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Research Article

The Risk Matrix of Occupational Health and Safety on Cleaning Service Occupation in Universitas X Ponorogo

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DOI: 10.33086/mtphj.v7i1.3591

Article History:

Received, November 14th, 2022

Revised, April 17th, 2023

Accepted, April 18th, 2023

Available Online: May 1st, 2023

Please cite this article as:

Rahmania A., et. al., "The Risk Matrix of Occupational Health and Safety on Cleaning Service Occupation in Universitas X Ponorogo" Register: Medical Technology and Public Health Journal, Vol. 7, No. 1, pp. 79-88, 2023

ABSTRACT

The risk matrix can be discovered by first identifying the hazards at the work stages. The cleaning service occupation has a risk of hazards during work. Cleaning service occupation becomes a job which often intersects with biological, ergonomic, physical, chemical and psychological hazards. If these hazards are not handled properly, they can cause work accidents, illness and even fatality. Identifying hazards at work is the initial stage before conducting risk assessment and mapping. The study aims to map the level of risk in the cleaning service occupation. The study used a quantitative analytical method with an observational approach. Data was collected by doing observation and filling out Hazard Identification Risk Assessment (HIRA) form. The result reveals several levels of risk appearing in the risk matrix for cleaning service employees. Most of the risk matrix levels seen in the cleaning service occupation are "high risk", and "moderate risk" appears in a small percentage. According to the result, the recommended actions are controlling the hazard through repairing work tools following the physiology of cleaning service workers, providing periodic recess on each work shift, socializing regarding the nature and types of materials and how to handle chemicals properly, and providing appropriate PPE facilities for the type of activity occupation.

Keywords: Cleaning service, hazard, HIRA, risk matrix

INTRODUCTION

Occupational health and safety become essential in every activity, whatever the type of work and industry. Occupations which do not apply the principles of occupational safety and health can cause losses in terms of material, environmental, work equipment, health problems and even death (fatality). Individuals or organizations can realize occupational safety and health through hazard identification and risk assessment (Syahidah & Musfiroh, 2017).

Occupational safety and health must be implemented to prevent work-related accidents and diseases (Kurniawidjadja, Martomulyono, & Susilowati, 2020). Moreover, it also builds a more competent, happier, and healthier workforce (Ridwan et al., 2021). The cleaning service occupation is faced with all types of dangers and hazards when an individual is performing cleaning task, such as biological, ergonomic, physical, chemical, and psychological hazards (Farsida & Zulyanda, 2019;

Prasetyo, Hasanbasri, & Hastaryo, 2015). Occupational health can help maximize overall health, physically and mentally (Tamba, 2020). According to Tarwaka, occupational health is an aspect of health closely related to the work environment (Tarwaka, 2014). In addition, implementing an occupational health system can rapidly provide a practical framework to prevent or minimize accidents and workplace-related ill-health. As mentioned before, the key benefit of implementing occupational health is to enhance physical, mental, and social health at the maximum level (Rejeki, 2016).

Occupational health and safety are crucial to running any business successfully and should be prioritized by all formal and informal companies (Yuliandi & Ahman, 2019; Yuantari & Nadia, 2018). Based on Law Number 1, the year 1970 concerning Occupational Safety states that every worker has the right to receive protection in carrying out work activities for the workers' safety, health, and welfare (Undang-Undang Republik Indonesia, 1970). Applying occupational health and safety is an investment and essential to prevent the negative impacts from work (Yuliandi & Ahman, 2019).

Cleaning service is vital in an institution, office, or any organization. Cleaning service workers have the responsibility for keeping the workplace clean and sanitary. They perform various duties, including cleaning, tidying up, and organizing furniture. According to the element of competency number N.812100.001.02, in doing their jobs, cleaning service workers need to know and apply the principles of occupational health and safety so that they can work safely (Menteri Ketenagakerjaan, 2016). Cleaning service workers face various occupational hazards, such as biological and chemical hazards. Biological hazards include exposure to infectious bacteria, microbes, or even viruses. In comparison, chemical hazards contain waste and trash that may be toxic and potentially cause infections (Hutagalung & Ikatrinasari, 2018).

A previous study presented that the level of risk to the safety and health of cleaning service workers is 45.1% considered the moderate risk and 36.6% considered high risk. The remaining 18.3% of the result is considered low-risk work activities. If an organization and management team are not committed to workplace safety, they will probably face several increases in accidents, injuries, and occupational diseases. Occupational safety hazards, such as musculoskeletal disorders (bones and back muscles) and skin irritation from chemicals, often occur. Further, some accidents are considered safety hazards often experienced by cleaning service workers, such as falling from stairs, slipping, puncturing or scratching by sharp objects (Yuantari & Nadia, 2018).

