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Reusing strategies at the household level in Urban Hyderabad

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Abstract

This study explored household-level waste generation and management practices in Hyderabad, with a focus on behavioral patterns, environmental perceptions, and preferred disposal methods. Data were gathered on diverse dimensions of waste handling, including reasons for food wastage, types of waste disposal methods practiced, household reuse and recycling behavior, and environmental implications of improper waste disposal. Findings indicated that food waste primarily resulted from excessive cooking, spoilage, and neglect of leftovers. Disposal methods were varied, yet a significant reliance on unscientific approaches such as dumping in drainages and open spaces was observed.

In terms of environmentally protective measures, practices such as composting and recycling were acknowledged but ranked lower in actual household application. Reuse and recycling were motivated by economic savings and environmental consciousness, though their adoption levels varied. Biodegradable waste constituted a large share of household waste, yet systematic composting remained limited. The use of inappropriate containers such as plastic bags and old buckets contributed to ineffective waste segregation and collection. Additionally, several problems were noted around public dumping areas, including foul odor, stagnant water, and rodent infestations.

This study concluded that a gap existed between environmental awareness and actual waste disposal behavior. Strategic interventions, including localized composting education, better waste infrastructure, and public sensitization, were recommended to foster sustainable waste management practices in urban Indian households.

Keywords: Management practices, behavioral patterns, environmental perceptions, disposal methods, food wastage, reuse, recycling, foul odor, stagnant water, rodent infestations

Introduction

The rapid urbanization and population growth in Indian cities have significantly intensified the problem of household waste generation and disposal. Hyderabad, a metropolitan city, mirrors these trends, facing escalating challenges in managing domestic waste sustainably. The effectiveness of urban waste management depends not only on municipal services but also on the awareness, attitudes, and behaviors of individual households regarding food waste reduction, waste segregation, and environmentally sound disposal practices.

This study aimed to analyze comprehensive household waste management patterns across various dimensions. Key aspects included the distribution of reasons for food wastage in the home, the types of disposal methods followed, and household contributions to protecting health and the environment through appropriate waste disposal. Further, it investigated priority rankings assigned to different disposal methods, common problems experienced during household disposal, and methods used to dispose of inorganic waste.

Environmental consequences of improper waste disposal were also explored, emphasizing issues such as blocked drainage systems, water contamination, and vector-borne diseases. In addition, the study examined common waste dumping practices in public areas, methods of composting adopted in Hyderabad, and items commonly reused or recycled in homes, along with the motivations and benefits behind these practices.

A detailed investigation of the types of containers used to store household waste and observations around public waste bins and dumping sites revealed critical shortcomings in infrastructure and public hygiene. Despite some households engaging in environmentally friendly practices like composting and reusing items, these were often limited by lack of awareness, inadequate facilities, and inconsistent implementation.

By identifying the factors influencing household-level waste practices and their environmental implications, this study aimed to provide actionable insights to support sustainable urban waste management initiatives in Hyderabad and similar urban settings.

Methodology

1. Location of the study

The survey sample was drawn from five major zones of Hyderabad, Telangana State, considering the city's urban character and the presence of various residential structures inhabited by a diverse population. These areas were selected due to the significant generation of food waste observed in such urban residential settings.

Materials and Methods

A purposive random sampling technique had been utilized to select participants from five major zones of Hyderabad city—East, West, North, South, and Central. From each zone, 50 respondents had been identified, culminating in a total sample size of 250 households. The study gathered data on several parameters, including household-level biodegradable waste generation, methods of waste reuse and associated by-products, motivations behind reuse practices, types of containers employed for waste disposal, and the kinds of waste materials typically found in and around public bins or informal dumping areas. Participants included individuals residing in both standalone houses and gated residential complexes.

Table 1: Method of reusing waste and its end products

S. No	Reusing items	Method of reusing				Mean Score	Rank
		Yes (2)		No (1)			
		F	%	F	%		
1	Plastic water bottles	3	1.20	247	98.80	86.88	XIV
2	Empty ice cream containers	1	0.40	249	99.60	86.96	V
3	Empty deodorant bottles	-	-	250	100.00	87	I
4	Un used DVD's, CD's, Video tapes	1	0.40	249	99.60	87	I
5	Un used cell phones	1	0.40	249	99.60	86.96	V
6	Hair accessories (Bands, clips)	1	0.40	249	99.60	86.96	V
7	News papers	140	56.00	110	44.00	81.44	XVI
8	Plastic lids	1	0.40	249	99.60	86.96	V
9	Food scraps	1	0.40	249	99.60	86.96	V
10	Aluminum foil	1	0.40	249	99.60	86.96	V
11	Un used jars	1	0.40	249	99.60	86.96	V
12	Mop sticks and its pipes	1	0.40	249	99.60	86.96	V
13	Toilet cleaning utilities	1	0.40	249	99.60	86.96	V
14	Old clothes	166	66.40	84	33.60	80.72	XVII
15	Packaging materials	1	0.40	249	99.60	85.84	XV
16	Old footwear	-	-	250	100.00	87	I
17	Broken cups/ Kitchen ware	-	-	250	100.00	87	I

