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Analysis of Occupational Accident in Household Garbage Man Community in Jember, Indonesia

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ABSTRACT

Household garbage man is a job that is at risk of causing illness and accidents due to work. The type of waste produced by households has diverse characteristics with all the negative impacts it causes. This research is a quantitative study with a correlative design that aims to identify the correlation ship between the use of personal protective equipment (PPE), posture and conditions of work facilities and incidents of occupational accidents. This study is involving 50 respondents taking by simple random sampling from 73 people who work as garbage man. The data collected using a questionnaires and observation sheets. Data analysis used the Spearman's Rho statistical test. The result shows the used of personal protective equipment (boots) is related to accident due to work (p value: 0.004; α: 0.05; r: 0.398). The use of personal protective equipment (gloves) is related to accident due to work (p value: 0.005 α: 0.05: r: 0.388). Proper postural body is related to accident due to work (p value :0.015; α: 0.05; r: -0,343). Condition of work facilities are related to accident due to work (p value: 0.026; α: 0.05; r: 0.315). The use of proper personal protective equipment, supported by work facilities and good posture can reduce accidents at work.

Keywords: *occupational accident, household, garbage man community*

1. INTRODUCTION

Garbage has become a national phenomenon. As the population continues to increase, it will also increase the amount of waste generated. Urban population worldwide are estimated at 4.3 billion people in 2025 which means waste generated is also increasing. Waste from the activity of city dwellers around 1.24 kg/person/day so that it will generate waste around 2.2 billion tons for a year [1]. Based on the data from Ministry of Environment and Ministry of Industry in 2016, there were about 65.2 million tons waste that generated in Indonesia for a year [2]. Urban municipal waste mostly produced by households and commercial companies [3].

Since the household waste production is high, it requires good management starting from the household level to the final disposal site. The collection process from households to temporary shelters require sufficient number of worker (garbage man). In addition, it needs a healthy body and strong energy.

Household garbage man is a job that is at risk of causing illness and accidents due to work [4], [5]. The risk is caused by household waste were various type of solid material left over from household activities that are no longer used. Various type of garbage produced by households include organic and inorganic waste, easy to rot and not, flammable and non-flammable, sharp and blunt one. Most of household waste are in the form of food, woods, iron, broken glasses, cans, plastics, papers and others. Kuijer & Frings-Dresen [5] said that some factors that could increase the risk of having occupational accidents in garbage man are the waste they have been take is not only rotten foods waste but also consist of broken rubbish, glass, sharp metal and also used cans. The diverse characteristics of household waste also present a diverse risk for garbage man as the collectors.

The process of collecting and moving rubbish from the household to the garbage cart, and from the temporary shelter to the truck requires adequate equipment and facilities. According to Yang et. al. [6], waste management in most developing country, including Indonesia, is done manually. The low quality of equipment, inadequate facilities, and manual collection by hand are put the garbage man in high risk position of having occupational accidents. In the other hand, low level of educational degree and lack of knowledge can further worsen and increase the number of occupational accidents. Aryantiningsih & Husmaryuli [7] stated that the loss caused by occupational accidents is loss of life and property.

The process of collecting and moving waste manually with the improvised equipment and facilities that rely on physical strength can caused the accidents due to work because of sharp object, scratched, sliced, slipped, sprained feet, hand and neck and also pain in their waist and back. Cointreau- Levine [8] obtained data that the biological risks mentioned by the scavengers are accidents due to scratched glass, needles, thorns, and contacts with substances found in the waste. Rimanto [9] said that complaints are often felt by garbage man are musculoskeletal disorders including pain in lower back, neck and knee.

2. METHOD

This research is a quantitative study with correlative design aims to identify the correlation ship between the use of personal protective equipment (PPE), posture and work

facilities with incidents of occupational accidents in garbage man. This study is involving 50 respondents taking by simple random sampling from 73 people who work as garbage man. The data collected using a questionnaires and observation sheets. Data analysis used the Spearman's Rho statistical test with α = 0.05.

3. RESULTS AND DISCUSSION

3.1. Correlation of the Use of PPE (Boots) with The Incidents of Occupational Accidents in Garbage Man Community

Household waste are solid material that is left over from household activities that are no longer used. Those waste are having various types and characteristics. The sharp object is one kind of household waste that is dangerous if it is not properly managed. It is also often causing accident du to work on the garbage man.

