# **Original Research Article**

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# A cross-sectional study on knowledge and practice of domestic waste management among the households residing in urban field practice area, GIMS, Kalaburagi

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#### **ABSTRACT**

**Background:** Effective domestic waste management is critical for public health and environmental sustainability, particularly in rapidly urbanizing areas.

**Methods:** A community-based cross-sectional study was conducted among 320 households selected by simple random sampling. Data were collected using a pre-tested semi-structured questionnaire and analyzed using descriptive statistics and Chi-square tests.

**Results:** Adequate knowledge and practice regarding domestic waste management were observed in 61.9% and 68.8% of respondents, respectively. Knowledge was significantly associated with education level (p=0.012), occupation (p=0.03), marital status (p=0.031), and type of house (p=0.006). However, these variables did not significantly affect practice levels. Despite high access to collection services, 56% still disposed of waste improperly. **Conclusions:** While knowledge on domestic waste management is relatively high, it does not consistently translate into good practice. Behaviour change interventions and stronger community engagement are essential.

Keywords: Domestic waste, Kalaburagi, Knowledge, Practice, Solid waste management, Urban households

# INTRODUCTION

Domestic waste management functions as a vital part for urban sanitation alongside environmental sustainability. Rapid urbanization has created significant waste production increases which produce challenges for waste collection and sorting and final disposal mainly in developing nations such as India. 1.2 Waste management issues lead to environmental degradation combined with polluted water resources and increased chances of mosquito-borne contagions. 3,4 Multiple research studies established that waste management practices performed in residences directly determine city cleanliness and public health conditions. 5,6

Waste management enhancement has involved multiple worldwide strategies that include source-based waste

segregation and recycling initiatives coupled with community involvement.<sup>7,8</sup> India launched the Swachh Bharat Mission (SBM) as part of its policies to enhance urban waste management.<sup>9</sup> Household waste disposal problems continue to exist steadily with particular intensity in semi-urban and low-income settlements even after these initiatives were undertaken.<sup>10,11</sup> GIMS's urban field practice area at Kalaburagi demonstrates general waste management problems which stem from residents' poor awareness combined with lacking infrastructure.<sup>12,13</sup>

The management of domestic waste when performed improperly leads to dangerous effects on both health and environmental conditions. Unawareness and improper waste disposal in urban areas result in environmental pollution and drainage system clogging alongside disease vector spread. 14,15 The improper blending of

biodegradable waste with non-biodegradable waste among homes causes waste processing issues and excessive landfill usage. 16,17

Proper waste disposal among households at the individual level shows minimal participation in the Kalaburagi city area. Research studies about household knowledge and behavior towards waste management practice in this specific area are scarce. Knowledge of these fundamental elements enables proper development of effective public health interventions along with policy measures. <sup>18,19</sup>

Knowing what people in households understand about waste matters because it leads to better urban development together with health protection. An assessment of household waste management behavior and knowledge levels exists as the goal of this study focusing on GIMS's Kalaburagi field practice area. The research outcomes will demonstrate gaps in knowledge and behavioral obstacles which policymakers need to use for developing focused intervention approaches.<sup>20,21</sup>

The research supports world sustainability initiatives because it contributes toward achieving sustainable development goal (SDG) 11 regarding sustainable cities along with SDG 12 about responsible consumption and production. Waste management local challenges need an understanding for creating cultural suitable waste disposal methods that also support environmental conservation. Also support environmental conservation.

Thus, the study has been carried out with objectives: 1) to assess the knowledge of domestic waste management among households residing in urban field practice area, GIMS, Kalaburagi and 2) to assess the practices of domestic waste management among households residing in urban field practice area, GIMS, Kalaburagi.

#### **METHODS**

# Source of data

People residing in households of urban field practice area, GIMS, Kalaburagi.

### Study subject

Households of urban field practice area among 18 to 60 years age group, GIMS, Kalaburagi were selected as the study subjects.

# Place of study

Urban Field practice area adopted by department of community medicine, GIMS, Kalaburagi.

### Study design

It was a community based cross sectional study.

#### Sample size calculation

Sample size was calculated using the formula  $n=z^2pq/d^2$ . Prevalence of practice of domestic waste management in a study done by Eshwari et al in 2019 was 72.87. Thus, taking p value as 72.8% at confidence level of 95% with 5% margin of error, the sample size was 317, which was rounded up to 320.

### Sampling method

Sample was collected by simple random sampling.