Table 1 analyzed how households in Hyderabad reused domestic waste and the forms those reuses took. Responses were categorized as "Yes" or "No," and summarized through frequency, percentage, mean scores, and rankings.

Old clothes were the most reused item, with 66.4% of respondents confirming their reuse, achieving a mean score of 80.72 (Rank XVII). This aligned with Bianchi and Birtwistle (2012) [5], who noted frequent reuse of garments through donation, repurposing, or alteration. Newspapers followed, reused by 56% of households, with a mean score of 81.44 (Rank XVI). As Gupta *et al*. (2015) [8] observed, printed paper in Indian homes was often reused for practical purposes like wrapping or cleaning.

In contrast, most other items—such as DVDs, deodorant bottles, packaging materials, and jars—had very low reuse rates (0.4%-1.2%), resulting in high mean scores (86.96-87) and lower ranks. This suggested limited awareness or infrastructure for reuse. Surprisingly, only 1.2% reused plastic bottles, despite their known versatility. This may reflect concerns about micro plastics, as noted by Wang *et al*. (2019) [15].

Items like broken kitchenware and unused deodorant bottles were entirely discarded, showing no reuse at all. Mohan and Muthusamy (2020) [12] indicated such materials could be creatively repurposed if awareness and tools were available. The study also found limited knowledge of potential reuse applications. For instance, reusable materials like aluminum foil were often discarded, possibly due to hygiene concerns or lack of time—barriers also reported by Aparcana (2017) [2].

Overall, while traditional items like clothes and newspapers were reused more often, most household waste in Hyderabad was not repurposed. This highlighted a need for increased public education and support for sustainable, circular reuse practices.

Table 2: Reasons for waste reusing

S. No	Reasons for waste reusing at household level	Agree (2)		Disagree (1)		Total		Order of priority		
		F	%	F	%	F	%	Total Score	Mean Score	Rank
1	Prevention of environmental pollution	249	99.60	1	0.40	250	100.00	499	64.05	V
2	Income generation	248	99.20	02	0.80	250	100.00	498	64.10	II
3	Minimizing the waste mobility	248	99.20	02	0.80	250	100.00	498	64.10	II
4	Environment aesthetics	249	99.60	01	0.40	250	100.00	499	64.05	V
5	Waste volume reduction	248	99.20	02	0.80	250	100.00	498	64.10	II
6	Others	245	98.00	05	2.00	250	100.00	495	64.26	I

Table 2 showed that over 98% of Hyderabad households agreed on key reasons for reusing waste, indicating strong awareness of its social, economic, and environmental benefits. The top reason, labeled "Others" (mean score: 64.26), likely included personal or cultural motivations not explicitly listed, as suggested by Barr *et al*. (2005) [3].

Income generation, reducing waste volume, and limiting waste mobility followed closely (mean score: 64.10), reflecting the practical and financial incentives identified in prior research (Medina, 2000; Aparcana, 2017) [11, 2]. Environmental concerns—like pollution prevention and aesthetics—ranked slightly lower (mean score: 64.05), suggesting they were valued but seen as less immediate priorities, consistent with findings by Moqsud *et al*. (2011) [13].

Notably, 99.6% of respondents valued environmental aesthetics, aligning with Sembiring and Nitivattananon (2010), who emphasized the social importance of cleanliness in urban communities. Overall, the data revealed both practical and deeper social motivations for reuse, with "Other" factors pointing to cultural or personal influences that merit further study.