From the explanation above, it is then identified that studies on applying risk assessment and control in every occupation need to be revised. This present study focuses on cleaning service workers. Therefore, this current study will be the first to map risk levels from the safety and health aspects of cleaning service workers' activities. Moreover, by conducting this study, the organizations and other researchers can use this result to evaluate the safety and health systems so that the maximum level of health degree for all cleaning service workers, especially in Universitas X Ponorogo, can be achieved.

MATERIAL AND METHODS

In order to answer the research question, this study used a quantitative analytical method with an observational approach. The research data was obtained through observation and filling out the Hazard Identification Risk Assessment (HIRA) form, as shown in Table 1. Data collection was conducted in March 2022. The researcher investigated the work activities of cleaning service workers at Universitas X Ponorogo, East Java. Fifteen participants out of forty workers were chosen

by accidental random sampling to take part in this research. Accidental random sampling was used by taking cleaning service workers close at hand . The data are analyzed using a risk assessment guide and matrix (Hutagalung & Ikatrinasari, 2018). The data analysis was then processed, as shown in Table 1.

Table 1. Data Processing and Analysis Stage

Stages	Category
Consequences (C)	1 = relatively minor risk (no lost time injury) 2 = minor injuries (still able to work on the day of the incident) 3 = moderate injury/needs medical treatment, not disabled, financial loss (lost 1-2 working days) 4 = severe injury/partial disability/permanent disability (loss of >3 working days) 5 = (<i>fatality</i>)
Likelihood (L)	1 =rarely (< once/10 years) 2 =unlikely (once in 10 years) 3 = likely (once in 5 years – once a year) ⁸ 4 = most likely (>once in a year - once a month) 5 = almost certain (over once a month)
Risk Level (R)	Low Moderate High Extreme

After the three stages in Table 1 have been implemented, the expected risk level can be matched to the risk matrix, as shown in Figure 1 (Isdiyati, Suhendar, & Suyana, 2021). ¹¹

Skala		Tingkat Keparahan (<i>Consequences</i>)				
		1	2	3	4	5
Probabilitas (<i>Likelihood</i>)	5	5	10 ^b	15	20	25
	4	4 ^b	8	12 ^a	16	20
	3	3	6	9	12 ^b	15
	2	2	4 ^a	6	8	10 ^b
	1	1	2	3	4 ^c	5

Figure 1. Risk Matrix

Figure 1 Description:



The risk Matrix in Figure 1 describes the risk level of the most severe occupational accidents so that the result can be used as guidance to set a priority scale in taking improvement (Ada & Hambali, 2020; Trisaid, 2020).

RESULTS AND DISCUSSION

This study reveals some information regarding cleaning service workers' activities in Universitas X Ponorogo. Cleaning service workers work 7 hours six days a week. Workers' various activities and hazard and risk factors analysis can be seen in Table 2.

Table 2. Hazard and Risk Factors in the Job Activities of Cleaning Service Workers at University X Ponorogo

Job Activities	Hazard	Risk	Risk Matrix		
			C	L	R
sweeping floor	ergonomics	sprains in the back or waist muscles	2	5	10 ^a
	ergonomics	wrist pain	2	5	10 ^a
sweeping stairs	ergonomics	sprains in the back or waist muscles	2	5	10 ^a
	ergonomics	wrist pain	2	5	10 ^a
	mechanical	slip over	2	4	8
	mechanical	slipped, hit, and bruised	2	4	8
	mechanical	Slipped, hit, and cause bone fracture	3	2	6
sweeping floor	ergonomics	sprains in the back or waist muscles	2	5	10 ^a
	ergonomics	wrist pain	2	5	10 ^a
	mechanical	slip over	2	4	8
sweeping stairs	ergonomics	sprains in the back or waist muscles	2	5	10 ^a
	ergonomics	wrist pain	2	5	10 ^a
	mechanical	slip over	2	4	8
	mechanical	slipped and hit and bruised	2	4	8
	mechanical	slipped and hit and cause bone fracture	3	2	6
wiping the window	ergonomics	back pain or sprains	2	5	10 ^a
	chemical	skin irritation	2	5	10 ^a
	mechanical	scratched table glass	2	4	8
wiping the desk	ergonomics	back pain or sprains	2	5	10 ^a
	chemical	skin irritation	2	5	10 ^a
	mechanical	scratched glass or window trim	2	4	8
cleaning the sink	ergonomics	back pain or sprains	2	5	10 ^a

