

# Environmental Sanitation and Public Health Risks from Household Waste Disposal in Chhatrapati Sambhajinagar

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## ABSTRACT:

Household waste disposal is a growing concern in India due to rapid urbanization and population growth. This study in Chhatrapati Sambhajinagar examined disposal behaviours and health impacts using interviews with 60 households. Findings show common practices like open dumping and burning, leading to environmental hazards and health risks such as infectious diseases and foul odour. Despite awareness, waste segregation remains inadequate. Statistical analysis revealed age and family size negatively correlated with proper disposal, while education showed a positive correlation. The study highlights the gap between knowledge and practice, stressing the need for awareness programs, infrastructure, and behavioural change to improve sanitation and reduce health risks.

## INTRODUCTION:

Municipal solid waste (MSW) generation has emerged as one of the most pressing environmental challenges worldwide, particularly in developing nations where rapid urbanization, population growth, and changing consumption patterns have intensified disposal difficulties (Agarwal, 2021; Elbeshbishy & Okoye, 2019). Inappropriate practices such as open dumping, burning, and misuse of canals for waste disposal contribute to pollution, health hazards, and ecological degradation (Chen et. al., 2020; Shafy, 2018). Previous studies highlight that improper disposal fosters unhygienic conditions, spreads diseases through vectors, and undermines environmental sanitation (Geetha & Rajalakshmi, 2020; Zakianis & Djaja, 2017). Moreover, waste generation is strongly influenced by consumer behaviour, industrial activity, and demographic factors, making household-level practices critical to sustainable management (Ramnath et. al., 2010; Mahdi et. al., 2016).

Against this backdrop, the present study investigates household waste disposal practices in Chhatrapati Sambhajinagar, with three key objectives: (i) to assess respondents' knowledge of proper disposal methods, (ii) to examine actual practices and identify gaps between awareness and behaviour, and (iii) to analyse correlations between demographic variables age, family size, and education and household waste management. By linking knowledge, behaviour, and demographics, this study aims to provide insights into how households contribute to environmental sanitation and public health, while emphasizing the need for community awareness, policy interventions, and improved municipal infrastructure (Brasch, 2022; Rane et. al., 2025; Mamady, 2016).

**MATERIALS AND METHODS:**

The present study was undertaken to examine household waste disposal practices and their implications for environmental sanitation and public health in Chhatrapati Sambhajnagar. An exploratory research design was adopted, as the study aimed to generate insights into existing behaviours and practices rather than test a specific hypothesis.

**Study Area and Population:** The research was conducted in selected urban localities of Chhatrapati Sambhajnagar, Maharashtra, India. The study population comprised households residing in these areas, representing diverse socio-economic and demographic backgrounds.

**Sampling Procedure:** A total of 60 respondents were selected using a random sampling method to ensure unbiased representation of households. The sample size was considered adequate for exploratory research, providing sufficient variability to identify patterns in waste disposal practices.

**Data Collection:** Primary data were collected using a structured interview schedule that was pre-tested for clarity and reliability. The schedule covered the respondents’ demographic profile (age, family size, education, occupation), their knowledge and awareness of household solid waste disposal, and the disposal practices followed over the past year, including frequency, methods such as open dumping, burning, or segregation, and the perceived health and environmental impacts. Interviews were conducted face-to-face to ensure accuracy and completeness of responses.

**Data Analysis:** The collected data were coded and tabulated systematically. Standard statistical tools such as descriptive statistics (frequency, percentage, mean) and correlation analysis were applied to examine relationships between demographic variables (age, family size, education) and waste disposal practices. Statistical analysis was performed using appropriate software to ensure reliability of results.

