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Risk Management of Occupational Safety and Health (K3) Against B3 Medical Waste Management at the Regional Hospital of Kotabumi North Lampung Regency, Indonesia

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A B S T R A C T

The implementation of Occupational Health and Safety is an endeavor to provide a safe, healthy, and pollution-free work environment in order to decrease or eliminate work accidents and occupational diseases, which can boost efficiency and production (sustainable, 2014). The level of occupational safety and health risk that waste management officers face from tasks such as selection, freight, and storage. This is a qualitative sort of research that uses the process of in-depth understanding of a topic by looking at it for generalization research (Drs. Sumanto, M.A., 1995). B3 medical waste management officers at regional hospitals face a high level of workplace safety and health risks, according to the researcher. The risk assessment is made up of the following items based on the results of the hazard identification: selection of hospital medical waste with the greatest risk of being exposed to sharp items, with a value/score of (16) indicating a high risk Muscle and bone injuries are the highest risk in hospital medical waste freight, with a score of (12) with High Risk, and bad smell is the highest risk in unwell medical waste storage, with a score of (15) with High Risk. Risk Analysis: Selection of Hospital Medical Waste from each waste-producing room (Exposed to sharp items) and Hazardous Waste Storage are two risk statements and the statement with the highest cause in Risk Analysis (Respiratory Disorders). Evaluation of the effect of the Highest Opportunity Risk (Likelihood) x Impact (Consequence) on waste storage (bad smell) and hospital medical waste selection from each waste generating room (Exposed to Sharp Objects). Suggestions for research; adequately supervise so that things don't happen that could be really hazardous (very high). Hospitals can issue a warning or sanctions to officers who manage solid medical waste improperly.

INTRODUCTION

Occupational Health and Safety (K3) is an endeavor to establish a work environment that is safe, healthy, and free of environmental pollutants in order to decrease or eliminate work accidents and occupational diseases, which can boost efficiency and production (sustainable, 2014).

Hospitals can be hazardous to patients and their caregivers, including doctors, nurses, technicians, and those involved in hospital management and patient care (Kusnoputranto, 2009). Apart from infectious diseases, there are additional possible hazards in hospitals, such as accidents (explosions, fires, electrical-related mishaps, and other sources of injury), radiation, chemically toxic compounds, anesthetic gases, psychosocial and ergonomic disturbances. All of the potential hazards listed above plainly endanger the lives of hospital officers, patients, and visitors (Ministry Department, 2000).

Depending on the type of hospital waste, several microorganisms may be present. Hospital waste can damage the environment and cause health problems for those who live near the hospital. Because hospital trash might contain bacteria that cause diseases in humans, such as typhoid fever, cholera, dysentery, and hepatitis, it must be treated before being released into the environment.

Based on this explanation, it is clear that risk analysis efforts for medical waste officers are required in order to limit or eliminate the risk of workplace accidents. As a result, the goal of Hospital Occupational Health and Safety is to protect medical waste management officers at hospitals. At

Major General HM Ryacudu Hospital of Kotabumi district is a case of punctured by sharp item trash, especially needles, according to information from medical waste management officers and cases related to solid medical waste management. This happened in 2019 when the inpatient room's medical waste plastic was taken by the solid medical waste management officer. There are also certain issues with the waste management system, such as the presence of mixed waste ranging from medical to non-medical waste, which can put medical waste management officers in danger (Saftarina, et al., 2015).

METHOD

This is a type of qualitative research with a method that emphasizes the aspect of in-depth understanding of a problem from a generalization research perspective (Drs. Sumanto. MA, 1995). B3 medical waste management officers face a high level of occupational safety and health risks, according to researchers at the General Hospital in HM Ryacudu of South Kotabumi.

