

## Socio-cultural Aspect of Household Waste Management and Its Effects on Public Health

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#### KEYWORDS

Feast and festival  
Household solid waste  
Public health  
Socio-cultural aspect  
Solid waste management

#### ABSTRACT

The main goal of this study is to analyze the knowledge and practices of solid waste management and its effects on public health. Hypotheses of the study were- There was no significant association between Religious and cultural practices and the causes of waste production, between knowledge of solid waste and methods of solid waste management, between place of residence and methods of cleanliness, between place of residence and solid waste management, between solid waste management and its effect on public health. Analytical research design was applied and the lottery method was administered to select the area and required number of respondents. Equal number of respondents (50 of each) from 3 selected local governments (Hetauda sub-metropolitan, Thaha Municipality and Gadhi rural Municipality), out of 10 local governments, were taken and administered interview schedule to collect the data. The data has been collected in 2023. People had knowledge of solid waste categories but they managed the waste in unscientific way. Seventy-two percent of respondents threw the solid waste everywhere. So, the knowledge did not play the vital role to manage solid wastes. There was no significant association between knowledge of solid waste categories and the method of solid waste management ( $p>0.916$ ). The consumerism culture and the celebration of various festivals had higher contribution to produce solid wastes. Incineration was the most favorable method of solid waste management in both rural and urban areas which had resulted the spread of various diseases. The people themselves should be aware and responsible to protect their own health by their own effort.

### 1. BACKGROUND OF THE STUDY

#### 1.1 WASTE

Waste refers to any material that does not have any economic value and

unusable or discarded by household, business, industries, and institutions (Singh J. B., 2017). The research in India shows that every individual produces the wastes ranges from 200-870 grams per day and the waste production rate is increasing by 1.3 percent per year (Singh, Goyal, Mittal, & Sharma, 2017).

Beyond sufficient regulatory practices were introduced to manage solid waste, including environment protection Act 1997 and Solid Waste Act 1987 followed by rules and duties of local authorities under Local Authorities Operation Act 2074, local bodies or even central government seemed unable to address solid waste management problem in Nepal. Because of ineffective implementation of law enforcement and unequal power sharing between central and local bodies, solid waste management become major issues and does not need any further policy instruments that can only be addressed with proper execution of solid waste management manual and strong commitment of concerned agencies (Dangi, Schoenberger, & Boland, 2017).

Study conducted on waste composition and its management practices in different landfill sites of Nepal, huge amount of biodegradable solid waste was stored and managed in landfill sites compared to non-degradable waste, such as contaminated industrial waste and heavy metal. In some cases, such solid waste materials were managed with sorting and composting, recycle and reused method especially for non-degradable material (Thapa & K. C., 2011).

### **1.2 WASTE MANAGEMENT**

Solid waste management system starts with its collection followed by different sets of procedure including transportation, sorting, and its proper disposal and management (Seadon, 2010). Similarly, waste management is the process of gathering, transporting, processing, disposing and monitoring. Transporting, pre-treating, processing and reducing are the traditional waste

management system. Solid waste management includes whole set of supervising, treating and disposing (Demirbas, 2011).

High demand of health care facilities may result increased amount of waste production of solid waste from health units and that needs proper management to overcome of adverse results on public and occupational health (Joshi, 2013 ).

Waste to energy production technologies and anaerobic composting has high potentiality to manage solid waste. However, lack of proper waste management infrastructure, high environmental risk and challenges in become hurdles for waste management in Kathmandu metropolitan city (Lohani, Keitsch, Shakya, & Fulford, 2021).

### **1.3 WAYS OF SOLID WASTE MANAGEMENT**

Solid waste management is referred as the process of gathering solid wastes and its treatment. It provides the solution to recycle except garbage. Solid wastes have been a problem in residential areas. Waste management is focused on its uses as an important resource. Every household as well as businessman should be involved in solid waste management in the world (Singh, Goyal, Mittal, & Sharma, A Review: On Solid Waste Management in Smart Cities, 2017).

