

## Profile of Hazardous and Toxic Materials Storage in the Hazardous and Toxic Materials Warehouse of Blambangan Regional Public Hospital Banyuwangi

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### ARTICLE INFORMATION

#### Article history

Received (4 May 2024)

Revised (1 June 2024)

Accepted (2 July 2024)

#### Keywords

Hazardous and toxic materials,  
storage, hospital

### ABSTRACT

**Introduction:** Hazardous and Toxic Materials are substances, chemical and biological in a single form or mixture, whose properties, concentration, or amount can contaminate, damage, and endanger the environment and health directly or indirectly. Improper storage of Hazardous and Toxic Materials can harm humans and the environment. Blambangan Regional Public Hospital has a Hazardous and Toxic Materials Warehouse used for storing chemicals needed for pharmacy service processes. This study aimed to investigate the Hazardous and Toxic Materials storage in the Hazardous and Toxic Materials Warehouse at Blambangan Regional Public Hospital. **Method:** This was an observational study using descriptive methods. It was conducted in the Hazardous and Toxic Materials Warehouse of Blambangan Regional Public Hospital during June-July 2023. **Results:** The results showed that the Hazardous and Toxic Materials storage in the Blambangan Regional Public Hospital Warehouse had Hazardous and Toxic Materials inventory data, and Material Safety Data Sheets (MSDS). The availability of Hazardous and Toxic Materials safety facilities includes Personal Protective Equipment (PPE), Hazardous and Toxic Materials signs and symbols, and a spill kit. **Conclusion:** However, the lack of safety facilities includes Hazardous and Toxic Materials cabinets, body wash stations, and eye wash stations. Guidelines and Standard Operating Procedures (SOPs) for Hazardous and Toxic Materials management are still incomplete, and Hazardous and Toxic Materials emergency handling is not yet well established. This study concludes that the Hazardous and Toxic Materials storage in Blambangan Regional Public Hospital Warehouse does not meet the requirements according to Permenkes No. 66 of 2016, because out of 5 required aspects, only 3 aspects are fulfilled.

## Introduction

Hazardous and Toxic Substances are substances, chemicals and biology, in single or mixed form, whose nature, concentration or amount, can pollute, damage and endanger the environment or health directly or indirectly. (Permen LHK RI Nomor 12 Tahun 2020 Tentang Penyimpanan Limbah Bahan Berbahaya Dan Beracun, 2020). Hazardous and Toxic Materials are used in several work industries as raw materials for operational activities or production of goods, one of which is hospitals. Hazardous and Toxic Materials in hospitals is stored in the Hazardous and Toxic Materials warehouse. Improper storage systems for hazardous and toxic materials will result in harm to humans and the environmental pollution. (PP RI Nomor 74 Tahun 2001 Tentang Pengelolaan Bahan Berbahaya Dan Beracun, 2021).

Examples of B3 in hospitals are cancer drugs, reagents, antiseptics and disinfectants, radioactive materials, etc. (Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit). Adverse events resulting from storing B3 due to placing mercury or B3 indiscriminately occurred at one of the Bali Province Eye Hospitals. This causes potential injuries



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to health workers in the relevant units. The recommended risk management is to carry out a B3 storage program (Pemerintah Provinsi Bali, 2019).

According to Kementerian Kesehatan RI Direktorat Jendral Kefarmasian dan Alat Kesehatan (2019) on Books Standard Technical Instructions for Pharmaceutical Services in Hospitals, Hazardous and Toxic Materials are stored in a special cupboard with markings indicating the nature of the materials. Hazardous and Toxic Materials storage areas must include eye washers and body showers, spill kits (spill handling equipment), Material Safety Data Sheet (MSDS) sheets and storage shelves/containers equipped with the appropriate Hazardous and Toxic Materials symbol.

Blambangan Regional Public Hospital is the largest and oldest hospital in Banyuwangi Regency. Geographically, it is in the middle of the city which is the center of the Banyuwangi Regency Government, surrounded by 2 government offices, business areas and educational facilities in Banyuwangi. Blambangan Regional Public Hospital has two warehouses, namely the Hazardous and Toxic Materials warehouse for storing Hazardous and Toxic Materials. Hazardous and Toxic Materials warehouse for storage of laundry chemicals and linen. Based on preliminary studies, information was obtained that in the Hazardous and Toxic Materials Warehouse which is under the auspices of the Hospital Pharmacy Installation, there are no Standard Operating Procedures (SOP) for Hazardous and Toxic Materials storage. The aim of this research was to see the suitability of B3 storage based on occupational health and safety aspects listed in the Republic of Indonesia Minister of Health Regulation No. 66 of 2016.