**RESULTS AND DISCUSSION:**

The study in Chhatrapati Sambhajnagar examined household waste disposal practices in relation to demographic factors, knowledge, and behaviours. Findings show that age, education, family size, and income significantly shape disposal methods. Educated households favour segregation, recycling, and composting, while lower-income or less-educated groups often rely on open dumping or burning. Larger families generate more waste, leading to inconsistent practices, and younger household heads adopt more eco-friendly methods compared to older generations. Overall, the demographic profile underscores the need for targeted policies and awareness programs to promote sustainable and socially inclusive waste management.

**Table 1: Demographic Profile in Relation to Waste Disposal Practices**

Demographic Factor	Distribution of Respondents	Observed Disposal Practices	Correlation with Proper Disposal
Age Group	43% (30–40 yrs), 40% (<30 yrs), remainder 40–60 yrs	Younger households generated more kitchen waste; middle-aged showed slightly better awareness	Weak positive correlation (middle-aged more consistent)
Marital Status	67% married, 33% unmarried	Married households produced more waste due to larger families; disposal practices similar across groups	No significant correlation

Family Size	67% small ( $\leq 4$ members), 28% medium (5–6), 5% large ( $\geq 7$ )	Larger families disposed waste more irregularly, often via open dumping	Negative correlation (larger families less consistent)
Education	59% postgraduates, 31% undergraduates, 10% senior secondary	Higher education linked to better awareness and partial segregation of waste	Strong positive correlation
Occupation	37% employed, 28% unemployed, 20% homemakers, 15% business	Employed respondents more aware; homemakers central to daily disposal, often using traditional methods	Mixed correlation (education stronger than occupation)

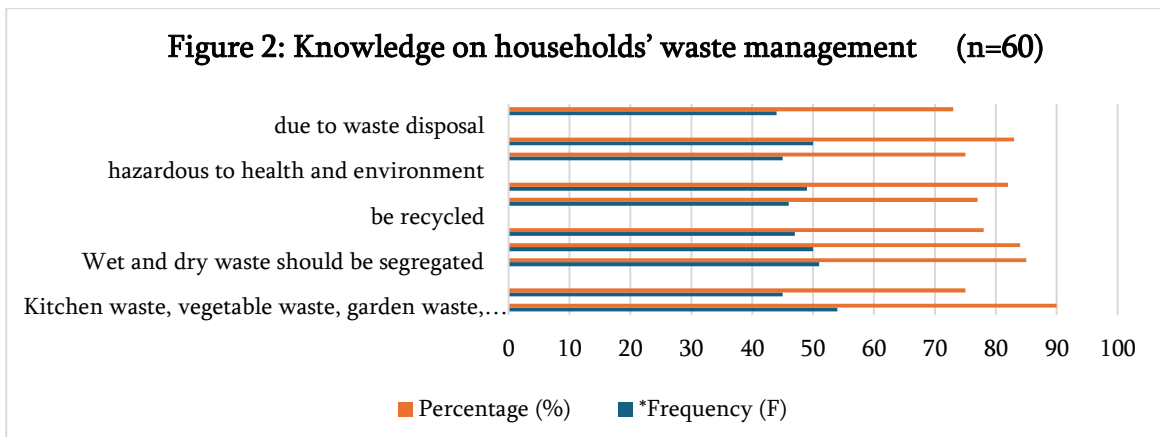
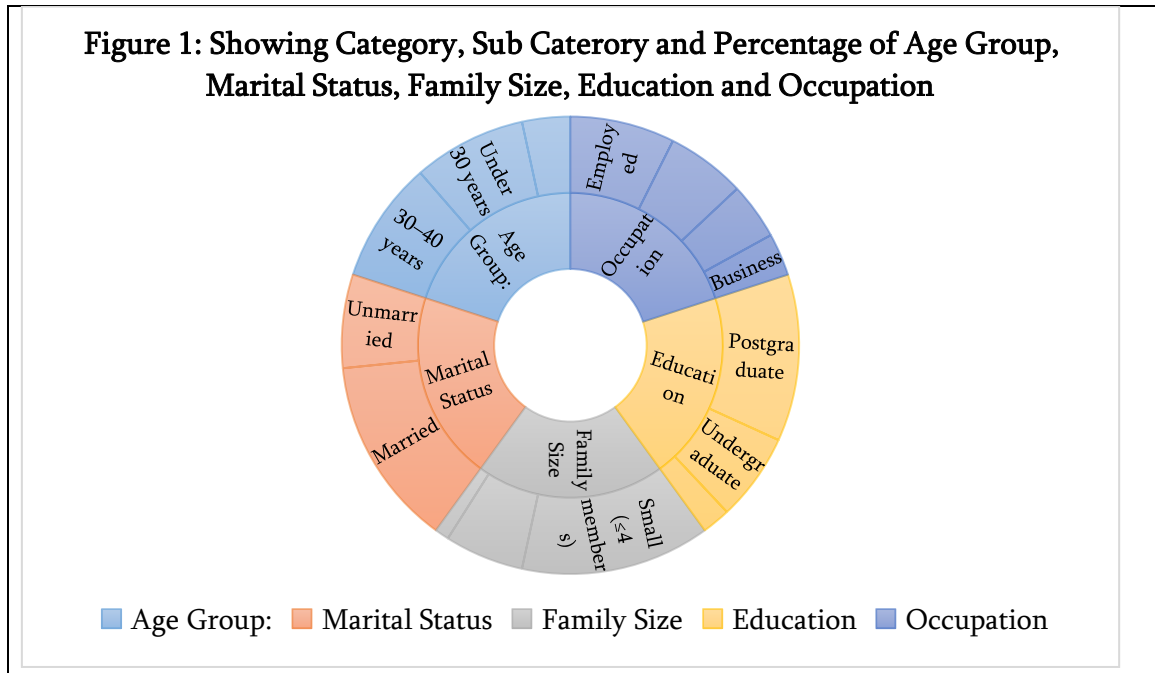
**Age Group:** As shown in Figure 1, most respondents (43%) belonged to the 30–40 years age group, followed by 40% below 30 years. Smaller proportions were observed in the 40–50 years and 50–60 years categories. Younger households tended to generate more kitchen waste due to lifestyle and consumption patterns, while middle-aged respondents demonstrated slightly better awareness of disposal practices. This aligns with Velton (2016), who noted that waste generation behaviour varies significantly with age.