Kathmandu valley has been facing the challenges for years in case of solid waste management. The practice of dumping of solid wastes nearby bank of the river has created environmental as well as public health problems. The data of different published articles showed that more than 70 percent solid wastes generated were organic. So, the organic solid wastes should be composted, which would reduce the wastes in landfill sites (Pokhrel & Viraraghavan, 2005).

Meidiana and Gamse (2010) stated that increasing rate of population in Indonesia has brought the problem of increasing amount of waste production. Lack of policies or strategies, lack of economic support, less awareness among community people lack of involvement of

private sectors have lead the less management of municipal wastes. On the other hand, Rafiee, et al. (2018) reported that during the periods of Islamic Revolutionary anniversary, wedding day and Tasoua-Ashoura the recyclable solid wastes has produced. Mixed plastic items were disposed at landfill sites. These mixed plastic items and polyester were more problematic recyclable wastes. To recycle such wastes and manage them well, people should be made aware.

The study in Portugal showed that largest amount of wastes were residuals of food and kitchen and packaging. The waste produced during cultural festivals was less than that of the wastes generated in other festivals and in canteen (Martinho, et al., 2017).

It is reported that per capita household waste generation rate differed on the basis of expenditure rate. High expenditure resulted high generation of solid wastes as compared to the less expenditure. People of Terai region produced 80 percent more waste as compared to the municipality of mountain region. Again, household waste composition showed that highest category of solid waste was organic with 66 percent. Similarly, commercial wastes contained 43 percent organic wastes. So, solid waste, in aggregate was composed of 56 percent organic waste. The result showed that we were losing the opportunity to produce useful and valuable compost manure from the waste (Asian Development Bank, 2013).

#### **1.4 SUPERSTITIOUS SPENDTHRIFTS**

People believed that ordering and eating special food items during the time of new year eve could attract pleasure, long life and success in the year to come. This caused the generation of residual wastes (Diab, 2018).

#### **1.5 LEGAL PROVISION OF SOLID WASTE MANAGEMENT (KNOWLEDGE OF RESPONDENTS)**

As per the guidance note in India the responsibility to manage solid wastes is of Urban Local Bodies. The Municipal Solid Waste Rules, 2000 was issued by the

Government of Indian under the Environment Protection Act, 1986, recommended that the authorities should collect, segregate, store, transport, process and dispose the municipal solid wastes. (Singh & Mehta, 2014).

There is no any monitoring system to regulate the effectiveness of policy and even municipality employees has lack of awareness of policy. There is no political good will and there is lack of waste regulating system (Samson & Wilson, 2023).

#### **1.6 EFFECTS OF WASTES**

The people living nearby landfill sites, composting areas, incinerators areas and the areas of nuclear installations is mostly scarce and unsatisfying. There is high risk of gastrointestinal problems due to pathogens found in sewage and sewage treatment plant (Giusti, 2009).

Long time use and storage in plastics product and exposure in high temperature can form the toxic chemical which mixed with food and drinks and the toxic chemicals mixed into air caused health problems (Alabi, Ologbonjaye, Awosolu, & Alalade, 2019).

#### **1.7 THEORY X AND THEORY Y**

According to Douglas McGregor, Theory X describes that the people do not want to work and follow the rule and regulation of the organization as well as want to escape, whereas the Theory Y describe that people are self-motivated and feel the responsibility as well as they use their creativity, capacity to solve the problem of the organization (Jacobs, 2004). It is a motivational theory to change behavior. Here, the study has also focused on the behaviour of the people in the different societies whether the people are self-motivated and responsible or not.

