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Determination of Factors Influencing Compliance with the Use of Personal Protective Equipment (PPE) Among Cleaning Staff at the Puuwatu Landfill in Kendari City

Determinasi Faktor yang Mempengaruhi Kepatuhan Penggunaan Alat Pelindung Diri pada Petugas Kebersihan TPA Puuwatu Kota Kendari

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ABSTRACT

Garbage workers are workers in one of the informal sectors that are at risk of exposure to diseases caused by garbage. Based on preliminary data collected by researchers from 10 Landfill sanitation workers, it was found that only 3 workers used PPE completely, 5 workers had low knowledge, and 4 workers had low attitudes. This study aims to determine the factors associated with the use of personal protective equipment (PPE) among Landfill sanitation workers in Puuwatu, Kendari City. This is a quantitative study with a cross-sectional design. The population in this study consisted of 66 workers, with a sample of 36 respondents selected using simple random sampling. The data were analyzed using univariate and bivariate analysis with the Chi-Square test. The results of this study show a moderate relationship between knowledge (X^2 count=8.371), a moderate relationship between attitude (X^2 count=11.638), a moderate relationship between the availability of PPE (X^2 count=8.377), and the use of Personal Protective Equipment (PPE) among sanitation workers at the Puuwatu Landfill in Kendari City. It is recommended that sanitation workers improve their knowledge and attitudes and instill in themselves that the use of PPE is a necessity at work.
Keywords: **Knowledge, attitude, availability of PPE**

ABSTRAK

Petugas sampah merupakan pekerja di salah satu sektor informal yang beresiko terpapar penyakit yang disebabkan oleh sampah. Berdasarkan data awal peneliti lakukan dari 10 orang petugas kebersihan TPA ternyata hanya 3 orang pekerja yang lengkap menggunakan APD, 5 orang pekerja dengan pengetahuan rendah dan 4 orang pekerja dengan sikap yang rendah. Penelitian ini bertujuan untuk mengetahui faktor yang berhubungan dengan penggunaan Alat Pelindung Diri (APD) pada petugas kebersihan TPA Puuwatu Kota Kendari. Jenis penelitian ini adalah penelitian kuantitatif dengan rancangan crosss secional study. Populasi dalam penelitian ini sebanyak 66 pekerja, dengan sampel 36 responden dengan cara simple random sampling. Data di analisis dengan analisis univariat dan bivariat dengan menggunakan uji Chi Square. Hasil penelitian ini menunjukan ada hubungan sedang antara pengetahuan (X^2 hitung=8,371), hubungan sedang antara sikap (X^2 hitung=11,638), hubungan sedang antara ketersedian APD (X^2 hitung=8,377), dengan penggunaan Alat Pelindung Diri (APD) pada petugas kebersihan TPA Puuwatu Kota Kendari. Disarankan kepada petugas kebersihan agar dapat memperbaiki pengetahuan dan sikap dan menanamkan didalam diri bahwa penggunaan APD adalah sebuah kebutuhan dalam bekerja.
Kata Kunci: Pengetahuan, sikap, ketersedian sarana APD

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INTRODUCTION

Indonesia, as a developing country, naturally has a population that is directly proportional to the amount of waste produced.[1] According to data from *the International Labor Organization* (ILO), every 15 seconds, a worker somewhere in the world dies from a work-related accident, and 160 workers suffer from work-related illnesses. According to monitoring research in the United States, 80% of work-related skin diseases are contact dermatitis, with irritant contact dermatitis ranking highest, followed by allergic contact dermatitis.[2]

According to data from the National Waste Management Information System (SIPSN) published by the Ministry of Environment and Forestry (KLHK), Indonesia recorded 55 million tons of waste production throughout 2024, with food waste dominating as the largest type of waste with a proportion of 39.18%. This was followed by plastic at 19.65%, wood or twigs at 12.75%, and paper or cardboard at 11.33%. Meanwhile, metal contributed 3.51%, fabric 2.52%, glass 2.44%, and rubber or leather 2.23%.[3]

Based on data from the National Waste Management Information System (SIPSN), total waste production in Southeast Sulawesi throughout 2024 reached 185,119 tons and in 2023 amounted to 174,475 tons, with households contributing 60.9% of the total volume. [3] Based on profile data from the Kendari City Environment and Sanitation Agency (DLHK), the amount of waste produced in 2022 was 98,476 tons, in 2023 it was 88,420 tons, and in 2024 it was 93,375.91 tons.[4]