Sampling was carried out using consecutive sampling, which is a sampling technique by selecting a sample among the population according to the inclusion criteria required by the researcher, namely 387 respondents. The data was collected online for one month using the Google Forms application while adhering to ethical norms such as protecting the anonymity of respondents' names, not injuring them, and not forcing them to become responders after giving informed consent. The information gathered is organized into a data matrix. Univariate analysis was used to describe the demographic features of the respondents, such as parity, age, husband's support, and expertise. Bivariate analysis was carried out with the Chi Square (X2) statistical test with a significance level (α<0.05) to determine the correlation between each independent variable and the dependent variable.

RESULT AND DISCUSSION

Based on research that has been carried out at the Regional General Hospital of Mayjend HM Ryacudu of Kotabumi, researchers carried out hazard identification, risk assessment, risk analysis, risk evaluation, and risk control against the hazards of B3 medical waste management officers on April 2021. The process of handling B3 medical waste as following:

Table 1
Early Identification of Potential Hazards in Medical Waste Management Officers

No	Potential Hazard	Location	Most at risk officers	The most risk stage of Waste Management	Consequences of the risks that arise
1	PHYSICAL				
	Slippery floor	Hallway, Room, Hazardous Waste Storage Room	Medical Waste Management officers	Freight Waste Storage	Slip
2	CHEMICAL				
	Disinfectant	Every room	Medical Waste Management Officers	Storage selection	Exposure to chemical liquids
	Cytotoxics	Pharmacy Room, Hazardous Waste Storage Area	Medical Waste Management Officers	Storage selection	Exposed to Chemical Liquids and Bad Smell
3	BIOLOGY				
	Virus	Emergency Room, Operating Room, Laboratory, Laboratory, Hazardous Waste Storage, Patient Room	Medical Waste Management Officers	Storage selection	Contagion of disease
	Insect	Isolation Room, Patient Room	Medical Waste Management Officers	Freight selection	Insect disease
4	MECHANICAL				
	Needled	Every room	Medical Waste Management Officers	Freight storage selection	Hit by sharp objects
5	ERGONOMICS				
	Lifting heavy weights	Every room	Medical Waste Management Officers	Freight	Muscle and bone injuries *(musculosk eletal dicorders*)

Table 1 can be explained that there are 5 (five) Potential Hazards for B3 Medical Waste Management Officers, namely: 1) Physical, namely with potential hazards, namely slippery floors which pose a risk to medical waste management officers at the transportation and storage stages. B3 which may pose a risk of slipping or falling. 2) Chemicals, with potential hazards, namely, Disinfectants, which pose a risk to medical waste management officers at the selection and container stages who may be at risk of exposure to chemical liquids, Cytotoxics, which pose a risk to medical waste management officers at the storage and selection stages who may be at risk of exposure to chemical liquids and inhaling bad smell. 3) Biology, with potential hazards, namely, Viruses, which pose a risk to medical waste management

officers at the selection and storage stage which can be at risk of contracting disease. 4) Mechanical, with a potential hazard, namely, needle sticks that pose a risk to medical waste management officers at the stage of selecting, transporting, and storing waste that can be at risk of being exposed to sharp objects. 5) Ergonomics, with potential hazards namely, lifting heavy loads that pose a risk to medical waste management officers at the stage of transportation which can be at risk Muscle and bone injuries / *musculosk eletal corders.* So it can be concluded that of the 5 (five) potential hazards that have the greatest risk to medical waste management officers are at the Selection, Freight, and Storage stages.