Conceptual Framework

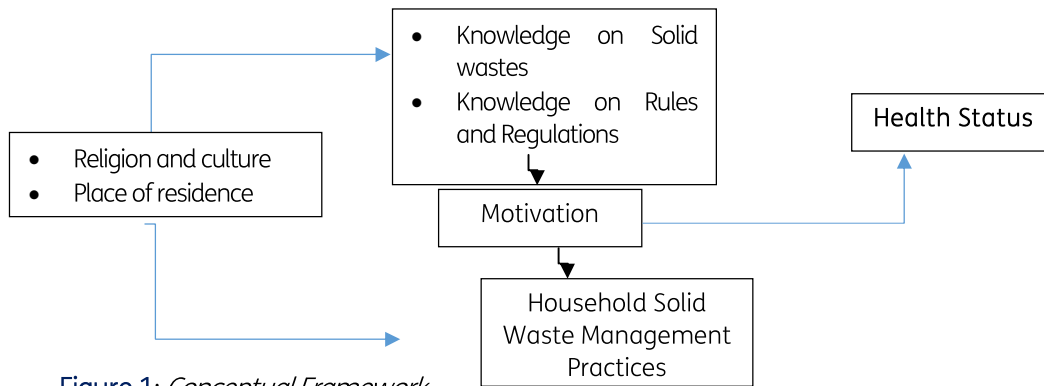


Figure 1: Conceptual Framework

On the basis of religious and cultural practices and the place of residence of people, knowledge on solid waste and its management may determine. The existing knowledge on rules and regulations related to Solid Waste Management and Environment Protection Act also determine the household solid wastes management practices. The methods of solid waste management play an important role to determine the public health status.

2. MATERIALS AND METHODS

Analytical research design was applied to analyze the knowledge and practice of solid waste management and its effects on health. The study was conducted in three local units-Hetauda sub-metropolitan, Thaha municipality and Gadhi rural municipality to meet the objective. Hetauda sub-metropolitan and

Thaha municipality were automatically selected as study areas because both are single in nature in Makawanpur district; Nepal, though the study was focused on sub-metropolitan, municipality and rural municipality respectively. Gadhi rural municipality was also selected as study area by using lottery method among eight other rural municipalities. Single ward from all three selected local levels were selected by using lottery method. Equal number of respondents (50) were selected from each of selected local governments. Interview schedule was administered to collect the data and Pearson’s Chi-square test was applied to analyze the data.

3. RESULTS AND DISCUSSION

The study was done in three local units of Makawanpur district. The data was analyzed with table and Chi-square test was administered as statistical tool.

3.1 CAUSES OF SOLID WASTE PRODUCTION ON THE BASIS OF RELIGIOUS AND CULTURAL PRACTICES OF RESPONDENTS

Table 1: Religious and Cultural Practices of Respondents and Causes of Waste Production

		Causes of solid waste production				Pearson's Chi-square
		Consumerism Culture	Feast and Festivals	Agricultural residual	Constructional residual	
Religion of Respondents	Hindu	Count 46	28	26	7	0.001
		% within Religion of Respondents	43.0%	26.2%	24.3%	
Budhist		Count 10	9	1	8	
		% within Religion of Respondents	35.7%	32.1%	3.6%	
Christian	Count	1	5	1	1	
	Total	107			8	

	% within Religion of Respondents	12.5%	62.5%	12.5%	12.5%	100.0%
Muslim	Count	6	0	1	0	7
	% within Religion of Respondents	85.7%	0.0%	14.3%	0.0%	100.0%
Total	Count	63	42	29	16	150
	% within Religion of Respondents	42.0%	28.0%	19.3%	10.7%	100.0%

The major cause of waste production is seemed consumerism culture (42%) and feast and festivals (28%) compared to agricultural residual (19.3%) and constructional residual (10.7%). There was significant association

between the religion and the causes of waste production ( $p < 0.001$ ). So, the null hypothesis- *there is no significant association between religious and cultural practices, and causes of waste production* is rejected.