## Methods

This research was an observational study that uses descriptive methods. The research was conducted in June-July 2023 at the Hazardous and Toxic Materials Warehouse of Blambangan Regional Public Hospital. The instrument used was an observation sheet which refers to Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) related to Hazardous and Toxic Materials storage in hospitals. Apart from making observations using observation sheets, researchers also conducted interviews with pharmaceutical installation officers who use the Hazardous and Toxic Materials Warehouse to clarify the observation data. This research has passed an ethical review by the STIKES Banyuwangi Health Research Ethics Commission team with number 097/01/KEPK-STIKESBWI/V/2023.

## Results

The research was carried out by observing Hazardous and Toxic Materials storage in the Hazardous and Toxic Materials Warehouse. Hazardous and Toxic Materials storage is one aspect of pharmaceutical supplies management that must be considered properly to support the quality of service in hospitals. The results of the research regarding the description of Hazardous and Toxic Materials storage in the Hazardous and Toxic Materials Warehouse at Blambangan Regional Public Hospital can be seen in table 1 below:

Table 1. Hazardous and Toxic Materials Storage

No.	Observed Aspects	There is	There isn't any
1.	Inventory of Hazardous and Toxic Materials in Hospitals	✓	-



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2.	Material Safety Data Sheet	✓	-
3.	Hazardous and Toxic Materials Safety Facilities which include:		
a.	Hazardous and Toxic Materials Cupboard	-	✓
b.	Body wash	-	✓
c.	Eyewasher	-	✓
d.	Personal Protective Equipment (PPE)	✓	-
e.	Hazardous and Toxic Materials signs and symbols	✓	-
f.	Spill kits	✓	-
4.	Guidelines and standard operational procedures for safe Hazardous and Toxic Materials management		
a.	SOP for handling Hazardous and Toxic Materials use	-	✓
b.	SOP for use of PPE	-	✓
c.	Guidelines for labeling hazardous materials and waste	-	✓
d.	SOP for permits and licenses	-	✓
e.	Guidelines for reporting and investigation mechanisms for Hazardous and Toxic Materials spills and exposure	-	✓
f.	Guidelines for managing spills and exposure	-	✓
5.	Handling Hazardous and Toxic Materials emergencies		
a.	There is training and simulation of Hazardous and Toxic Materials spills	-	✓
b.	There are procedures to manage spills and exposure to Hazardous and Toxic Materials	-	✓
c.	There is reporting and investigation for Hazardous and Toxic Materials spills and exposure	-	✓

## Discussion

Based on table 1, it is known that the Hazardous and Toxic Materials inventory consists of several Hazardous and Toxic Materials, including 70% alcohol, 96% alcohol, aseptic gel, sodium hypochlorite. The inventory sheet in Hazardous and Toxic Materials Warehouse is held by the head of the Pharmacy Installation. Apart from the inventory sheet, Hazardous and Toxic Materials Warehouse also uses stock cards which are used to check the number of outgoing and incoming goods. This stock card can be accessed by the Pharmaceutical Technical Personnel on duty. This is in accordance with Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) related to Hazardous and Toxic Materials storage, the hospital must have Hazardous and Toxic Materials inventory. Different from research conducted by Haryani & Nopriadi (2022) regarding Evaluation of the Occupational Safety and Health Implementation in the



Hemodialysis Unit of the Regional Public Hospital, Mandau District, Bengkalis Regency. The results obtained were that the hospital did not have Hazardous and Toxic Materials inventory data. Kepmenkes RI Tahun 2022 Tentang Standar Akreditasi Rumah Sakit (2022) in the facility and safety management chapter regarding Hazardous and Toxic Materials management, it is stated that hospitals must have a Hazardous and Toxic Materials management system which includes Hazardous and Toxic Materials inventory data collection.

