ISSN: 2395-1664 (ONLINE)
DOI: 10.21917/ijms.2026.0363

A STUDY ON HOUSEHOLD WASTE MANAGEMENT WITH SPECIAL REFERENCE TO CHENNAI CITY

L. Cesis Dastan, V. Bala Kumar and R. Nisha
Department of Commerce, Presidency College, India

Abstract

In today's swiftly growing and urbanizing world with new technologies and industries every day, the generation of waste is a major concern as the daily waste generation is increasing rapidly. Chennai is one of the most densely populated cities of India, which faces the significant problems of waste generation, collection and treatment of household waste. This study aims to analyse household waste management practices, assess the level of awareness regarding efficient household waste management practices and compare the important provisions of the Solid Waste Management Rules, 2016 and the Solid Waste Management Rules, 2026. Convenience sampling method was used to collect primary data from 120 households from different areas of Chennai city by using Questionnaire. The findings of the study reveals that the most commonly generated household waste among the respondents is plastic waste (82.5%) and on an average 1.33 kg of household waste is generated in a day. Further, among the respondents who segregate household waste, segregation of electronic waste (38.2%), biomedical waste (27.6%) and hazardous waste (26.3%) is considerably lower. Door-to-door corporation collection is the most commonly adopted waste disposal method among the respondents and around 51% of the respondents stated that they give their household waste for recycling. The study also reveals that the mean percentage of awareness on efficient household waste management practices is 77.36 and majority of the respondents (61.7%) fall under high awareness category.

Keywords:

Household Waste Management, Reuse, Recycle, Sustainability, Waste Segregation

1. INTRODUCTION

Annually, more than 2 billion tonnes of municipal solid waste are generated across the globe (United Nations Environment Programme (UNEP)) [12]. The main reasons for increasing solid waste are increasing population, urbanization and changing living pattern. From domestic garbage to industrial waste, the volume and diversity of waste produced are posing significant challenges. Municipal solid waste generation is predicted to grow from 2.3 billion tonnes in 2023 to 3.8 billion tonnes by 2050 [12]. The need for efficient waste management is crucial for overcoming from this danger. This study emphasizes the importance to provide practical solutions to improve household waste management practices and promote awareness among the households. In this context, the present study seeks to identify the types of waste generated by households, analyse existing household waste management methods, assess the level of awareness related to efficient household waste management practices and compare the important provisions of the Solid Waste Management Rules, 2016 and the Solid Waste Management Rules, 2026.

1.1 OBJECTIVES OF THE STUDY

- To study the socio-economic profile of the respondents
- To analyse household waste management practices
- To assess the level of awareness in efficient household waste management practices
- To compare important provisions of Solid Waste Management Rules, 2016 and Solid Waste Management Rules, 2026

1.2 SCOPE OF THE STUDY

The study is undertaken in different areas of Chennai city during January 2026. This study focuses on identifying the different types of waste generated by the households and to investigate the waste management practices. Additionally, the study assesses the awareness in managing household waste efficiently.

2. METHODOLOGY

Both primary data and secondary data were collected for the study. Convenience sampling method was used to collect the primary data from households from different areas of Chennai city. The sample size was chosen as 120. Questionnaire was used to collect the data from the respondents. The secondary data were collected from books, journals, government reports and websites.

2.1 LIMITATIONS OF THE STUDY

- Only 120 samples were chosen for the study.
- Only selected factors are considered to assess the awareness on efficient waste management practices of the respondents.

2.2 HYPOTHESES

- There is no significant difference or relationship between socio economic profile and quantity of waste generated.
- There is no significant difference or relationship between socio economic profile and awareness regarding efficient waste management practises.

2.3 STATISTICAL TOOLS

The following statistical tools are used for the study: Percentage, Minimum, Maximum, Range, Mean, Median, Correlation, t-test and One-way ANOVA.

3. REVIEW OF RELATED LITERATURE

The research conducted in Prayagraj city, Uttar Pradesh, India, examined the waste management practices which includes solid waste generation, collection, transportation, processing and disposal methods. The analysis revealed that waste collection is irregular, which shows that substantial portion of waste was uncollected. Rag pickers play a significant role in minimizing the

landfill load and environmental hazards. The study concludes that, a comprehensive and integrated waste management system is critical for promoting sustainable urban living and minimizing long term environmental and public health risks [3].

The research on household waste segregation behaviour among urban residents in Ujjain, India, aimed to explore the urban community members' motivation, opportunity, and household waste segregation ability. The findings identified three key themes such as motivation, which reflects willingness to segregate but fear of improper sorting; ability, growing acceptance of segregation as a social norm and opportunity which shows availability of facilities and social support systems. The study highlights the central role of women in waste segregation and emphasizes the need for educational interventions and women's self-help group involvement to promote sustainable and community-oriented waste management practices [10].