Job Activities	Hazard	Risk	Risk Matrix		
			C	L	R
cleaning the closet	chemical	skin irritation due to liquid HCl	2	5	10 ^a
	mechanical	hit the sink or faucet	2	4	8
throwing garbage	ergonomics	back pain or sprains	2	5	10 ^a
	chemical	skin irritation due to liquid HCl	2	5	10 ^a
picking up trash can	mechanical	scratched by glass or cutter causes the wound on the skin hand	2	4	8
lifting and moving tables	ergonomics	sprains in the back and waist muscles or wrists	2	5	10 ^a
lifting and moving tables	ergonomics	sprains in the back and waist muscles	2	4	8
	mechanical	bruises on the feet or toes from being squeezed by the table	2	4	8

Table 2 describes the cleaning services workers' activities spread across eleven buildings at X Ponorogo University. The three common workplace hazards potentially expose all cleaning services workers are ergonomic, chemical, and mechanical. The ergonomic risk factor is any condition related to the interactions between workers, work tools, work facilities, machines, work environment, and work systems (Iridiastadi & Yassierli, 2017).

Cleaning service workers perform various duties such as sweeping, mopping, and cleaning tables/windows. The duties are conducted by using work tools or machines. The working tools used are brooms, mops, buckets, floor-cleaning brushes and others. The interaction between cleaning service workers and work tools negatively impacts the body. Workers' physical conditions, such as static postures while doing the job, may pose a risk of injury to the musculoskeletal system, including excessive fatigue, muscle injury, and other physical complaints (Iridiastadi & Yassierli, 2017). Figures 2 and 3 are examples of cleaning service activities, showing the interaction between workers and work tools.



Figure 2. Sweeping floor activity



Figure 3. Wiping the window activity

These activities are shown in Figures 2 and 3, potentially can cause muscle injury due to non-ergonomic work postures. These activities repeatedly are done every day for six days a week. These repetitive motions need bending, twisting, and bowing movements. Further, these movements involve excessive muscle work because it needs to be more ergonomic.

Applying ergonomic principles in all cleaning service activities is vital to enhance work productivity and quality, reduce the intensity of complaints caused by muscle pain such as shoulders, neck, wrists, back or waist muscles, and reduce unsafe acts and work accidents. One way to approach that goal is by improving work posture from not ergonomic to ergonomic. Repairs, modifications, or adjustments to work tools can be implemented so that the workers to get rid of the need to reach, bend, or stay in awkward postures for an extended period (Susanti, Zadry, & Yuliandra, 2015).

Furthermore, using HCl liquid with levels between 17 – 32% to clean the sink and closet can be done twice a week. HCl is a mineral acid liquid that quickly corrodes objects and damages cell tissue in an organic base (Rejeki, 2016). This characteristic can cause severe chemical burns to clean service workers' skins. HCl can cause adverse effects such as skin irritation (PT. SULFINDO ADIHUSADA, 2020), redness, itching, heat or peeling (Subamia, Sriwahyuni, & Widiasih, 2019).

Slippery floors and hazardous objects such as sharp objects are also identified as a mechanical factors in the work environment. These sharp objects can be potentially severe and dangerous, cutting injuries to cleaning service workers while doing cleaning duties in the University. The risk matrix for the cleaning service occupation at X University Ponorogo can be illustrated in Figure 4.