Accident is an unexpected event. Unexpected, since behind the incidents there was no intentional element [10]. Working accidents can happen anytime and anywhere. The risk of an occupational accidents depends on the type of works. Working as a garbage man, will put them in a risk of having occupational accidents related to the activity they have done. The occupational accidents that experienced by the garbage man could happen to all of body parts, including the legs. Potential of having occupational accidents on their legs are high. The garbage man's feet are used as a pedestal during work and also to trample various types of garbage.

Occupational accidents in the garbage man's foot could be punctured, scratched, and sliced by sharp or sprained rubbish. The use of PPE (boots) is needed in order to protect the leg during working. PPE is absolutely needed. The use of PPE is useful since this boots will protect the body form harmful objects. Pravitra et.al. [11] stated that the use of PPE serves as protector for every part or whole body from potential dangers or occupational accidents.

The use of PPE is does not give full warranty that the garbage man will save from occupational accidents. But it will be able to reduce the risk of having occupational accidents caused by rubbish sharp object. Pravitra, Bagyono, & Hendrarini (2017 stated that PPE may not perfectly protect the body, but it will reduce the severity of accidents that may occur. This can be seen in table 1 which show that despite having a correlation ship in the low category, PPE is still useful in preventing and reducing the occurrence of occupational accidents in garbage man's foot Occupational accidents in the legs of garbage man in Jember apparently do not only occur in those who do not use PPE at work. The fact is that this kind of accidents is also occur in those who wearing boots. Based on information conveyed by the respondents, the etiologic of injury to their foot was sharp objects such as skewers, needles, glass, and other type of metal. Those kinds of rubbish still could penetrate the boots and eventually hurt the foot.

Table 1 Correlation of the use of PPE boots with the incidents of occupational accidents in garbage man community in Jember

The use of PPE (boots)	Frequency of Occupational Accidents						Total	
	Often		Seldom		Never			
	f	%	f	%	f	%	f	%
Seldom	33	86	8	14	0	0	41	100
Often	0	0	8	100	0	0	8	100
always	0	0	1	100	0	0	1	100
Total	37		12		1		50	100
pvalue = 0.004; α = 0.05; r = 0.398								

Table 1 shows that garbage man in Jember are not use the PPE properly. At the working time, they seldom wearing boots. They tough that the boots are no too important. Using boots for the majority of garbage man is considered to be able disrupt work activities and agility.

Factors such as lack of knowledge and self-awareness of the use PPE are still become biggest problem in worker community, including the garbage man. The lack of knowledge and self-awareness become the basis for humans to behave or act. It will increase the risk of having occupational accident. Widodo [12] stated that occupational accident could happen due to careless behaviour or unsafe condition such as physical or environmental influence.

Another factor which cause the garbage man not wearing PPE is because they are unable to afford it. They work informally and earn little income by collecting and selling recycled goods [13]. Some study stated that their working conditions is on low socio economic level [14]–[16]. Their salary is not enough to afford a good boot. A poor-quality boot will be easily torn and pierced by sharp objects and only last for a month.

This condition is very alarming and needs attention. The role of various parties, especially the policy makers, is needed to observe and supervise the facilities. The Minister of man resources stated that one of the etiologic of occupational accidents is due to lack of supervision and implementation of working safety in working place. So, it needs a real effort to prevent and reduce the incidence of occupational accident or occupational disease maximally.

3.2. The Correlation ship of The Use of PPE Gloves with The Incidence of Occupational Accident in Garbage Man Community in Jember

The proper use of PPE is strongly recommended and required for all workers. Especially for the job which is high

risk of unwanted events. The proper use of PPE will reduce the risk of unwanted events.

Garbage man is a high-risk job. Beside of occupational accidents, the garbage man is at risk of having disease due to the chemical content in the garbage. Accidents that occurs in the hand of garbage man are including scratched, pierced or cutted by sharp objects.

Table 2 The correlation of the use of PPE gloves with the incidence of occupational accident in garbage man community in Jember

The use of PPE (Gloves)	Frequency of Occupational Accident				Total	
	Often		Seldom			
	f	%	f	%	f	%
Often	29	76	9	24	38	100
Seldom	4	33	8	67	12	100
Total	33		17		50	100
Pvalue = 0.005; α = 0.05; r = 0.388						

Occupational work in garbage man's hand in Jember is happen since the garbage collection still by using hand directly. Various characteristics of household garbage, especially sharp rubbish (metal, cans, broken glass, thorns and other types of sharp rubbish) will increase the risk of having occupational accidents.

The efforts that can be made to reduce those mentioned risk is the use of PPE to protect hands (rubber gloves). Even though as stated before that the use of PPE does not guarantee that the worker is free from occupational accidents. This statement is supported by the data which is said that all respondents experienced occupational accidents in their hands such as scratched, punctured or cut. This incident is not only experienced by those who is not wearing gloves but also those who wearing PPE when working.