UHTC: Manikeswari has total population of 62471 with 7 wards, of which 4 wards are adopted by department of community medicine GIMS, Kalaburagi as field practice area. All the household in these 4 wards are google tagged. List of tagged households was prepared and a number was given against each household. From each ward 80 households were randomly selected using simple random generator, thus reaching the sample size of 320.

#### Duration of the study

The study took place from 16 January to 12 February 2025.

#### Inclusion criteria

Individuals between 18 to 60 years of age group are selected. All the randomly selected households of urban field practice area.

# Exclusion criteria

Households locked at the time of visit. Household not giving consent for assessment of knowledge and practice.

To access the knowledge and practice of solid waste management in the household, score was given to each correct and best possible practice. For each correct answer 1 mark was given and 0 for incorrect answer. The range of score was 0 to 8, the score was categorized into two categories adequate (score >4) and inadequate (score ≤4). Similarly in practice, same scoring was followed for each question except in case of question number 5, where use of no R was given 0, any 1R was given 1, any 2R was given 2 and using all 3R methods was given 3. In case of practice, range of score was 0 to 9. Similarly, practice was categorized into adequate (score ≥5) and inadequate (score <5).

# Methods of collection of data

Prior to data collection, informed written consent was obtained in a standard format. After review of literature a pretested and validated, semi-structured questionnaire was used to collect data from all the selected people by house-to-house survey through interview method. Anonymity of the study participants was maintained.

#### Statistical methods

Data was entered in Microsoft excel spreadsheet and results was analyzed in the form of proportion and percentages. Chi square test was used to find the association between sociodemographic profile and knowledge and practice. Statistical significance was taken if p value was <0.05. Results were presented in the form of tables and graphs.

#### **RESULTS**

Most (35.6%) of the study population belonged to age group of 18-30 years, 25.3% belonged to >51 years, 23.4

% belonged to 30-40 years and 15.6 % belonged to 40-50 years age group. 23% of the study population was male and 77% were female. 73% of the study participants belonged to nuclear family, 21% belonged to joint family and 6% of the study participants belonged to three generation family. In the study, 44% of people belonged to OBC followed by 30% ST, 18% general and only 8% of people belonged to SC. 35% of study participants belonged to middle class, 31% were in upper middle class and 18% were in lower middle class. 27% of the study participants had primary school education, 25% had secondary school education, 21% were graduate and above, 20% had higher secondary education and 7% were illiterate.

Table 1: Sociodemographic profile of study participants residing in urban field practice area of GIMS, Kalaburagi.

Sociodemographic Profile	Categories	Frequency	Percentage	
Age (in years)	18-30	114	35.6	
	31-40	75	23.4	
	41-50	50	15.6	
	>51	81	25.3	
Gender	Male	75	23.4	
Gender	Female	245	76.6	
Caste	General	59	18.4	
	OBC	141	44.1	
	SC	25	7.8	
	ST	95	29.7	
Family	Nuclear	236	73.8	
	Joint	66	20.6	
	Three generation	18	5.6	
	Upper class	39	12.2	
	Upper Middle	98	30.6	
Socioeconomic status	Middle	111	34.7	
	Lower Middle	59	18.4	
	Lower class	13	4.1	
	Graduate and above	66	20.6	
	Higher secondary	65	20.3	
Elmodon	Secondary	81	25.3	
Education	Primary	87	27.2	
	Illiterate	21	6.6	
	Total	320	100	
	Skilled	79	24.7	
Occupation	Semiskilled	110	34.4	
	Unskilled	131	40.9	
	Married	259	80.9	
Marital status	Unmarried	40	12.5	
	Widow	21	6.6	
	For 1 year	216	67.5	
Years of residence	For 2 years	97	30.3	
	For 3 years or above	7	2.2	
Type of house	Pucca	273	85.3	
	Semi Pucca	43	13.4	
	Kutcha	4	1.3	

Table 2: Knowledge questions on domestic waste management.

Questions	Frequency	Percentage			
Is solid waste source of pollution for the environment?					
Yes	248	78			
No	72	22			
Burning of solid waste causes health risks					
Yes	227	71			
No	93	29			
The amount of solid waste can be reduced by reusing at household levels					
Yes	213	67			
No	107	33			
Waste papers, plastic bags, clothes are recyclable					
Yes	215	67			
No	105	33			
Improper dumping of solid waste can eventually lead to pollution of rivers, lakes and wells					
Yes	243	76			
No	77	24			
Non sanitary landfills contaminate the ground water reserve	oir				
Yes	168	53			
No	152	47			
Compost and organic fertilizers can be prepared from solid	waste				
Yes	151	47			
No	169	53			
Sorting of solid waste at home level helps for solid waste man	Sorting of solid waste at home level helps for solid waste management				
Yes	193	63			
No	127	40			

Table 3: Practice questions on domestic waste management.