The research results show that Hazardous and Toxic Materials at the Blambangan Regional Hospital is also accompanied by a Material Safety Data Sheet. Material Safety Data Sheets (material safety data sheets) are available in 2 languages, namely English and Indonesian which are handled by the Head of Pharmacy Installation and the Head of Logistics. The Head of Logistics provides a study in the form of outreach regarding material safety data sheets to Pharmaceutical Technical Personnel who use Hazardous and Toxic Materials. This is because not everyone understands and can understand the meaning of the numbers listed in the Material Safety Data Sheet. Officers who use Hazardous and Toxic Materials simply use the Hazardous and Toxic Materials management SOP provided by the Head of Logistics. This is in accordance with Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) related to Hazardous and Toxic Materials storage, hospitals must have a material safety data sheet (material safety data sheet) which contains information about hazardous materials related to safe handling of Hazardous and Toxic Materials, procedures for handling spills and procedures for managing exposure.

Different from research conducted by (Haryani & Nopriadi 2022). The results obtained were that the hospital did not have a Material Safety Data Sheet because the Hospital did not have proof that the Hazardous and Toxic Materials procurement had attached an MSDS. Hospitals and suppliers still do not understand the negative impact of not having an MSDS. Kepmenkes RI Tahun 2022 Tentang Standar Akreditasi Rumah Sakit (2022) in the facility and safety management chapter regarding Hazardous and Toxic Materials management, it is stated that hospitals must have a Hazardous and Toxic Materials management system which includes the availability of a Material Safety Data Sheet. Each hospital has a different B3 list. The B3 list is adjusted to the B3 used in the hospital (Unit Keselamatan dan Kesehatan Kerja RSUP Dr. Sardjito, 2019).

Hazardous and Toxic Materials at the Blambangan Regional Hospital is not stored in the Hazardous and Toxic Materials cupboard, but uses wooden pallets and iron shelves with a length of 2.5 meters and a width of 0.5 meters, totaling 3 shelves. Hazardous and Toxic Materials storage at the Blambangan Regional Hospital does not require a Hazardous and Toxic Materials cupboard because the amount of Hazardous and Toxic Materials they have is not too much and they do not contain the type of Hazardous and Toxic Materials that is corrosive and toxic which must be stored in the Hazardous and Toxic Materials cupboard. These results are not in line with research conducted by Susanto & Nopriadi (2021) Regarding Evaluation of the Implementation of the Occupational Safety and Health (OSH) Program in Hospitals. The results obtained are that Hazardous and Toxic Materials are stored in the Hazardous and Toxic Materials cupboard in accordance with the requirements Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016). According to Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) related to Hazardous and Toxic Materials storage, you must have a dangerous and toxic materials cupboard. The Hazardous and Toxic Materials cupboard made of iron has 2 doors and the Hazardous and Toxic Materials that is stored in the cupboard is Hazardous and Toxic Materials which is poisonous, one example of which is cyanide acid. Therefore, the Hazardous and Toxic Materials Warehouse at Blambangan



Regional Hospital does not meet the requirements Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016).

Hazardous and Toxic Materials Warehouse of Blambangan Regional Public Hospital does not have a body wash but is provided with a bathroom that can be used to wash the body. These results are not in line with research conducted by Martin et al. (2022) regarding the Description of the Implementation of Occupational Safety and Health (OSH) at Semen Padang Hospital in 2021. The results showed that the hospital has implemented it in accordance with the requirements of Minister of Health Regulation Number 66 of 2016 by providing Hazardous and Toxic Materials safety facilities, namely body wash. According to Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) regarding Hazardous and Toxic Materials storage, the Hazardous and Toxic Materials warehouse must have a body wash. Therefore, the Hazardous and Toxic Materials Warehouse at the Blambangan Regional Public Hospital does not meet the requirements of Minister of Health Regulation Number 66 of 2016.

Hazardous and Toxic Materials Warehouse at Blambangan Regional Hospital does not have an eyewasher, but a sink is provided in each place that can be used to wash the eyes. This is not appropriate Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) Regarding Hazardous and Toxic Materials storage, you must have an eyewash. This is in accordance with the research results conducted by Martin et al. (2022) regarding the description of the implementation of Occupational Safety and Health (OSH) at Semen Padang Hospital in 2021. The results obtained show that the hospital has implemented it in accordance with the requirements Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) by providing Hazardous and Toxic Materials safety facilities, namely eyewashers.