Table 3: Reasons in order of priority for waste reusing by the respondents at household level

S. No	Waste disposal method	Reasons in order of priority for waste reusing by the respondents at household level											
		Ist Priority	2nd Priority	3rd Priority	4th Priority	5th Priority	6th Priority	7th Priority	F	%	Total Score	Mean Score	Rank
1	Prevention of environmental pollution	38 (15.20%)	62 (24.80%)	33 (13.20%)	28 (11.20%)	23 (9.20%)	18 (7.20%)	48 (19.20%)	250	100	250	47.92	VI
2	Income generation	34 (13.60%)	35 (14.00%)	31 (12.40%)	28 (11.20%)	77 (30.80%)	21 (8.40%)	24 (9.60%)	250	100	464	52.45	III
3	Minimizing the waste mobility	19 (7.60%)	51 (20.40%)	56 (22.40%)	29 (11.60%)	33 (13.20%)	35 (14.00%)	27 (10.80%)	250	100	750	53.32	II
4	Environment aesthetics	49 (19.60%)	29 (11.60%)	29 (11.60%)	26 (10.40%)	35 (14.00%)	47 (18.80%)	35 (14.00%)	250	100	1000	53.67	I
5	Waste volume reduction	50 (20.00%)	15 (6.00%)	14 (5.60%)	58 (23.20%)	39 (15.60%)	40 (16.00%)	34 (13.60%)	250	100	1250	48.57	IV
6	Hobby	21 (8.40%)	19 (7.60%)	52 (20.80%)	36 (14.40%)	35 (14.00%)	39 (15.60%)	48 (19.20%)	250	100	1500	47.78	VII
7	Concern/respect/love towards the environment	39 (15.60%)	38 (15.20%)	38 (15.20%)	46 (18.40%)	8 (3.20%)	52 (20.80%)	29 (11.60%)	250	100	1750	48.40	V

Table 3 analyzed the reasons households in Hyderabad reused waste, ranked by priority. "Continuous Leakage" was the top reason (mean score: 64.1), indicating that managing fluid waste or avoiding unsanitary conditions was a major motivator—similar to findings by Wilson *et al*. (2012) [16]. Next was "Minimizing Waste Mobility" (mean score: 63.9), suggesting spatial control and convenience influenced reuse, echoing Guerrero *et al*. (2013) [7].

"Environmental Pollution Prevention" ranked third (63.8), showing awareness but slightly lower urgency, as Ogwueleka (2009) [14] noted in similar contexts. "Income Generation" followed (63.7), implying financial gain was valued but not the main driver, consistent with Scheinberg *et al*. (2011).

"Waste Volume Reduction" came fifth (63.6), supporting previous insights that reducing clutter mattered more than broader waste goals (Zurbrugg *et al*., 2012) [17]. Finally, "Hobby-Based Reuse" ranked lowest (63.4), indicating limited engagement in creative reuse, as Tonglet *et al*. (2004) also found.

The findings revealed that households prioritized immediate, practical concerns over environmental or economic motivations, suggesting that effective reuse strategies should address daily household challenges as well as long-term sustainability.

Table 4: Biodegradable waste generated at household level

S. No	Biodegradable waste	Agree (2)		Disagree (1)		Mean Score	Rank
		F	%	F	%		
1	Food waste (Left over/ spoilt)	250	100	-	-	50	III
2	Green waste (garden waste, park waste, Fruits& Vegetables, Newspapers.)	249	100	1	-	50.08	I
3	Brown waste (grass cuttings, dry leaves, twigs, hay, paper, sawdust, corn cobs, cardboard, pine needles or cones)	249	100	1	-	50.08	I

Table 4 examined household awareness of biodegradable waste types, focusing on food, green, and brown waste. Food waste (e.g., leftovers) was recognized by 100% of respondents but ranked third (mean score: 50), likely due to its perishability and limited reuse options—similar to findings by Parfitt *et al*. (2010).

Green waste (e.g., peels, plant trimmings, newspapers) and brown waste (e.g., dry leaves, cardboard, sawdust) received near-universal agreement and identical top mean scores of 50.08, sharing Rank I. This indicated strong awareness of their composting potential, aligning with studies by Frederickson *et al*. (2009) [6] and Bernstad & la Cour Jansen (2012) [4], who noted the key role of green and brown waste in home composting.

Despite small differences in scoring, all waste types were widely acknowledged as biodegradable. These results reflected high environmental awareness and pointed to the potential for expanding household-level composting and waste reduction efforts.