Garbage collectors are workers in the informal sector who, to this day, still find it quite difficult to obtain services or health insurance commensurate with the significant risk of exposure to diseases caused by dirty and unsanitary environments. Various diseases can be caused by these conditions by waste can also occur for waste managers or officer Cleanliness. Piles of rubbish that are not managed properly become a breeding ground for bacteria, viruses, and parasites, which can cause disease.[5]

According to the Indonesian Health Profile, the number of outpatient cases related to skin diseases was 247,256 in 2023, with 122,076 new cases that year. Epidemiological studies in Indonesia showed that 97% of the 389 cases were contact dermatitis, of which 66.3% were irritant contact dermatitis and 33.7% were allergic contact dermatitis.[6] Because of that, the waste management officer is at risk. What's wrong with that kit? It is associated with personal hygiene.[7]

Several factors related to health workers' behavior are knowledge, attitudes, and actions to comply with PPE use. The use of good and correct PPE, starting from the use of gloves to boots, also plays a very important role because it is the last prevention that can be done by waste officers. PPE will minimize the length of skin contact with substances or materials or hazardous substances that can cause skin disorders. The use of PPE is also supported by the availability of adequate PPE infrastructure in preventing health problems due to their work.[8]

Several factors related to healthcare workers' behavior are knowledge, attitude, and actions in complying with PPE use. Proper and correct use of PPE, from gloves to boots, also plays a very

important role as it is the last preventive measure that waste management workers can take. PPE minimizes skin contact with hazardous substances or materials that can cause skin disorders. The use of PPE is also supported by the availability of adequate PPE infrastructure to prevent health problems resulting from their work.[8]

Through initial observations conducted by researchers on 10 Landfill sanitation workers, it was found that only 3 workers used PPE fully, with a result of 30%. Meanwhile, the other 7 workers were also observed not to be using standard PPE, or to be using PPE that met the category but not the requirements, for example, only wearing protective shoes but not protective gloves, or wearing gloves but only on one hand. The lack of knowledge and attitude of workers in using PPE while performing their jobs was influenced by knowledge, where there were still some workers who did not know the benefits of using PPE, attitude, where workers often ignored the use of PPE as required, and the availability of PPE, where they considered the distribution of PPE from the workplace to be very limited, thus impacting the behavior of workers in using PPE while working.

Based on the above issues, the purpose of this study is to determine the factors related to the use of Personal Protective Equipment (PPE) by sanitation workers at the Puuwatu Landfill in Kendari City.

MATERIALS AND METHODS

The type of research conducted was quantitative, with a cross-sectional study design. This research was conducted from July to August 2025, at the Puuwatu Landfill in Kendari City. The population in this study was all sanitation workers at the Puuwatu Landfill in Kendari City, totaling 66 people. The sample in this study consisted of 36 respondents. The sampling method used was simple random sampling. Data analysis used univariate and bivariate analysis with the Chi-Square test. The data were presented in tables and narratives.

RESULTS

Table 1. Distribution of Respondent Characteristics at Puuwatu Landfill

Respondent Characteristics	n	%
Gender		
Woman	11	30.5
Man	25	69.5
Age		
21-30 Years	19	52.8
31-40 Years	10	27.8
41-50 Years	7	19.4
Last education	**n**	**%**
Elementary School	10	27.8
Junior High School	16	44.4
Senior High School	7	19.4
College	3	8.3
Total	**36**	**100**

Source: Primary Data, 2025

Table 1 shows the characteristics of the respondents. The table shows that 25 respondents (69.5%) were male and 11 (30.5%) were female. Table 1 also shows that the 21-30 age group was the largest, with 19 (52.8%) of the total respondents. The 41-50 age group is the smallest, with seven (19.4%) respondents. Table 1 also shows that of the 36 respondents, 16 (44.4%) had a junior high school education as their highest level of education, while 3 (8.3%) had a college education as their lowest level of education.

Table 2 describes the univariate analysis.