**Marital Status:** Most respondents were married (67%), while one-third were unmarried. Married households generally produced more waste due to larger family sizes and diverse consumption needs. However, awareness of proper disposal practices was not significantly different between married and unmarried respondents.

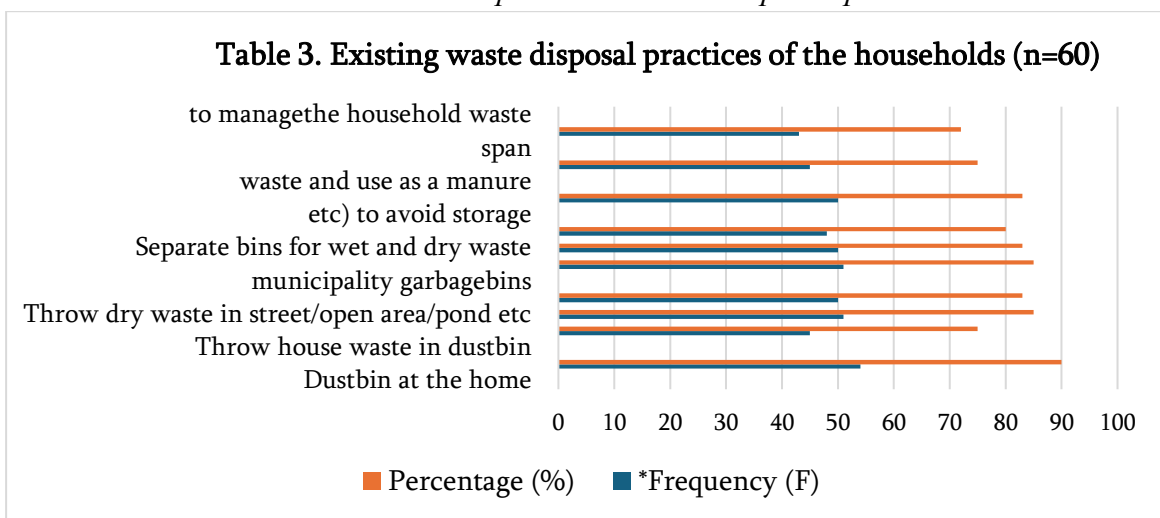
**Family Size:** Figure 2 indicates that 67% of respondents belonged to small families (up to 4 members), 28% to medium-sized families (5-6 members), and only 5% to large families (7 or more members). Larger families tended to dispose of waste more irregularly, often resorting to open dumping. Statistical analysis confirmed a negative correlation between family size and proper disposal practices, suggesting that larger households face greater challenges in managing waste effectively.