### 3.2 KNOWLEDGE OF THE CATEGORIES OF SOLID WASTE AND METHODS OF SOLID WASTE MANAGEMENT

**Table 2:** Knowledge of the Categories of Solid Waste and Methods of Non-Degradable Solid Waste Management

		Methods of non-degradable waste management			Chi-square		
		Incineration	Throwing everywhere	Burying in pit			
Knowledge of solid waste categories	Biodegradable	Count	15	0	6	21	0.305
		% within Knowledge of solid waste categories	71.4%	0.0%	28.6%	100.0%	
	Non-degradable	Count	58	11	26	95	
		% within Knowledge of solid waste categories	61.1%	11.6%	27.4%	100.0%	
	Both degradable and non-degradable	Count	24	1	9	34	
		% within Knowledge of solid waste categories	70.6%	2.9%	26.5%	100.0%	
Total	Count	97	12	41	150		
	% within Knowledge of solid waste categories	64.7%	8.0%	27.3%	100.0%		

Majority of respondents (64.7%) had practiced incineration for the management of non-degradable solid waste management as compared to throwing everywhere (8%) and burying in

pit (27.3%). There was no significant association between knowledge of solid waste and methods of non-degradable solid waste management ( $p > 0.305$ ).

**Table 3:** Knowledge of Categories of Solid Waste and Methods of Degradable Solid Waste Management

		Method of degradable waste management			Chi-square		
		Burying in Pit	Throwing everywhere	composting			
Knowledge of solid waste categories	Biodegradable	Count	3	15	3	21	0.916
		% within Knowledge of solid waste categories	14.3%	71.4%	14.3%	100.0%	
	Non-degradable	Count	13	68	14	95	
		% within Knowledge of solid waste categories	13.7%	71.6%	14.7%	100.0%	
	Both degradable and non-degradable	Count	6	25	3	34	
		% within Knowledge of solid waste categories	17.6%	73.5%	8.8%	100.0%	
Total		Count	22	108	20	150	
		% within Knowledge of solid waste categories	14.7%	72.0%	13.3%	100.0%	

Majority of the respondents (72%) replied that they were throwing the solid wastes everywhere, where 14.7% respondents burry in pit and 13.3% respondents practicing composting for the management of degradable solid wastes. There was no significant association between knowledge of solid waste

categories and the method of solid waste management ( $p > 0.916$ ). So, the null hypothesis- *there is no significant association between knowledge of solid waste and waste management* is accepted. It means that the knowledge of solid waste does not determine the methods of solid waste management.

**3.3 METHODS OF CLEANLINESS ON THE BASIS OF PLACE OF RESIDENCE**

**Table 4:** Methods of Cleanliness on the Basis of the Place of Residence

		Method of cleanliness			Chi-square Value	
		Self	Community	Total		
Place of Residence	Rural	Count	41	9	50	0.000
		% within Place of Residence	82.0%	18.0%	100.0%	
Municipality		Count	27	23	50	0.000
		% within Place of Residence	54.0%	46.0%	100.0%	
Sub-metropolitan		Count	46	4	50	0.000
		% within Place of Residence	92.0%	8.0%	100.0%	
Total		Count	114	36	150	0.000
		% within Place of Residence	76.0%	24.0%	100.0%	

The above table (Table 1) shows that self-cleanliness practice was higher (76%), as compared to cleanliness practice of community (24%). The data shows that there was significant association

( $p < 0.000$ ) between the place of residence and the methods of cleanliness. So, the null hypothesis- *there is no significant association between place of residence and methods of cleanliness*, is rejected.