Table 2 shows that 10 respondents (27.8%) used PPE and 26 respondents (72.2%) did not use PPE. Table 2 shows that 15 respondents (41.7%) had sufficient knowledge and 21 respondents (58.3%) had insufficient knowledge. Table 2 shows that 16 respondents (44.4%) had adequate attitudes and 20 respondents (55.6%) had inadequate attitudes. Table 2 shows that 12 respondents (33.3%) had adequate facilities and 24 respondents (66.7%) had inadequate facilities.

Table 2. Distribution of Respondents Based on Use of PPE, Knowledge, Attitude and Availability of PPE Facilities at Puuwatu Landfill

Research Variables	n	%
Use of PPE		
Use	10	27.8
Do not use	26	72.2
Knowledge		
Enough	15	41.7
Not enough	21	58.3
Attitude		
Enough	16	44.4
Not enough	20	55.6
Availability of Facilities		
Enough	12	33.3
Not enough	24	66.7
Total	**36**	**100**

Source: Primary Data, 2025

Table 3 illustrates the bivariate analysis. Table 3 shows that 15 respondents had adequate knowledge, including 8 respondents (53.3%) who used PPE and 7 respondents (46.7%) who did not use PPE. Meanwhile, 21 respondents had inadequate knowledge, including 2 respondents (9.5%) who used PPE and 19 respondents (90.5%) who did not use PPE.

Based on data analysis using the Chi-Square test, the calculated X^2 value was > X^2 Table (8.371 > 3.841), so H_0 was rejected and H_1 was accepted, indicating a relationship between knowledge and the use of Personal Protective Equipment (PPE) among cleaning staff at the Puuwatu Landfill in Kendari City.

Table 3 shows that 16 respondents had an adequate attitude, including 9 respondents (56.2%) who used PPE and 7 respondents (43.8%) who did not use PPE. Meanwhile, 20 respondents had an inadequate attitude, including 1 respondent (5.0%) who used PPE and 19 respondents (95.0%) who did not use PPE.

Based on data analysis using the Chi-Square test, the calculated X^2 value was > X^2 Table (11.638 > 3.841), so H_0 was rejected and H_1 was accepted, indicating a relationship between attitude and the use of Personal Protective Equipment (PPE) among sanitation workers at the Puuwatu Landfill, Kendari City.

Table 3 shows that there were 12 respondents with adequate PPE facilities, including 7 respondents (58.3%) who used PPE and 5 respondents (41.7%) who did not use PPE. Meanwhile, there were 24 respondents with inadequate PPE facilities, including 3 respondents (12.5%) who used PPE and 21 respondents (87.5%) who did not use PPE.

Based on data analysis using the Chi-Square test, the calculated X2 value was > X2 table (8.377 > 3.841), so H0 was rejected and Ha was accepted, indicating that there was a relationship between the availability of PPE facilities and the use of Personal Protective Equipment (PPE) by cleaning staff at the Puuwatu Landfill, Kendari City.

Table 3. Distribution of Respondents on the Relationship between Knowledge, Attitudes and Availability of PPE Facilities and the Use of PPE at the Puuwatu Landfill

Variables	Use of PPE				Total		Test Results
	Use		Do not use				
	n	%	n	%	n	%	
Knowledge							
Enough	8	53.3	7	46.7	15	100	$X^2_{hits} = 8.371$
Not enough	2	9.5	19	90.5	21	100	$X^2_{tabs} = 3.841$
Attitude							
Enough	9	56.2	7	43.8	16	100	$X^2_{hits} = 11.638$
Not enough	1	5.0	19	95.0	20	100	$X^2_{tabs} = 3.841$
Availability of PPE Facilities							
Enough	7	58.3	5	41.7	12	100	$X^2_{hits} = 8.377$
Not enough	3	12.5	21	87.5	24	100	$X^2_{tabs} = 3.841$
Total	**10**	**27.8**	**26**	**72.2**	**36**	**100**	

Source: Primary Data, 2025

DISCUSSION

Knowledge plays an important role in shaping a person's attitude and behavior towards occupational safety. Cleaning workers who have a high level of knowledge about the function, types, methods of use, and risks of not using Personal Protective Equipment (PPE) tend to be more compliant and consistent in using PPE while working. Conversely, workers with less knowledge often neglect to use PPE because they consider it unimportant or feel uncomfortable wearing it.[9]