**Education:** Education emerged as a critical factor influencing disposal practices. A majority (59%) of respondents had completed postgraduate studies, 31% were undergraduates, and 10% had studied up to senior secondary level. Higher education was positively correlated with better knowledge and awareness of waste segregation, though actual practices remained inconsistent. This finding supports earlier studies (Mahdi et. al., 2011) that emphasized the role of education in improving waste management behaviour.

**Occupation:** Figure 3 shows that 37% of respondents were employed, 28% unemployed, 20% homemakers, and 15% engaged in business. Employed respondents demonstrated greater awareness of disposal methods, possibly due to exposure to workplace sanitation practices. Homemakers, however, played a central role in daily waste disposal, often relying on traditional methods such as open dumping or burning



*\*Total exceeds cent per cent due to multiple responses*



*\*Total exceeds cent percent due to multiple response.*

**Table 2: Correlation analysis between knowledge on households’ solid waste management and existing waste disposal practices**

Sr. No	Waste Disposal Practices	Practice (r - value)
1.	Acquaintance	0.916**

\*\* Correlation is significant at the 0.01 level (2-tailed)

Table 2 presents the correlation analysis between households’ knowledge of solid waste management and their actual disposal practices. The results indicate that higher levels of awareness and understanding of waste management principles are positively associated with more sustainable disposal methods such as segregation, recycling, and composting. Conversely, households with limited knowledge tend to rely on unsystematic practices like open dumping or burning, which contribute to environmental pollution. This highlights the critical role of education and awareness campaigns in shaping responsible waste disposal behaviour.

**Table 3: Correlation analysis between age, family size and education on households’ solid waste management and existing waste disposal practices**

Sr. No	Dependent Variables	Independent Variables		
		Age	Family size	Education
1.	Place waste in the trash bin	-305*	-140 <sup>NS</sup>	287*
2.	Ease of disposing waste	-315*	-092 <sup>NS</sup>	338*
3.	Challenges in waste management	-051 <sup>NS</sup>	-288*	-155 <sup>NS</sup>
4.	Composting household kitchen scraps	-221 <sup>NS</sup>	-008 <sup>NS</sup>	278*

Table 3 examines the correlation between demographic variables age, family size, and education and households’ solid waste management practices. The analysis reveals that younger and more educated household heads are more likely to adopt modern and eco-friendly disposal methods, while larger families often face challenges in consistent waste segregation due to higher daily waste volumes. Education emerges as a particularly strong factor, reinforcing the idea that informed households are better equipped to implement sustainable practices. Together, these findings suggest that demographic characteristics significantly influence waste management behaviour and targeted interventions should consider these factors to improve overall urban solid waste management.