Questions	Frequency	Percentage
Do you separate solid waste before disposal	• •	·
Yes	190	59
No	130	41
In what type of container do you collect your waste		
Dustbins /old containers	242	76
Plastic bags	78	24
How often do you dispose of household waste		
Daily	261	82
Weekly/monthly	59	18
How do you get rid of solid waste from home		
Dumped in disposal sites	140	44
Dumped along road sides or backyard	180	56
Do you practice reduce, reuse and recycle strategy f	or solid waste managemen	t
Do not use 3R	104	32
Use any one R	3	1
Use any 2R	112	35
Use 3R's	101	32
Do you participate in community waste managemen	t or clean up programs	
Yes	140	44
No	180	56
Do you have access to door-to-door waste collection	service	
Yes	315	98
No	5	2

Table 4: Knowledge and Practice across different socio-demographic profile.

Sociodemographic p		Adagrata				<b>(6)</b>	
31_		Adequate	Inadequate	P value	Adequate	Inadequate	P value
31-	30	76 (66.70)	38 (33.30)	0.06*	80 (70.20)	34 (29.80)	0.852
	40	48 (64.00)	27 (36.00)		49 (65.30)	26 (34.70)	
Age (in years) 41-	50	34 (68.00)	16 (32.00)		36 (72.00)	14 (28.00)	
>51		40 (49.40)	41 (50.60)		55 (67.90)	26 (32.10)	
Gender Ma	le	51 (68.00)	24 (32.00)	0.212	54 (72.00)	21 (28.00)	0.488
Fen	nale	147 (60.00)	98 (40.00)	0.212	166 (67.80)	79 (32.20)	
Ger	neral	40 (67.80)	19 (32.20)		41 (69.50)	18 (30.50)	0.931
Caste OB	C	79 (56.00)	62 (44.00)	0.099	96 (68.10)	45 (31.90)	
SC		13 (52.00)	12 (48.00)	•	16 (64.00)	9 (36.00)	
ST		66 (69.50)	29 (30.50)		67 (70.50)	28 (29.50)	
Nuc	clear	141 (59.70)	95 (40.30)		156 (66.10)	80 (33.90)	
Family Join	nt	46 (69.70)	20 (30.30)	0.338	49 (74.20)	17 (25.80)	0.176
Thr	ree generation	11 (61.10)	7 (38.90)	•	15 (83.30)	3 (16.70)	
Upj	per class	29 (74.40)	10 (25.60)		28 (71.80)	11 (28.20)	0.65
Upi	per middle	62 (63.30)	36 (36.70)	•	69 (70.40)	29 (29.60)	
Socioeconomic Mic	ddle	62 (55.90)	49 (44.10)	0.322	73 (65.80)	38(34.20)	
status	wer Middle	36 (61.00)	23 (39.00)		39 (66.10)	20 (33.90)	
Lov	wer class	9 (69.20)	4 (30.80)	•	11 (84.60)	2 (15.40)	
Gra	aduate and above	52 (78.80)	14 (21.20)		48 (72.70)	18 (27.30)	0.17
Hig	gher secondary	42 (64.60)	23 (35.40)		40 (61.50)	25 (38.50)	
<b>Education</b> Sec	condary	42 (51.90)	39 (48.10)	0.012*	63 (77.80)	18 (22.20)	
Priı	mary	51 (58.60)	36 (41.40)		55 (63.20)	32 (36.80)	
Illit	terate	11 (52.40)	10 (47.60)	•	14 (66.70)	7 (33.30)	
Ski Ski	lled	53 (67.10)	26 (32.90)		47 (59.50)	32 (40.50)	0.105
Occupation Sen	niskilled	54 (49.10)	56 (50.90)	0.03*	81 (73.60)	29 (26.40)	
Uns	skilled	91 (69.50)	40 (30.50)		92 (70.20)	39 (29.80)	
Ma Ma	rried	161 (62.20)	98 (37.80)	0.031*	174 (67.20)	85 (32.80)	
Marital Uni	married	29 (72.50)	11 (27.50)		32 (80.00)	8 (20.00)	0.26
Status wid	low	8 (38.10)	13 (61.90)		14 (66.70)	7 (33.30)	'
For	· 1 year	131 (60.60)	85 (39.40)	0.748	148 (68.50)	68 (31.50)	0.002
	· 2 years	62 (63.90)	35 (36.10)		67 (69.10)	30 (30.90)	
	3 years or	5 (71.40)	2 (28.60)		5 (71.40)	2 (28.60)	0.983
Puc	cca	160 (58.60)	113 (41.40)	0.006*	189 (69.20)	84 (30.80)	
Type of house Sen	ni Pucca	36 (83.70)	7 (16.30)		29 (67.40)	14 (32.60)	0.698
V 1	tcha	2 (50.00)	2 (50.00)		2 (50.00)	2 (50.00)	•