**3.4 SOLID WASTE MANAGEMENT ON THE BASIS OF RELIGION OF RESPONDENTS**

**Table 5: Methods of Non-degradable Solid Waste Management on the Basis of Religion**

Religion of Respondents		Methods of non-degradable waste management				Pearson's Chi-square
		Incineration	Throwing everywhere	Burying in pit	Total	
Hindu	Count	63	9	35	107	0.106
	% within Religion of Respondents	58.9%	8.4%	32.7%	100.0%	
Budhist	Count	23	2	3	28	
	% within Religion of Respondents	82.1%	7.1%	10.7%	100.0%	
Christian	Count	4	1	3	8	
	% within Religion of Respondents	50.0%	12.5%	37.5%	100.0%	
Muslim	Count	7	0	0	7	
	% within Religion of Respondents	100.0%	0.0%	0.0%	100.0%	
Total	Count	97	12	41	150	
	% within Religion of Respondents	64.7%	8.0%	27.3%	100.0%	

Majority of the respondents (64.7%) had practiced incineration to manage the non-degradable solid waste as compared to throwing everywhere and burying in pit. The people living in urban area had not enough land to dispose by burying in pit and the rural people have

also incinerated the solid wastes for easy management of such wastes. There was no significant association ( $p > 0.106$ ) between religion of respondents and the methods of non-degradable solid waste management.

**Table 6: Methods of Degradable Solid Waste Management on the Basis of Religion**

Religion of Respondents		Method of degradable waste management			Total	Pearson's Chi-square
		Burying in Pit	Throwing everywhere	composting		
Hindu	Count	20	70	17	107	0.079
	% within Religion of Respondents	18.7%	65.4%	15.9%	100.0%	
Budhist	Count	2	25	1	28	
	% within Religion of Respondents	7.1%	89.3%	3.6%	100.0%	
Christian	Count	0	6	2	8	
	% within Religion of Respondents	0.0%	75.0%	25.0%	100.0%	
Muslim	Count	0	7	0	7	
	% within Religion of Respondents	0.0%	100.0%	0.0%	100.0%	
Total	Count	22	108	20	150	
	% within Religion of Respondents	14.7%	72.0%	13.3%	100.0%	

Majority of respondents (72%) had said that they throw everywhere to manage the solid wastes, where only 22

percent of respondents buried in pit and 20 percent of respondents practiced composting. There was no significant

association ( $p > 0.079$ ) between religion of the respondents and method of degradable solid waste management. It means religions did not determine the

methods of degradable solid waste management.

**3.5 PLACE OF RESIDENCE AND THE METHODS OF SOLID WASTE MANAGEMENT**

*Table 7: Methods of Non-degradable Solid Waste Management on the Basis of Place of Residence*

		Methods of non-degradable solid waste management				Chi-square Value	
		Incineration	Throwing everywhere	Burying in pit	Total		
Place of Residence	Rural	Count	21	10	19	50	0.000
		% within Place of Residence	42.0%	20.0%	38.0%	100.0%	
	Municipality	Count	39	2	9	50	
		% within Place of Residence	78.0%	4.0%	18.0%	100.0%	
	Sub-metropolitan	Count	37	0	13	50	
		% within Place of Residence	74.0%	0.0%	26.0%	100.0%	
Total	Count	97	12	41	150		
	% within Place of Residence	64.7%	8.0%	27.3%	100.0%		

The above table 2 shows that the incineration method of solid waste management was higher in urban (both in municipality and sub-metropolitan city) as compared to the rural area. Similarly, incineration method was popular method

(64.7%) to manage solid waste both in urban and rural areas as compared to other methods. There was significant association ( $p < 0.000$ ) between the place of residence and method of non-degradable solid waste management.

*Table 8: Place of Residence and Method of Degradable Solid Waste Management*

		Method of degradable waste management				Chi-square value	
		Burying in Pit	Throwing everywhere	composting	Total		
Place of Residence	Rural	Count	3	4	43	50	0.000
		% within Place of Residence	6.0%	8.0%	86.0%	100.0%	
	Municipality	Count	45	5	0	50	
		% within Place of Residence	90.0%	10.0%	0.0%	100.0%	
	Sub-metropolitan	Count	46	4	0	50	
		% within Place of Residence	92.0%	8.0%	0.0%	100.0%	
Total	Count	94	13	43	150		
	% within Place of Residence	62.7%	8.7%	28.7%	100.0%		

Burying in pit method was highly used in urban area as compared to rural areas and composting is used only in rural

area. Higher number of people used burying method (62.7%) as compared to other. There was significant association



( $p < 0.000$ ) between place of residence and method of degradable solid waste management. So, the null hypothesis-

*there is no significant association between place of residence and solid waste management* is rejected.