**Picture 1.** Eyewasher

There is Personal Protective Equipment (PPE) consisting of gloves, masks and nurse caps. This is in accordance with Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) Regarding Hazardous and Toxic Materials storage, you must have Personal Protective Equipment (PPE). The personal protective equipment used is gloves, masks, chemical coveralls and chemical respirators. This is in accordance with the results of research conducted by Martin et al. (2022) regarding the description of the implementation of Occupational Safety and Health (OSH) at Semen Padang Hospital in 2021. The results obtained show that the hospital has implemented it in accordance with the requirements RI Minister of Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) by providing Hazardous and Toxic Materials safety equipment, namely Personal Protective Equipment (PPE).

There is 1 Hazardous and Toxic Materials sign and symbol stuck on the wall of the Hazardous and Toxic Materials Warehouse at Blambangan Regional Public Hospital. This is in accordance with Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) related to Hazardous and Toxic Materials storage must have signs and symbols for Hazardous and Toxic Materials. These results are in accordance with the results of research

conducted by Susanto & Nopriadi (2021) Regarding Evaluation of the Implementation of Occupational Safety and Health (OSH) Programs in Hospitals. The results obtained are that the hospital has Hazardous and Toxic Materials signs and symbols in accordance with the requirements Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016).

There is a spill kit consisting of a mask, surgical gloves, household gloves; google; aprons; absorbent (tissue, underpad, newspaper, used cloth); liquid chlorine 0.5%; trash scoop and mop; yellow and brown plastic bags; sand and spill containers (buckets, barrels). This spill kit is used to handle spills and to neutralize concentrated compounds. This is in accordance with Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) Regarding Hazardous and Toxic Materials storage, you must have a spill kit. This is in accordance with the results of research conducted by Martin et al. (2022) regarding the description of the implementation of Occupational Safety and Health (OSH) at Semen Padang Hospital in 2021. The results obtained show that the hospital has implemented it in accordance with the requirements Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) by providing Hazardous and Toxic Materials safety equipment, namely spill kits.

Blambangan Regional Public Hospital's Hazardous and Toxic Materials warehouse does not have guidelines and SOPs for Hazardous and Toxic Materials management. This is not appropriate Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) related to Hazardous and Toxic Materials storage, there must be guidelines and SOPs for Hazardous and Toxic Materials management. Hazardous and Toxic Materials management SOPs include SOPs for handling Hazardous and Toxic Materials use, use of PPE, permits and licenses, Hazardous and Toxic Materials labeling guidelines, reporting and investigation mechanisms for Hazardous and Toxic Materials spills and exposure and guidelines for managing spills and exposure. Different from the results carried out by Haryani & Nopriadi (2022) The results obtained are that the hospital has an SOP related to Hazardous and Toxic Materials regulation which includes Hazardous and Toxic Materials use, storage and management. The existing SOPs are not complete, there are no SOPs for managing each type of Hazardous and Toxic Materials and SOPs for the stages in Hazardous and Toxic Materials management.

There is no training regarding Hazardous and Toxic Materials spills. However, the Blambangan Regional Hospital provided outreach carried out by the Pharmacy Installation team to officers who used Hazardous and Toxic Materials, carried out once 5 years ago. This is not appropriate Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) related to Hazardous and Toxic Materials storage, they must carry out training and simulate Hazardous and Toxic Materials spills. The results of this study are not in line with research conducted by Susanto & Nopriadi (2021) Regarding Evaluation of the Implementation of Occupational Safety and Health (OSH) Programs in Hospitals. The results obtained were that officers received training and handling of Hazardous and Toxic Materials spills and socialization during morning assembly as well as socialization in every room.

## Conclusion

Based on the results of the research that has been carried out, it can be concluded that the Hazardous and Toxic Materials storage in the Blambangan Regional Public Hospital's Hazardous and Toxic Materials Warehouse does not meet the appropriate requirements Permenkes RI Nomor 66 Tahun 2016 Tentang Keselamatan Dan Kesehatan Kerja Rumah Sakit (2016) because of the 5 required aspects, only 3 aspects have been fulfilled, namely there is Hazardous and Toxic



Materials inventory data, Material Safety Data Sheet (material safety data sheet) and there are material safety facilities such as personal protective equipment (PPE), Hazardous and Toxic Materials signs and symbols and spill kits. Meanwhile, aspects that have not been fulfilled are not having guidelines and SOPs for Hazardous and Toxic Materials management and not having SOPs for handling Hazardous and Toxic Materials emergencies. Hospitals can create SOPs related to handling B3 spills and training related to handling B3 spills.

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