<sup>\*</sup>P value was considered significant (p<0.05)

41% of the people were unskilled worker, 34% were semi-skilled and 25% were skilled worker. In our study 81% of the people were married, 13% were unmarried and 7% were widow. 68% of people were living the study area for one year, 30% people for 2 years and only 2% people for more than or equal to 3 years. Among the study participants 85.3% were residing in pucca house, 13.4% in semi-pucca and 1.3% in kutcha house (Table 1).

In the study, 78% people knew that solid waste is source of pollution for the environment, 71% knew that burning of solid waste causes health risk, 67% people knew, the amount of solid waste can be reduced by reusing at household level and waste papers, plastic bags, clothes

are recyclable was known by 67% people. 76% people knew, improper dumping of solid waste can eventually lead to pollution of river, lake and wells, 53% knew that non-sanitary landfills contaminate the ground water reservoir, compost. 64% people said yes to solid waste segregation reduces the waste disposal cost and environmental pollution is and 54% people said no for sorting and selling for recycle companies (Table 2). As per the score given, 61.9% had adequate knowledge whereas 38.1% had inadequate knowledge (Figure 1).

In the study it was found that, 59% people said yes for separation of solid waste before disposal, 76% of people collected waste in dustbins or old container, 82% people

disposed household waste daily and 56% people dumped along roadside or backyard to get rid of solid waste from home. 35% people used 2R strategy for solid waste management, 56% participated in community waste management or cleanup programs, 98% of people had door to door collection service (Table 3). It was found that 220 (68.8%) people had adequate practice on domestic waste management while 100 (31.2%) had inadequate practice (Figure 2).

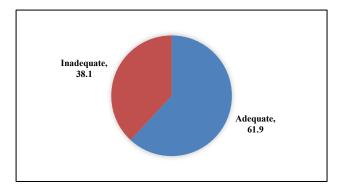


Figure 1: knowledge on solid waste management amongst the study participants (%).

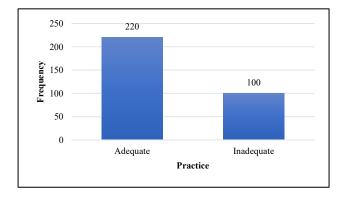


Figure 2: Practice of solid waste management among the study participants (N).

The highest proportion of adequate knowledge was observed among participants aged 41-50 years (68%), followed by those aged 18-30 years (66.7%). However, knowledge levels declined in participants aged above 51 years (49.4%). The association between age and was statistically significant knowledge (p=0.06). Regarding practice, no statistically significant association was found across age groups (p=0.852), although the 41-50 years age group showed slightly better practice (72%). Male participants demonstrated higher adequate knowledge (68%) compared to females (60%), though the difference was not statistically significant (p=0.212). Similarly, practice levels were higher in males (72%) than in females (67.8%), with no statistically significant difference (p=0.488). Scheduled tribe (ST) participants had the highest proportion of adequate knowledge (69.5%), followed by the general category (67.8%). However, the association between caste and knowledge was not statistically significant (p=0.099). Similarly, there

was no significant association between caste and practice (p=0.931). Participants from joint families showed higher levels of both knowledge (69.7%) and practice (74.2%) compared to those from nuclear or three-generation families. However, the differences were not statistically significant (p=0.338 for knowledge; p=0.176 for practice). Adequate knowledge was highest in the upper class (74.4%), followed by the upper middle class (63.3%). Nonetheless, the association between SES and knowledge (p=0.322) and SES and practice (p=0.650) was not statistically significant. A statistically significant association was observed between education and knowledge (p=0.012), with graduates and above showing the highest level of adequate knowledge (78.8%). However, no significant association was found between education and practice (p=0.170), despite higher practice levels among those with secondary education (77.8%). Knowledge was significantly associated with occupation (p=0.03). Unskilled workers reported the highest adequate knowledge (69.5%), followed by skilled workers (67.1%). Practice levels were also highest among unskilled workers (70.2%), but the association with practice was not statistically significant (p=0.105). Unmarried participants had higher levels of knowledge (72.5%) than married (62.2%) and widowed individuals (38.1%). The association between marital status and knowledge was statistically significant (p=0.031), while the association with practice was not (p=0.260). No significant association was observed between years of residence and knowledge (p=0.748) or practice (p=0.983). A statistically significant association was noted between type of house and knowledge (p=0.006), with participants living in semi-pucca houses reporting the highest adequate knowledge (83.7%). However, no significant association was found between type of house and practice (p=0.698) (Table 4).