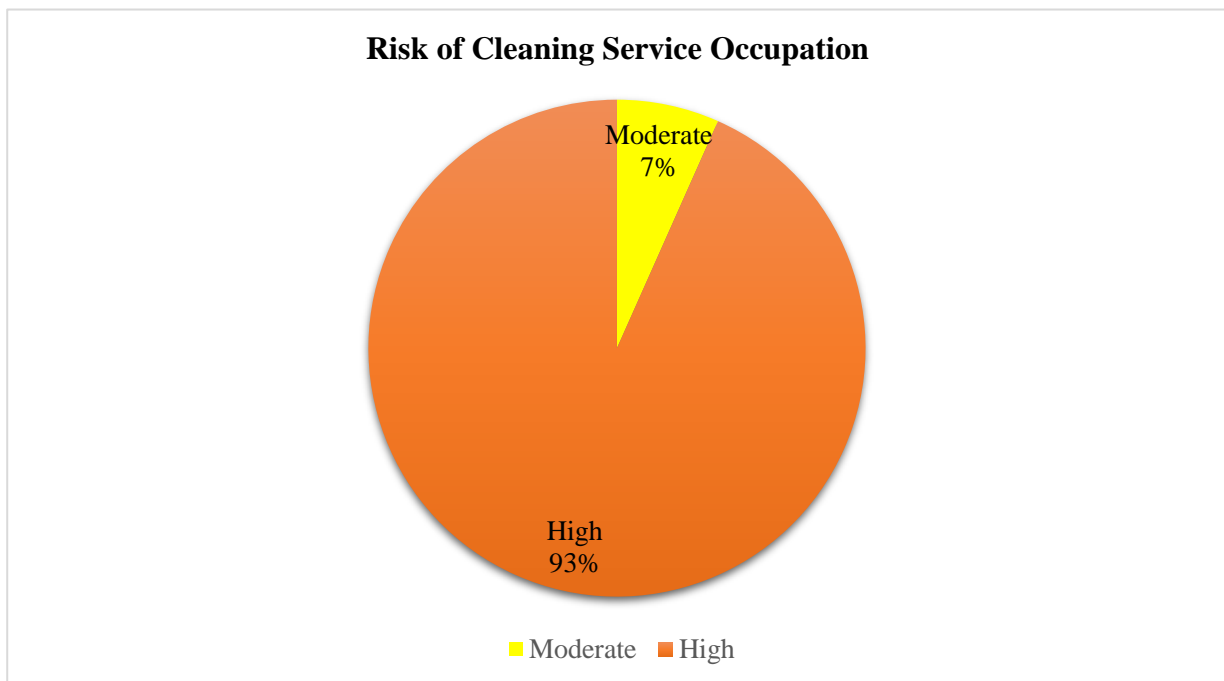


Figure 4. The risk level of Cleaning Service Occupation

Figure 4 shows that most cleaning service workers' activities have high-risk levels. The workers carry out high-risk activities that can result in fatalities and injuries, such as minor injuries. However, the workers can still work on the day the incident happens once a month or over one incident per month (Isdiyati et al., 2021). The high-risk level includes sweeping the floor or stairs, wiping the window, cleaning the sink or closet, throwing garbage, picking up trash can, and lifting-moving tables. Besides that, the moderate risk level is the activities that include sweeping the stairs causing bone fractures. This incident could happen because of the occurrence's intensity, about once in 10 years past/unlikely (Isdiyati et al., 2021).

Besides, according to the result, cleaning sinks and closets uses 17 - 32% of HCl liquid. Floor cleaning liquid containing 17% HCl can react with metal, further producing hydrogen gas. metal reaction mainly occurs between Al metal and floor cleaner liquids (Rahmah et al., 2020). This condition requires effective safety management so that the company becomes actively controlled and reduces incidents. Providing the training and information necessary for the workers related to cleaner materials, the impact on the body, and knowing what to do in a medical emergency if a worker is injured or overcome by chemicals (Subamia et al., 2019).

Moreover, the university management should provide Personal Protective Equipment (PPE) and communicate with the workers on how to wear it, including explaining the proper step in wearing it and choosing the right type of PPE following the activities being done (Yuantari & Nadia, 2018). Research shows that hand glove use effectively decreases potential dermatitis (Azizah, 2019). The training agenda could significantly increase workers' knowledge (Elfiana & Suryana, 2020), so the university should schedule How to Use PPE especially hand gloves, to make cleaning service workers know and use PPE properly during work hours.

Cleaning service work activities that comply with ergonomic principles need to be considered. Ergonomic factors can pose various risks, including excessive work fatigue, sprains, lumbar or back muscle pain and other musculoskeletal complaints (Rahdiana, 2017). Cleaning

service workers do their work manually and repetitively and must be ergonomic. These activities can trigger excessive work fatigue and musculoskeletal disorders. The company can take preventive measures by applying divisions of labor in every element of occupation and providing periodic recesses for at least one hour on each work shift (Widiastuti, Nurhayati, Nur, & Sari, 2019). In addition, the company needs to pay attention to the cleaning service workers' attitude. This aligns with the study's result, which shows a relationship between workers' attitudes and musculoskeletal complaints (Rachman, 2019).

CONCLUSION AND SUGGESTION

This present study conveys that the cleaning service occupation involves high-risk occupation, which must be addressed and considered. The risk Matrix of cleaning service occupation indicates 93% of work activities are included as high-risk work activities, and 7% of work activities are included as moderate risk. The high risk could cause a moderate injury or need medical treatment, not being able to work for 1-2 days and financial loss. This risk level comes from the activities such as sweeping the floor or stairs, wiping the window, cleaning the sink or closet, throwing garbage, picking up trash can, and lifting - moving tables. This present study can serve to provide insights or suggestions for management in the organization to build some improvements such as redesigning the work tools following the physiology of cleaning service workers, arranging periodic recess on each work shift, organizing the training and information related to any cleaner materials, the impact on the body, and how to handle chemicals, and providing suitable Personal Protective Equipment (PPE) for the cleaning service workers wear to protect them from a hazard.

ACKNOWLEDGEMENT

The corresponding author, all authors and the Department of Occupational Health and Safety would like to thank all respondents and parties who supported the implementation of this research; well done.

CONFLICT OF INTEREST

The corresponding author states that no conflict of interest exists between researchers, respondents, or other parties involved in this study.

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