

# Association of knowledge on waste handling and use of personal protective equipment among waste handlers

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## ABSTRACT

**Background:** Waste is generally known as unwanted or unusual materials. Municipal solid waste handling and disposal is a growing environmental and public health concern in a developing country. **Objective:** This study was designed to assess the association of knowledge on waste handling and use of personal protective equipment (PPE) among waste handlers. **Materials and Methods:** The populations of the study were the waste handlers of Rupandehi district. A total of 138 samples were taken using nonprobability purposive sampling technique. Data were collected using pretested semi-structured questionnaires. The collected data were analyzed using descriptive statistical method such as frequency and percentage in SPSS version 16; Chi-square test was applied to see association. **Results:** The mean age of the respondent was  $34.63 \pm 9.03$  years and most (93.5%) of them were male. Majority of them (91.3%) had the knowledge to use mask, whereas 89.9% of them used mask while handling the waste. About two-third (63.8%) of the respondents answered the cause of the disease is poor hygiene and sanitation. In bivariate analysis, age, sex, and training are statistically significant with the knowledge on waste handling and use of PPE. **Conclusion:** Most of the waste handlers had good knowledge of waste handling. Majority of the waste handlers were using mask as a PPE. The practice of waste handling was good among the respondents who had received training on waste handling. Training can be a milestone to reduce serious health problem using their knowledge into practice.

**KEY WORDS:** Knowledge; Practice; Preventive Measures; Waste Handlers; Training


## INTRODUCTION

Waste is generally known as unwanted or unusual materials. Waste handlers are defined as a group of people or workers who are involved in the collection, handling, transporting, treating, and disposing the waste materials.

Solid waste management is one of the major environmental issues in cities of many developing countries including Nepal. Urban population growth and economic development lead to increasing generation of municipal solid waste.<sup>[1]</sup>

Municipal solid waste workers or refuse collectors universally expose to many work-related health hazards and safety risks due to the task of collecting, treating, and disposing of solid waste. Workers can be protected by employing safety procedures in the workplace and ensuring the use of adequate personal protective equipment (PPE).<sup>[2]</sup>

In Nepal, there are no provisions for handling hazardous wastes separately, and the country lacks worker protection

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system. Waste workers themselves are unaware and do not undertake protective measures. Wearing PPE reduces the risk from germs, sharps, exposure to blood as well as other bodily fluids, and splashes from chemicals.

**MATERIALS AND METHODS**

The descriptive cross-sectional study design was carried out to assess the knowledge and practice of preventive measures adopted by the waste handlers. A total of 138 waste handlers were taken as respondents. The study populations were the respondents who were involved in handling waste of Butwal Sub-metropolitan city, Siddhartha municipality, Tilottama municipality, and Sainamaina municipality of Rupandehi district. Due to the small number of study population census was done to collect information among those who were willing to participate in the study.

Information related to sociodemographic, knowledge on waste, and practice of using PPE were collected in the semi-structured questionnaire.

Content validity was maintained through the review of literature and reliability was maintained by pre-testing the instruments among 10% of anticipated sample size in Devdaha municipality.

Ethical clearance was obtained from the institutional ethical review committee including informed consent from all participants. The subjects were assured for the confidentiality of the information and right to discontinuation and refusal to answer any question if they are not willing answers.

**Statistics**

The sample size was calculated using formula  $n = z^2 \cdot p \cdot q/d^2$ ; where, confidence interval was 95% and level of error was 5%. The collected data were compiled, coded and entered, and analyzed in SPSS version 16. Information was reported in terms of frequency and percentage, mean, and standard deviation. Interpretation of data was done on the basis of analyzed data. Chi-square test was applied to analyze qualitative data while  $P \leq 0.05$  was taken statistically significant.