The results showed that 58.3% of cleaning staff at the Puuwatu Landfill had inadequate knowledge of PPE use. This condition indicates that most staff still do not understand the importance of using PPE properly to protect themselves from occupational hazards. Based on the respondents' answers, it was found that the respondents' lack of knowledge was due to some respondents not knowing that PPE must be used every time officers carry out waste transportation activities, and that not using PPE can cause accidents and health problems/illnesses. This lack of knowledge can cause workers to neglect the use of PPE, either because they feel uncomfortable, are in a hurry, or are unaware of the health risks involved, such as infection, respiratory problems, or injuries from sharp objects. This is in line with Green's theory in the Precede-Proceed Model, which states that knowledge is a major predisposing factor that influences a person's behavior in implementing health measures.[10]

The results showed that 41.7% of sanitation workers had sufficient knowledge about the use of PPE at the Puuwatu Landfill. These results indicate that almost half of the workers already had an adequate understanding of the importance of using PPE as protection from occupational hazards. Based on the respondents' answers, several respondents already knew that PPE is a tool used to protect workers from disability/injury/illness due to work accidents while working, which must be used every time officers carry out waste transportation activities and can reduce the risk of occupational diseases. This good knowledge is an important asset for workers to develop safer and healthier work behaviors.[11] In addition, according to Lawrence Green's Health Behavior Theory, good knowledge can be a strong predisposing factor in encouraging

individuals to consistently apply preventive behaviors.[12]

The results of the study show that 9.5% of respondents who are sanitation workers have inadequate knowledge but still use Personal Protective Equipment (PPE) at the Puuwatu Landfill. These findings indicate that PPE usage behavior is not always directly influenced by the level of knowledge. Other factors include the availability of PPE, work policies, and supervision by superiors. Based on information from respondents, it appears that some respondents have made the use of PPE a work habit because they have experienced work accidents. This is in line with Green's theory, which explains that behavior is influenced by three factors, namely predisposing factors (knowledge, attitude), facilitating factors (availability of facilities), and reinforcing factors (social support, supervision). Therefore, even though officers have inadequate knowledge, the existence of facilitating factors such as the provision of PPE by institutions and reinforcing factors in the form of regulations can encourage them to continue using PPE.[13]

The results showed that 46.7% of sanitation worker respondents had sufficient knowledge but did not use PPE at the Puuwatu Landfill. This study shows a gap between knowledge and practice. Although workers have sufficient understanding of the importance of PPE, this knowledge has not been fully internalized in their actions. This is influenced by factors such as the comfort of using PPE, availability of facilities, and perceptions of occupational accident risks among sanitation workers, which are reflected in their daily behavior.

The results of the analysis show a moderate relationship between knowledge and the use of Personal Protective Equipment (PPE) among sanitation workers at the Puuwatu Landfill in Kendari City. A similar study was also conducted by A rif, Selpianriani, & Ali, which found a relationship between knowledge and the use of Personal Protective Equipment (PPE) among waste collectors in the Jeneponto Regency Environmental Services area with a p value of $0.01 < 0.05$.[14] The results of this study indicate that the better the knowledge of workers regarding the benefits, functions, and methods of using PPE, the higher their tendency to use PPE consistently.

Attitude is a psychological factor that plays an important role in determining a person's behavior, including in the context of the use of Personal Protective Equipment (PPE) by sanitation workers.[15] The results of the study show that 55.6% of sanitation workers have a less than positive attitude towards the use of Personal Protective Equipment (PPE) at the Puuwatu Landfill. The results of this study show that more than half of the staff still do not have a positive attitude towards the importance of using PPE to protect themselves from potential occupational hazards. This less than positive attitude can be reflected in the responses of several respondents who disagreed that PPE is necessary when working in unsafe places, and that the available PPE does not need to be maintained and cared for.

The results of the study show that 44.4% of cleaning staff have an adequate attitude towards the use of Personal Protective Equipment (PPE) at the Puuwatu Landfill. The results of this study show

that some staff have a positive attitude towards the importance of using PPE as a form of self-protection from the risk of work accidents and occupational diseases.