**3.6 METHODS OF SOLID WASTE MANAGEMENT AND THE EFFECTS ON HEALTH**

**Table 9: Methods of Non-degradable Solid Waste Management and the Effects on Health**

			Effects on health due to unmanaged waste				Total	Chi-square
			Diarrhoea	Fever	Spread of various diseases	No Problem		
Methods of non-degradable waste management	Incineration	Count	0	12	85	0	97	0.000
		% within Methods of non-degradable waste management	0.0%	12.4%	87.6%	0.0%	100.0%	
	Throwing everywhere	Count	11	0	0	1	12	
		% within Methods of non-degradable waste management	91.7%	0.0%	0.0%	8.3%	100.0%	
	Burying in pit	Count	0	0	0	41	41	
		% within Methods of non-degradable waste management	0.0%	0.0%	0.0%	100.0%	100.0%	
	Total	Count	11	12	85	42	150	
		% within Methods of non-degradable waste management	7.3%	8.0%	56.7%	28.0%	100.0%	

Higher number of respondents (56.7%) reported that incineration causes the various diseases than other methods. There was significant association between

methods of non-degradable solid waste management and the effects on community health ( $p < 0.000$ ).

**Table 10: Methods of Degradable Solid Waste Management and Effects on Health**

			Effects on health due to unmanaged waste				Total	Chi-square
			Diarrhea	Fever	Spread of various diseases	No Problem		
Method of degradable waste management	Burying in Pit	Count	2	2	3	15	22	0.000
		% within Method of degradable waste management	9.1%	9.1%	13.6%	68.2%	100.0%	
	Throwing everywhere	Count	8	10	75	15	108	
		% within Method of degradable waste management	7.4%	9.3%	69.4%	13.9%	100.0%	
	composting	Count	1	0	7	12	20	
		% within Method of degradable waste management	5.0%	0.0%	35.0%	60.0%	100.0%	
	Total	Count	11	12	85	42	150	
		% within Method of degradable waste management	7.3%	8.0%	56.7%	28.0%	100.0%	

There was higher number (72%) of health problem due to unmanaged solid waste management (throwing everywhere). There was significant association between methods of

degradable solid waste management and the bad effects on health ( $p < 0.000$ ). So, the null hypothesis- *there is no significant association between solid waste*

*management and its effect on health is rejected.*

#### 4. CONCLUSION

Solid waste management is the burning problem of the world. There are many causes of solid waste production. The study has focused on the knowledge and practices of solid waste management and its effect on health. The study has shown that the knowledge has not the major role to manage solid wastes. The consumerism culture and the celebration of feast and festivals have higher contribution to the production of solid wastes. Place of residence and the religion do not have any influence on the method of solid waste management. Incineration was the most favourable method of solid waste management both in rural and urban area. At the same time, respondents opined that incineration method of solid waste had resulted in various diseases.

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#### TO CITE THIS ARTICLE

Adhikari, R. P., Adhikari, B. C., Karki, R., Ghising, D. K., Basnet, D., Sapkota, S., Lama, K., & Dahal, S. (2023). Socio-cultural aspect of household waste management and its effects on public health. *International Research Journal of MMC*, 4(3), 85-97. <https://doi.org/10.3126/irjmmc.v4i3.58966>

**Submitted:** 23 September 2023

**Accepted:** 29 September 2023

**Published:** 2 October 2023

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*International Research Journal of MMC (IRJMMC)* is a peer-reviewed open access journal published by Research Management Cell, Makawanpur Multiple Campus, Hetauda