**RESULTS**

Table 1 shows the sociodemographic information and knowledge on waste handling of the respondents. A total of 138 respondents age ranging from 15 to 60 years and above were included in this study where mean age of the respondents was  $34.63 \pm 9.03$  years, but age of the respondents and knowledge on waste handling was not statistically significant. Majority (93.5%) of the respondents were male. More than half (58%) were Brahmin/Chhetri and religion of the respondents and knowledge on waste handling was not statistically

significant. Nearly two-third (65.2%) were literate whereas one-third (34.8%) were illiterate and reveals that more the waste handler are literate more the knowledge they have and the association of education and knowledge on waste handler was statistically significant ( $P = 0.002$ ). Majority (89.9%) of the respondents follow Hindu religion.

Table 2 represents the information related to sociodemographic status and use of PPE of the respondents which reveal that of 138 respondents, more than two-third (69.6%) of the respondents were of age 36 years and above. Age of the respondents was not statistically significant with use of PPE. Education of the respondents was strongly associated with use of PPE in which literate respondents use PPE more

**Table 1:** Sociodemographic status and knowledge on waste handling,  $n=138$

Variables	Knowledge on waste handling		Total (%)	P-value
	Yes (%)	No (%)		
Age in years				
≤35 years	35 (25.4)	7 (5.1)	42 (30.4)	0.882
≥36 years	79 (64.5)	17 (5.1)	96 (69.6)	
Mean age±Standard deviation=34.63±9.03				
Education				
Illiterate	33 (23.9)	15 (10.9)	48 (34.8)	0.002
Literate	81 (58.7)	9 (6.5)	90 (65.2)	
Caste				
Janajati	12 (8.7)	3 (2.3)	15 (10.9)	0.182
Dalit	32 (23.2)	11 (8.0)	43 (31.2)	
Brahmin/Chhetri	70 (50.7)	10 (7.2)	80 (58)	
Religion				
Hindu	104 (75.4)	20 (14.5)	124 (89.9)	0.123
Buddhist	2 (1.4)	0 (0.0)	2 (1.4)	
Christian	3 (2.2)	0 (0.0)	3 (2.2)	
Muslim	5 (3.6)	4 (2.9)	9 (6.5)	

**Table 2:** Sociodemographic status and use of PPE,  $n=138$

Variables	Use of PPE		Total (%)	P-value
	Use (%)	Not use (%)		
Age in years				
≤35 years	31 (22.5)	11 (8.0)	42 (30.4)	0.580
≥36 years	75 (54.3)	21 (15.2)	96 (69.6)	
Education				
Illiterate	29 (21.0)	19 (13.8)	48 (34.8)	0.001
Literate	77 (55.8)	13 (9.4)	90 (65.2)	
Caste				
Janajati	14 (10.1)	1 (0.7)	15 (10.8)	0.101
Dalit	29 (21)	14 (10.1)	43 (31)	
Brahmin/Chhetri	63 (45.7)	17 (12.3)	81 (58)	

PPE: Personal protective equipment

(75.4%) than illiterate (21%), respondents. In respect to caste of the respondents, caste is not statistically significant with use of PPE.

Table 3 shows the knowledge and practice of the respondents on waste handling which reveals that knowledge on waste handling and use of PPE was statistically significant ( $P=0.004$ ). It further explores that having knowledge on waste handling increases the practice of using PPE as well as no knowledge on waste handling decreases the practice of using PPE.

Regarding training received by the respondents and their practice on the use of PPE, it was found to be statistically significant ( $P = 0.000$ ) which further directs that receiving training increases the use of PPE as well as it also explains that respondents not receiving training also has practice of the use of PPE.

### DISCUSSION

The study was designed to assess the association of knowledge on waste handling and use of PPE among waste handlers. A total of 138 respondents were selected from different municipalities using nonprobability purposive sampling technique. This study provides a brief scenario of association of knowledge on waste handling and use of PPE by the waste handlers of Rupandehi district. In this study, more than half (52.2%) of the waste handlers were in the age groups 30–45 years, the mean age of the respondent in this study was 34 years, and majority of the respondents were male with 93.5%. The knowledge regarding waste among the respondent was found to be around 86%. Majority of the respondents (81.9%) were found to be aware of PPE. Less than half (43.5%) of the respondents have taken or received the training about the safety measures that are needed while dealing with waste. The education and caste of the respondents were found statistically significant ( $P < 0.05$ ) with knowledge on waste handling. It was found that education was statistically significant ( $P < 0.05$ ) with use of PPE.