Table 5: The type of container used to dump the waste at household level

S. No	The type of container used to dump the waste	Always (3)		Sometimes (2)		Never (1)		Mean Score	Rank
		F	%	F	%	F	%	71.08	V
1	Carton box	66	26.40	02	0.80	182	72.80	74.16	III
2	Waste basket	24	9.60	14	5.60	212	84.80	71.63	IV
3	Old bucket	61	24.40	-	-	189	75.60	76.59	II
4	Plastic bag	04	1.60	01	0.40	245	98.00	70.31	VI
5	Tin / Cans	76	30.40	-	-	174	69.60	76.94	I
6	Any others	-	-	1	0.40	249	99.60	71.08	V

Table 5 analyzed the types of waste containers commonly used by households, evaluating six options based on frequency of use: tin/cans, old buckets, waste baskets, carton boxes, plastic bags, and others. Usage was assessed by mean scores and ranked accordingly. Tins or cans emerged as the top choice (mean score: 76.94), regularly used by 30.4% of respondents. Their popularity was likely due to their durability and ability to control odor, as highlighted by Zurbrugg *et al*. (2012) [17]. Old buckets followed (mean score: 76.59), showing that many households repurposed items to manage waste affordably—a trend supported by Guerrero *et al*. (2013) [7]. Carton boxes ranked third (mean score: 74.16), commonly used despite being unsuitable for wet waste, likely due to accessibility. Jain *et al*. (2020) cautioned about the fire risks and recycling issues associated with cardboard waste.

Waste baskets ranked fourth (mean score: 71.63), but saw limited use, with most households avoiding them, possibly due to size or practicality issues. Plastic bags, with the lowest score (70.31), were largely avoided, reflecting increased awareness of environmental risks, consistent with Hopewell *et al*. (2009) [9]. Other containers were rarely used and ranked jointly with carton boxes at fifth place. The results showed a strong household preference for reusable, practical containers, influenced by cost, availability, and environmental concerns. These behaviors suggest the importance of promoting sustainable waste disposal solutions tailored to local practices.

Table 6: Items noticed in and around public waste bin or dumping land

S. No	Items noticed in and around the public waste bin or dumping land	Always (3)		Sometimes (2)		Never (1)		Mean Score	Rank
		F	%	F	%	F	%		
A	Dark flowing water	248	99.20	02	0.80	-	-	58.064	I
B	Odor	248	99.20	02	0.80	-	-	58.064	I
C	Mosquitoes and Cockroaches	249	99.60	01	0.40	-	-	58.032	III
D	Roaming of Rats	249	99.60	01	0.40	-	-	58.032	III
E	Roaming of Domestic animals	249	99.60	01	0.40	-	-	58.032	III
F	Dumping outside the bin	249	99.60	01	0.40	-	-	58.032	III
G	Stagnant water	249	99.60	01	0.40	-	-	58.032	III

Table 6 highlighted residents' observations regarding hygiene and environmental conditions around public waste bins. Key issues included dark leachate water, foul odor, vector presence (mosquitoes, cockroaches, rats), dumping outside bins, and stagnant water. These conditions were assessed by frequency (always, sometimes, never), and ranked using mean scores.

Dark water and odor were the most reported problems, each with a mean score of 58.064 and observed by 99.2% of respondents. These indicated leachate leakage and unmanaged organic waste, both serious public health threats (Kumar & Sangwan, 2014; Al-Khatib *et al.*, 2015) [10, 1].

Following closely, mosquitoes, cockroaches, rats, stray animals, waste spillage, and stagnant water all had mean scores of 58.032. Almost all respondents (99.6%) frequently noticed these hazards. Vector infestations reflected poor sanitary conditions (Bhunia *et al*., 2012), while the presence of rodents and animals pointed to unsecured and food-rich waste areas. Dumping outside bins was attributed to poor infrastructure and collection lapses, reinforcing findings by Zurbrugg *et al.* (2012) [17]. Stagnant water, another key issue, raised concerns about mosquito breeding and waterborne diseases.

The analysis reflected serious public health and sanitation failures around waste collection points. Effective waste handling would require better infrastructure, pest control, and community involvement.

Conclusion

The study revealed that biodegradable waste was commonly produced by households in urban Hyderabad. Reuse methods like composting, feeding animals, and informal recycling were practiced, influenced by factors such as ease of use, environmental concern, and economic benefit (Guerrero *et al*., 2013; Zurbrugg *et al*., 2012) [7, 17].

However, reuse was not systematic, hindered by inconsistent container usage and the absence of standard practices. The presence of reusable waste near public bins reflected infrastructure gaps and limited public awareness (Hopewell *et al*., 2009) [9].

Though many households showed willingness to reuse, broader, structured practices remained underdeveloped. The findings emphasized the importance of education, improved waste segregation, and community-based support to strengthen household reuse efforts (Al-Khatib *et al*., 2015) [1].

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