Table 2
Hazard Identification of Medical Waste Selection at Regional General Hospital of Kotabumi

No	Hazard	Risk Owner	Cause
I	**Selection of Hospital Medical Waste from each waste generating room**		
1	Punctured / cut medical waste (syringes, broken laboratory equipment)	Officers	1. The volume of waste in the container is excessive, so there is some medical waste that appears / looks outward 2. Untrained 3. In a hurry 4. Not being careful when selecting medical waste Not using PPE (hand protection)
2	Exposure to chemical liquids	Environmen t, Worker	1. Perforated plastic parts 2. Not Using PPE
3	Diseases caused by insects (typhoid, diarrhea, cholera)	Worker	insects present in the waste when selecting waste
4	Disease Contagion	Worker	Infectious disease viruses contained in B3 Medical Waste

Table 2 can be explained that there are 4 (four) sources of danger in the medical waste collection process, namely; 1) Being punctured/cutting medical waste (syringes, broken laboratory equipment) there are 5 causes, namely: Excessive volume of waste in the container, so that some medical waste appears/looks outward, Untrained, Hasty, not careful be careful when collecting medical waste, do not use PPE (protective hands). 2) Exposed to chemical liquids caused by perforated/damaged plastic parts, and not using PPE. 3) Diseases caused by insects (typhoid, diarrhea, cholera) which can be caused by insects in non-medical waste. 4) Contagion of diseases that can be caused by infectious disease viruses contained in B3 Medical Waste.

Table 3
Hazard Identification of Medical Waste Freight at Regional General Hospital of Kotabumi

No	Hazard	Risk owner	Cause
I	**Hospital Medical Waste Freight**		
1	exposed to sharp objects	Freight officers	- Do not use PPE - Not being careful when freighting
2	Slip or fall	Freight officers	- Does not have a special path for transporting medical waste - Not being careful with the transport officers at work
3	Muscle and bone injuries *(musculoskeletal dicorders*)	Freight officers	- Less careful when transporting - Lack of training when transporting waste
4	Diseases caused by insects (typhoid, diarrhea, cholera)	Freight officers	There are a lot of insects in non-medical waste when it hurts to transport

Table 3 can be explained that there are 4 (four) sources of danger in the process of transporting medical waste, namely: 1) Being exposed to sharp objects, the causes that arise are, not using PPE and being less careful when freighting. 2) Slipping during freight, the causes that arise are, not having a special route for transporting medical waste and being less careful when freighting officers work. 3) Injury to muscles and bones / *musculosk eletal corders*, the causes of which are due to lack of care when transporting and lack of exercise when transporting waste. 4) Diseases caused by insects (typhoid, diarrhea, cholera), the causes of which are caused by the large number of insects found in non-medical waste when injuring transportation.

Table 4
Hazards identification of hazardous waste storage at Regional General Hospital of Kotabumi

No	Hazard	Risk owner	Cause
I	**Garbage storage**		
1.	Bad smell	Officer at medical waste storage	The smell from bottles of used drugs or chemical substances and the reaction of residual gases from chemicals from the lab.
2.	Slip or fall	Officer at medical waste storage	- Floor of storage area is slippery or uneven - Not being careful
3.	Exposed to sharp objects	Officer at medical waste storage	Spilled medical waste that is not properly packaged or broken plastic
4	Disease Contagion	Officer at Medical Waste Storage	Infectious disease viruses contained in B3 Medical Waste

Based on table 4 can be explained that there are 4 (four) sources of danger contained in the process of transporting medical waste, namely: 1) Bad odor caused by smells from bottles of used drugs or chemical substances and reactions residual gases from chemicals from the lab. 2) Slips caused by slippery or uneven storage floor and lack of care. 3) exposed to sharp objects, scattered medical waste that is not packaged properly or damaged plastic. 4) Contagion of diseases that can be caused by infectious disease viruses contained in B3 Medical Waste.