#### **DISCUSSION**

The present study assessed the knowledge and practices regarding domestic waste management among urban households in the field practice area of GIMS, Kalaburagi. The findings reveal that while 61.9% of participants had adequate knowledge, only 68.8% demonstrated adequate practice, indicating a modest knowledge-practice gap.

A statistically significant association was observed between knowledge levels and several socio-demographic factors, including education, occupation, marital status, and type of house. These findings align with earlier Indian studies that highlighted education and socio-economic factors as key determinants of waste management behaviour.

Education played a crucial role in determining knowledge. Participants who were graduates or above showed significantly higher knowledge (78.8%) compared to those with lower educational qualifications. This result is consistent with findings from a study

conducted in Mysuru, Karnataka by Eshwari et al, which reported that higher education levels were significantly associated with better awareness of waste segregation and recycling practices. Similarly, Joshi and Ahmed, in their review, emphasized the importance of educational attainment in promoting effective solid waste management behaviour in urban India.

Occupation was also found to significantly influence knowledge, with unskilled and skilled workers reporting better knowledge than semiskilled ones. This trend may be linked to occupational exposure or informal learning through practical experience. These findings resonate with Sharholy et al, who reported that occupational exposure, especially among urban service workers, often influences their understanding and engagement in wasterelated behaviours.<sup>11</sup>

The study found that marital status was significantly associated with knowledge, with unmarried individuals displaying better awareness than their married and widowed counterparts. This might be attributed to the younger age and recent educational exposure of the unmarried group. However, this factor has not been extensively studied in prior literature and warrants further exploration.

Interestingly, type of housing also had a significant association with knowledge. Residents of semi-pucca houses demonstrated the highest knowledge (83.7%). This contrasts with findings from Annepu, who noted that housing type typically correlates with socio-economic conditions and infrastructure availability, which in turn influence access to information and services.<sup>14</sup>

Despite relatively good knowledge levels, practice scores did not show significant variation across most sociodemographic variables. For example, while education and occupation influenced knowledge, their impact on actual waste management practices was less pronounced. This suggests the existence of a knowledge-practice gap, a phenomenon also reported in studies from Delhi and Hyderabad, where residents were aware of waste segregation but did not practice it due to lack of convenience, motivation, or municipal support. 17,15

Furthermore, a large proportion (56%) of participants in this study still resorted to disposing of waste along roadsides or in backyards despite high awareness levels. Similar trends were observed in Chatterjee, who reported infrastructural and behavioural barriers that prevent translation of awareness into action in Indian cities. <sup>10</sup>

Encouragingly, the majority of respondents (98%) had access to door-to-door waste collection services, yet only 59% practiced waste segregation at the household level. This discrepancy highlights the need for behaviour change communication (BCC) strategies in addition to infrastructural provision. Previous work by Dhokhikah et

al emphasized the role of community participation and civic engagement in strengthening household practices.<sup>13</sup>

The study failed to address about the liquid waste generated at the household level like waste from washroom and toilets. Furthermore, disposal of medical drugs like Dettol, antiseptic ointments, syrups, expired tablets etc kept at the house are not included in the study. Future studies can include all these limitations so that it will give a comprehensive picture of the waste management at the household level.

#### **CONCLUSION**

This study highlighted that while a majority of urban households in the GIMS, Kalaburagi field practice area possessed adequate knowledge of domestic waste management, the actual practices adopted were suboptimal. Key determinants of knowledge included education, occupation, marital status, and type of housing. However, these variables showed limited influence on practice, pointing toward a persistent knowledge-practice gap. Despite access to door-to-door collection services and general awareness of the environmental risks of improper waste disposal, many participants continued to follow unsanitary disposal methods such as dumping waste on roadsides or in backyards. This underscores the need for translating awareness into consistent, sustainable behavioural change at the household level.

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