The research conducted in Chennai, India, aimed to identify the key socio-economic factors affecting household waste generation and recycling behaviour, and assess the implications of these factors for waste management policies. The key findings of the study state that the monthly income significantly influenced waste generation, with lower income households generating more waste. Higher education levels were associated with higher recycling rates, highlighting the importance of awareness and educational programs. The study concludes that understanding the socio-economic drivers of household waste generation and recycling is crucial for developing inclusive and sustainable waste management strategies in Chennai [2].

The study conducted among the residents of rural community in Bengaluru, India, aimed to assess the level of knowledge and awareness regarding domestic waste management among residents of Thirumalapura village. The findings revealed that 80 per cent of respondents had inadequate knowledge, 18 per cent had moderate knowledge and only 2 per cent demonstrated adequate knowledge. The mean knowledge score of 34.33 per cent indicated generally low awareness levels. The study concludes that domestic waste management awareness in rural areas is inadequate and highlights the need for community-based education, improved infrastructure and collaborative efforts to promote sustainable waste practices and protect public health [7].

The study conducted in Malaysia explores how household awareness, gender and demographic factors influence sustainable waste management practices. The study found that higher awareness of proper waste management increases the likelihood of households adopting sustainable practices. Also, men were more actively involved in recycling activities, whereas women played a larger role in waste disposal and handling. However, inadequate infrastructure and financial constraints remained as major barriers. The study concludes that targeted awareness programs, improved infrastructure and consideration of gender roles are essential for promoting sustainable household waste management in Malaysian urban areas [11].

The study titled "Enhancing sustainable solid waste management through separate source collection", investigates the output and benefit of a separate source collection system. The study was conducted among 3,124 households and 8,460 individuals of Amman, Jordan. The result of the study highlights that each individual produces about 0.89 kilogram of waste per day and this amount increases gradually over time. About 60 per cent of the waste is organic and 12.5 per cent is recyclable. The study concludes that awareness campaign conducted, which is increasing the public knowledge and encourages them to sort waste properly [1].

4. ANALYSIS AND DISCUSSION

4.1 SOCIO-ECONOMIC PROFILE

The socio-economic factors examined in the study are gender, age, family size, duration of stay in Chennai, type of house, type of accommodation, built-up area of house, annual family income and annual family expenditure.

Table.1. Gender

Gender	Number	Percentage
Male	51	42.5
Female	69	57.5

Source: Primary data

Table.2. Descriptive statistics on age, family size and duration of stay in Chennai

Statistics	Age	Family Size	Duration of Stay (in years)
Mean	38.28	4.03	20.62
Median	40	4	21.50
Range	41	8	54
Minimum	19	1	1
Maximum	60	9	55

Source: Computed data

The Table.1 shows that majority of the respondents (57.5%) are female. The Table.2 shows that the mean age of the respondents is around 38 and the median is 40, which shows that half of the respondents' age is more than 40. The minimum age of the respondents is 19 and the maximum age is 60. The table also states that the mean family size of the respondents is 4.03 and the median is 4. The family size of the respondents varies between 1 and 9. Further, the mean duration of stay of the respondents in Chennai is around 21 years, with a median of 21.50 years, showing long-term residence among most respondents. The duration of stay ranged from 1 to 55 years.

Table.3. Type of house and accommodation

Particulars	Categories	Number	Percentage
Type of house	Independent house	73	60.8
	Apartment	47	39.2
Type of accommodation	Own	54	45.0
	Rented	58	48.3
	Lease	8	6.7

Source: Primary data

The Table.3 shows that majority of the respondents live in independent houses (60.8%), while the remaining 39.2% reside in

apartments. This shows that independent houses constitute the predominant housing type among the respondents. The table also shows that nearly half of the respondents (48.3%) live in rented houses, while 45% reside in their own houses. Leased accommodation is reported by only 6.7% of the respondents.

Table.4. Descriptive statistics on built-up area of house in square feet (sq. ft.)

Statistics	Built-up area (sq. ft.)
Mean	925.05
Median	800
Range	3450
Minimum	150
Maximum	3600

Source: Computed data

The Table.4 shows that the average built-up area of the house is around 925 sq. ft., with a median of 800 sq. ft. The built-up area ranges from 150 sq. ft. to 3,600 sq. ft., highlighting significant variation in housing size.

Table.5. Descriptive statistics on annual family income and annual family expenditure (Rs.)