In the study, more than half (52.2%) of the waste handlers were in the age groups 30–45 years, the mean age of the

**Table 3:** Knowledge on waste handling and practice on use of PPE,  $n=138$

Variables	Use of PPE		Total (%)	P-value
	Not use (%)	Use (%)		
Knowledge on waste handling				
No	11 (8.0)	13 (9.4)	24 (17.4)	0.004
Yes	21 (15.2)	93 (67.4)	114 (82.6)	
Training received				
Not received	31 (22.5)	47 (34.1)	78 (56.5)	0.000
Received	1 (0.7)	59 (42.8)	60 (43.5)	

PPE: Personal protective equipment

respondent in this study was  $34.63 \pm 9.03$  years. Similar study was conducted in Ethiopia in 2016, where the mean age of the respondents of that study was 35 years.<sup>[3]</sup> Majority of the respondent was male with 93.5% and the findings contrast to the previous study conducted in Ethiopia in 2016 as the majority of the respondents of that study were female which accounts for 69.7%.<sup>[3]</sup> In the present study, majority of the respondents (81.9%) were found to be aware of PPE which is similar to the study conducted in South-Eastern state of Nigeria were around 3/4<sup>th</sup> of the respondents (76.1%) were aware of PPE.<sup>[4]</sup> In this study, less than half (43.5%) of the respondents have taken or received the training about the safety measures that are needed while dealing with waste that is similar to the previous study conducted in South Eastern State of Nigeria in 2016 July, in which respondents (44.5%) received pre-employment training.<sup>[5]</sup> In this study, education and caste of the respondents were found statistically significant ( $P < 0.05$ ) with knowledge on waste handling which was similar to a study in Northern Thailand which highlighted that age and education level were statistically significant with the KAP level on medical solid waste management ( $P < 0.05$ ).<sup>[6]</sup> In this study education was found statistically significant ( $P < 0.05$ ) with use of PPE which was similar to a study in South Eastern State of Nigeria were age, sex and recipient of pre-employment were found statistically significant with use and awareness of PPE ( $P < 0.001$ ).<sup>[5]</sup>

The study is one of the few study among the waste handlers in Nepal.<sup>[7]</sup> As this was a cross-sectional study, results were not able clearly to indicate causal directionality.<sup>[8]</sup> The nonprobability purposive sampling technique was used for this study; hence, it further reduced the external validity.<sup>[9]</sup>

Waste is generally known as unwanted or unusual materials.<sup>[10]</sup> Waste handlers are exposed to a number of pathogens (bacteria, fungi, viruses, parasites, and cysts), toxic substances, and chemicals that come from the waste itself and from its decomposition.<sup>[11]</sup> The participants who got training regarding waste management were more aware of the proper techniques of waste handling.<sup>[12]</sup> Hence, from finding of this study, we can say that the training can be given to the workers time to time so that they can use their knowledge into practice about various kinds of preventive measures that should be used, while handling waste and can prevent themselves from different kinds of infectious waste that may cause different kinds of serious health problems or issues.<sup>[13]</sup> A comparative study can be conducted between other districts and Rupandehi district of Nepal.<sup>[14]</sup> A longitudinal study can be conducted among waste handlers to find out the real scenario among the waste handlers.

### CONCLUSION

Most of the waste handlers had good knowledge of waste handling. Majority of the waste handlers were using mask

as a PPE. The practice of waste handling was good among the respondents who had received training on waste handling. Training can be a milestone to reduce serious health problem using their knowledge into practice.

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