Table 5
Risk Table and Explanation

NO	RISK/EFFECT	EXPLANATION
1	SELECTION	
	exposed to sharp objects	At this stage of the election being exposed to sharp objects has the possibility of happening at one time to the officer (Likely) Consequences of being hit by sharp objects, namely, serious accidents, loss of operating/production capabilities, high material losses (Major)
	Exposure to Chemical Liquid	At this stage of selection exposed to chemical liquids Rarely occurs in officers (Rare) Consequences of being exposed to chemical liquids, namely, medical treatment, and also quite high material losses (Moderate)
	Diseases caused by insects (typhoid, diarrhea, cholera)	At this selection stage Diseases caused by insects (typhoid, diarrhea, cholera) tend to occur at one time in the officers (Unlikely) Consequences of Insect Diseases (Typhoid, Diarrhea, Cholera) i.e. initial accident assistance, medium material loss (Minor)
	Disease Contagion	At this selection stage, contracting the disease should occur at some point in the officer (Possible) Consequences of contracting the disease, namely, required medical treatment, material losses are quite high (Moderate)
2	FREIGHT	
	Fall or slip	At the stage of transportation, falls or slips are rare for officers (Rare) Consequences of falling or slipping, namely, required medical treatment, material losses are quite high (Moderate)
	Diseases caused by insects (typhoid, diarrhea, cholera)	At this stage of transportation Diseases caused by insects (typhoid, diarrhea, cholera) tend to occur at one time in the officer (Unlikely) Consequences of Insect Diseases (Typhoid, Diarrhea, Cholera) i.e. initial accident assistance, medium material loss (Minor)
	Muscle and bone injuries / musculoskeletal disorders	At this stage of transport Injury to muscles and bones / musculosk eletal corders Likely to occur in all situations in officers (Likely) Consequences of muscle and bone injury / musculosk eletal corders i.e., required medical treatment, material loss is quite high (Moderate)
	Exposed to sharp objects	At this stage of transportation being exposed to sharp objects tends to occur at one time (unlikely). Consequences of being hit by sharp objects, namely, serious accidents, loss of operating/production capabilities, high (major) material losses
3	STORAGE	
	Bad Smell	At this stage of storage an unpleasant odor should occur at some point (Possible) Consequences of unpleasant odors, namely, radiation hazard with wide-spread effects, very large losses.(Extrime)
	Exposed to sharp objects	At this stage of storage, exposure to sharp objects should have occurred at some time (Possible) Consequences of being hit by sharp objects, namely, serious accidents, loss of operating/production capabilities, high material losses (Major)
	Fall or Slip	At the storage stage, falls or slips are rare for officers (Rare) Consequences of falling or slipping, namely, required medical treatment, material losses are quite high (Moderate)
	Disease contagion	At this stage of storage, contracting the disease should occur at some point in the officer (Possible) Consequences of contracting the disease, namely, required medical treatment, material losses are quite high (Moderate)

Qualitative Risk Analysis, qualitative analysis in risk management is the process of assessing the impact and likelihood of the identified risks. This process is carried out by compiling risks based on their effects on project objectives. The measurement scale used in the qualitative analysis is the Australian Standard/New Zealand Standard (AS/NZS).

It can be concluded that the process/stage of transporting medical waste has the highest value, namely muscle and bone injury with a value of (12) High, while at the risk of being punctured by medical waste (syringes) with a value of

(8) Medium, then on the risk of disease due to insects with a value of (4) Low, and the lowest is in falling and slipping with a value of (3) Low.

LIMITATION OF THE STUDY

In this research there are many other factors that need to be investigated further.

CONCLUSION AND RECOMMENDATIONS

For the Head of the occupational safety and health risk management K3RS Installation to carry out good and routine supervision of the medical waste management system from the storage, collection, transportation, and storage stages so that things do not happen that can pose a very high risk (Very High). routine checks on officers, if there are officers who handle medical waste who do not use complete Personal Protective Equipment (PPE) when handling B3 medical waste, a warning and sanctions are given so that the officer behaves well in handling solid medical waste. For nurses or other officers, it is better to be able to separate B3 medical waste and non-medical waste so that there is no mixing of medical and non-medical waste in the room by providing Safety Boxes in each room so that officers avoid accidents due to sharp objects.

ETHICAL CONSIDERATIONS

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The author declares that no funding was received in connection with this research.

Conflict of Interest statement

The author declares that there is no conflict of interest related to this research and that there are no ethical issues arising from this research.

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