The study in Chhatrapati Sambhajinagar revealed that socio-demographic factors play a decisive role in shaping household waste disposal practices. Income emerged as a particularly strong determinant, with 45% of respondents belonging to the high-income group, 32% to the middle-income group, and 23% to the low-income group. Higher-income households were more likely to own separate bins, practice segregation, and engage in composting, while lower income households often relied on open dumping due to limited resources and infrastructure. Knowledge levels among respondents were generally high, with 90% aware of wet waste categories, 75% aware of dry waste categories, and a majority recognizing the hazards of burning waste (82%) and the risks of improper disposal such as blocked drainage (75%) and breeding of disease vectors (83%). Despite this awareness, actual practices revealed inconsistencies: although 90% owned dustbins and 75% disposed of wet waste properly, 85% admitted to discarding dry

waste in open areas, and 80% resorted to burning due to irregular municipal collection. On a positive note, 83% prepared compost, 75% engaged in recycling, and 72% practiced the 3Rs reduce, reuse, and recycle. Correlation analysis further confirmed the influence of socio-demographic variables. Knowledge was strongly and positively correlated with proper disposal practices ( $r = 0.918$ ,  $p = 0.001$ ), indicating that households with better awareness adopted improved methods. Age showed a negative correlation, with older respondents less likely to dispose of waste properly, consistent with earlier findings by Talalaj and Walery (2015) and Kayode and Omole (2011). Family size also negatively influenced disposal, as larger households generated more waste and faced coordination challenges, echoing Noufal et. al. (2020). Education, however, had a significant positive correlation, with better-educated respondents more likely to segregate waste, compost kitchen waste, and use bins effectively, supporting the findings of Babei et. al. (2015) and Thorat et. al. (2024). These findings align with a broader body of research in Maharashtra. Early work by Sonawane and Thorat (2010) pioneered biotechnological approaches to convert municipal solid waste into manure, while later studies (Thorat & Chavan, 2021; Rane et. al., 2025; Thorat & Attarde, 2023) documented the scale of urban waste challenges, highlighting per capita generation rates, open dumping practices, and the urgent need for sanitary landfills, recycling, and community participation. Collectively, these studies emphasize a waste-to-wealth paradigm that integrates microbial biotechnology, sustainable urban management, and ecological sensitivity, offering actionable insights for policymakers, scientists, and communities striving toward environmental sustainability in India.

Overall, the results highlight a clear knowledge practice gap. While households demonstrate awareness of proper disposal methods, irregular municipal collection and difficulty in segregation lead to unsafe practices such as burning and open dumping. Education and income emerge as strong positive drivers of sustainable disposal, while age and family size pose challenges. Addressing these gaps requires targeted awareness campaigns, improved municipal infrastructure, and behavioural interventions to ensure environmentally sound and health-conscious waste management in Chhatrapati Sambhajnagar.

### **CONCLUSION:**

Household solid waste is a major challenge in developing nations, intensified by urbanization and population growth. In Chhatrapati Sambhajnagar, respondents showed strong knowledge of segregation, composting, and 3R practices, with most aware of the health and environmental risks of improper disposal. Better practices were linked to higher education, younger age, and smaller family size, yet unsafe methods like burning dry waste persisted due to irregular municipal collection. These findings highlight a clear knowledge practice gap and stress the need for stronger municipal systems and targeted interventions to ensure safe and sustainable waste management.

### **RECOMMENDATIONS:**

To tackle waste management challenges in Chhatrapati Sambhajnagar, community awareness programs must drive behavioural change, especially in handling dry waste. Promoting positive attitudes, environmental concern, and individual responsibility is key to sustainable disposal. Policymakers should integrate these behavioural aspects into regulations while strengthening municipal infrastructure to reduce unsafe practices like burning and open dumping. Targeted interventions are needed for vulnerable groups such as larger households and older populations. Incentives for composting, recycling and segregation at source, backed by stricter enforcement, can improve outcomes. Ultimately, a coordinated effort between

households, local authorities and policymakers is essential for environmentally sound and health conscious waste management.

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