Gloves is not just able to withstand sharp objects such as iron, nails, broken glass, or skewers. All of garbage man experienced occupational accident in their hand even though they already have wearing the glove. But by wearing the glove at work it will reduce the risk of having occupational accident compare to those who doesn't.

Correlation of Body Posture with The Incidence of Occupational Accident in Garbage Man Community Jember

Perfect postural body in doing work will guarantee the safety at work. Wrong posture will lead to musculoskeletal disorder [17], [18]. Occupational accidents experienced by the garbage man is happen due to the injury of their musculoskeletal system [19]–[21]. It is because when doing their jobs, they are using their physical strength so that it could lead them for having musculoskeletal disorder [22]. Besides that, wrong posture at work could lead to the incidence of twisted muscle or even fracture. Mallapiang et. al. [23] found that the most frequent complaints by the garbage man is muscular pain, sprain and back pain. Singh [24] stated that musculoskeletal disorder is significantly higher in the lower back, knee, upper back, shoulder and ankle.

Table 3 Correlation ship of postural body with occupational accident in garbage man community in Jember

Postural body	Occupational Accident				Total	
	Happen		Never			
	f	%	f	%	f	%
Wrong	22	51	21	49	43	100
Proper	3	43	4	57	7	100
Total	29		21		50	100
pvalue= 0.015; α=0.05; r= -0.343						

Being a garbage man is dominated by physical strength. Collecting the garbage from household, pushing the garbage cart, and moving it to the truck is a strenuous activity. Lifting and carrying the wet trash was the most strenuous one.

Lifting, carrying and pushing the garbage without proper body posture will caused a serious injury to musculoskeletal system. The ignorance to maintain proper posture at work contribute to occurrence of injury. The observational study shows that all respondents doing wrong position when handling the garbage. It supported by the data that 57% respondents stated that they experienced pain in back, waist, shoulder, neck, knee, and wrist at the time and after lifting or carrying the garbage. This finding is in line the study conduct by Rimanto [9] which stated that most frequent complaint experienced by the garbage man are muscular pain in lower back, neck and knee.

3.3. Correlation of stepping steps facilities with the incidence of occupational accident in garbage man community in Jember

Moving the garbage from garbage cart to the truck is a routine activity that always be done by the garbage man in Jember. The stepping stairs is a facilities that has been made to resolving the distance between the cart and the truck which is relatively high. Rizal (2011) stated that proper facilities are strongly needed to handling the garbage and it is a must.

The use of stepping stairs to picking up the trash from the cart to the truck is also has the negative impact. Stepping stairs facilities should be made from strong material, sloping, the distance between steps is not too far, the sole of the feet can stand perfectly, not slippery, and has safety handles on both sides. This thing is need to be considered to reduce the risk of occupational accidents.

Table 4 Correlation of stepping steps facilities with the incidence of occupational accident in garbage man community in Jember

Stepping Stairs Facility	Occupational Accident				Total	
	Happen		Never			
	f	%	f	%	f	%
Bad	27	73	10	27	37	100
Good	5	38	8	62	13	100
Total	32		18		50	100
pvalue = 0.026; α = 0.05; r = 0.315						

The real condition, stepping those handles stairs facilities that used to picking up the trash to the truck are very far from what has been recommended. Stairs are made of zinc with no stairs, but given bamboo with a distance of more than 50 cm between bamboo for stepping. This condition is worst by liquid waste scattered at the top of the stairs make the stairs slippery and endangering the garbage man. It supported by the data that 32 respondents said that they experienced slip when climbed up the stairs.

The stairs are not only stepping foot. Stairs is a facility that has been made to ease the garbage man when doing their activities. The safety of the user should be considered. Stairs should be made from the stepping foot and supported by safety handle on both sides. The handle is useful for those who need to hold on while climbing up the stairs. The handle is should made of strong material, so it will not endanger the user.

Condition in location of study shows that the safety handle is not available. The insecurity of the condition of the stairs is strengthened by the incidence of occupational accidents in the form of falling from the stairs with the total number of 17%.

4. CONCLUSION

Personal protective equipment like boots and glove; proper postural body and facilities are related significantly with the incidence of occupational accident in garbage man community in Jember. The use of personal protective equipment for household garbage man, in the form of boots and gloves, are strongly needed to minimize the incidence of occupational accidents Another thing that is important to prevent musculoskeletal injury at work is by maintaining proper postural body. Supporting facilities to reach zero accidents in garbage man is by providing the ergonomically stairs.

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