The results show that 43.8% of cleaning staff respondents have an adequate attitude but do not use Personal Protective Equipment (PPE) at the Puuwatu Landfill. These results indicate that a positive attitude towards PPE does not always correlate with actual behavior in its use. In other words, even though almost half of the staff already have awareness and positive views about the importance of PPE, this has not been fully internalized in their daily work activities. This condition reflects a gap (attitude-behavior gap) that can be a serious obstacle in efforts to implement occupational safety and health at the Landfill. Attitudes do not stand alone in influencing behavior, but are also influenced by knowledge, availability of PPE, comfort in using it, and work culture.[16] The results showed that 5.0% of sanitation staff respondents had a negative attitude but still used PPE at the Puuwatu Landfill.

This study shows that the use of PPE by respondents is influenced by knowledge and the availability of adequate facilities. Attitude is not the only determinant of behavior; rather, a combination of other factors can suppress or even mask the influence of attitude on PPE compliance.[17]

The results of the analysis show a moderate relationship between attitude and the use of Personal Protective Equipment (PPE) among cleaning staff at the Puuwatu Landfill in Kendari City. A similar study was also conducted by Kaseger et al., which found a relationship between attitude and PPE use among waste collectors with a p-value of $0.02 < 0.05$.[18] The results of this study indicate that attitude plays an important role in influencing PPE use, although it is not the only determining factor. The more positive an officer's attitude toward the importance of PPE, the more likely they are to consistently use it while working.

The availability of facilities and infrastructure is one of the external factors that greatly influences the use of Personal Protective Equipment (PPE) among sanitation workers.[19] The results of the study show that 66.7% of sanitation workers stated that the PPE facilities and infrastructure at the Puuwatu Landfill were inadequate. The results of this study show that even though some staff have good knowledge and attitudes towards the use of PPE, the insufficient availability of facilities can be a major obstacle to its implementation. Based on the respondents' answers, it appears that some respondents do not use PPE facilities completely. The results of the study show that 33.3% of cleaning staff stated that PPE facilities and infrastructure at the Puuwatu Landfill were adequate. The results of this study show that some staff feel that the availability of PPE is relatively adequate to support their daily work activities. The availability of this infrastructure can contribute positively to PPE usage behavior because with PPE available and easily accessible, the opportunity for staff to comply with work safety standards becomes greater.

The study found that 41.7% of sanitation workers stated that PPE facilities were adequate but did not use them at the Puuwatu Landfill. This study shows that compliance in the use of PPE is not only

determined by the availability of facilities but is also influenced by other factors such as knowledge, attitude, habits, comfort, and the level of individual motivation to protect themselves.

The results show that 12.5% of sanitation workers stated that PPE facilities were inadequate but still used them at the Puuwatu Landfill. These results indicate that a small group of respondents still complied with PPE usage behavior despite facing limited facilities. This shows that in addition to the availability of facilities, other internal factors such as knowledge, attitude, motivation, and individual awareness play an important role in promoting work safety behavior. This study is in line with research by Sasmitha, Andriyani, & Srisantyorini, which found that some workers continued to use PPE despite its limited availability due to high awareness of occupational risks and negative experiences in the past that encouraged them to be more disciplined.[20] Therefore, efforts to improve work safety behavior are not only sufficient by providing facilities, but also need to strengthen awareness, motivation, and a safe work culture among cleaning staff.

The results of the analysis show that there is a moderate relationship between the availability of PPE and the use of Personal Protective Equipment (PPE) among cleaning staff at the Puuwatu Landfill, Kendari City. A similar study was also conducted by Arif, Selpianriani, & Ali, which found that there is a relationship between the availability of PPE facilities and the use of personal protective equipment among waste collectors in the environmental service area of Jeneponto Regency with a p value of $0.01 < 0.05$.[14] The results of this study indicate that the availability of PPE has a significant influence on its use by workers. The researchers' assumption in this study is that although the availability of PPE has been proven to have a positive relationship with its use, this factor does not entirely determine the behavior of workers. It is possible that some workers still do not use PPE even though it is available due to reasons of comfort, habit, or lack of supervision from management.

CONCLUSION AND SUGGESTIONS

Based on the results of the study, it can be concluded that there is a moderate relationship between knowledge, attitude, and availability of Personal Protective Equipment (PPE) with the use of PPE among cleaning staff at the Puuwatu Landfill, Kendari City.

It is recommended that cleaning staff improve their knowledge and attitude and instill awareness that the use of PPE is mandatory in the workplace.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in the research and writing of this article.

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