positions can cause pain and even low back pain. In contrast, psychological hazards come from anxiety, fear, excessive worry, and increased workload.
2. Risk analysis of nurses in the emergency room of Tk Hospital. III dr. R. Soeharsono Banjarmasin has the highest risk level of physical and biological hazards with *a risk level of extreme risk.* Meanwhile, psychological and ergonomic hazards have *a high and moderate risk level.*
3. Risk evaluation of nurses in the emergency room of Tk Hospital. III dr. R. Soeharsono Banjarmasin mainly needs control as soon as possible and management involvement. One thing that must be done immediately is the application of SOPs and policies on the use of PPE when providing procedures to patients.

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