Statistics	**Annual family income**	**Annual family expenditure**
Mean	726950	575517
Median	600000	500000
Range	2790000	2380000
Minimum	210000	120000
Maximum	3000000	2500000

Source: Computed data

The Table.5 indicates that the mean annual family income of the respondents is Rs.7,26,950, while the median income stood at Rs.6,00,000. The annual family income ranged from a minimum of Rs.2,10,000 to a maximum of Rs.30,00,000, reflecting wide income variation among the respondents.

The mean annual family expenditure is Rs.5,75,517, with a median expenditure of Rs.5,00,000. Expenditure levels varied considerably, ranging from Rs.1,20,000 to Rs.25,00,000 per annum.

9.2 HOUSEHOLD WASTE MANAGEMENT PRACTICES

The study considers five factors to analyse the household waste management practices of the respondents. The factors analysed are waste generation pattern of households, household waste segregation practices, waste disposal, recycling, reuse and other waste management practices, and challenges faced in household waste management practices.

4.1.1 Waste Generation Pattern of Households:

The Fig.1 indicates that the most generated household waste among the respondents is plastic waste (82.5%) and food waste (81.7%). A substantial proportion of households also generate paper and cardboard waste (74.2%). Garden waste is reported by 45% of the households, while electronic waste accounted for 40.8%, reflecting moderate levels of generation of these waste types. Biomedical waste is generated by 30.8% of the households. Lower proportions of households reported the generation of metal waste (22.5%) and glass waste (20.8%). Hazardous waste is generated by only 14.2% of the households, indicating relatively limited occurrence of such waste.

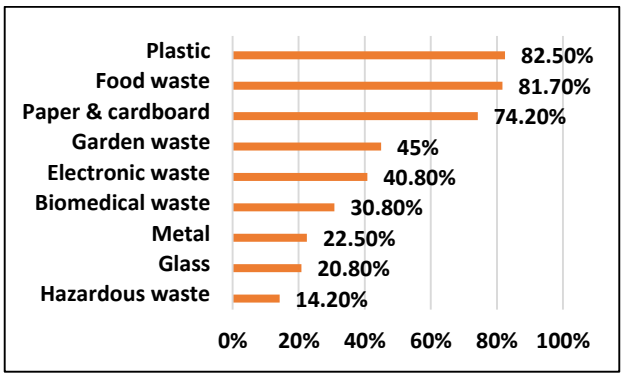

Fig.1. Type of waste generated by households (Source: Primary data)

Table.6. Descriptive statistics on quantity of waste generated in a day in Kilogram (kg)

Statistics	**Quantity (kg)**
Mean	1.33
Median	1.00
Range	4.30
Minimum	0.20
Maximum	4.50

Source: Computed data

The Table.6 reveals that the mean quantity of waste generated by the households in a day is 1.33 kg, while the median quantity is 1 kg, indicating that most households generated around one kilogram of waste. The quantity of waste generated in a day ranged from a minimum of 0.20 kg to a maximum of 4.50 kg, showing considerable variation in waste generation levels among the households.

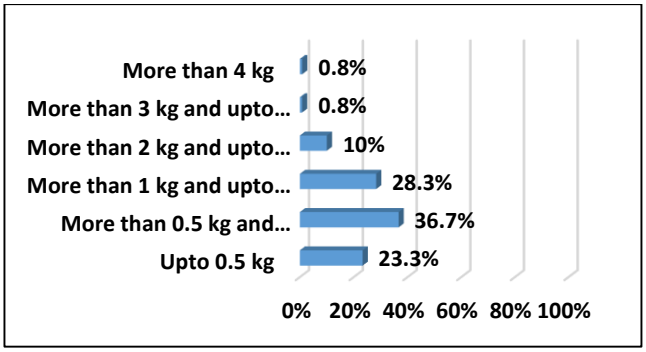

Fig.2. Classification of quantity of waste generated (Source: Primary data)

Fig.2 indicates that the maximum of households (36.7%) generate more than 0.5 kg and upto 1 kg of waste per day. This is followed by households generating more than 1 kg and upto 2 kg of waste (28.3%). About 23.3% of the households generate upto

0.5 kg of waste, while a smaller proportion (10%) generate more than 2 kg and upto 3 kg of waste. Very few households generate higher quantities of waste, with only 0.8% each reporting waste generation of more than 3 kg and upto 4 kg and more than 4 kg per day.

4.1.2 Relationship between Family Size and Quantity of Waste Generated:

To know the relationship between family size and quantity of waste generated, Pearson Correlation tool is used. The analysis shows r (120) = 0.281 and p = 0.002. There is a significant weak positive relationship between family size and quantity of waste generated, as the p value is less than 0.05.

4.1.3 Relationship between Built-up Area of House and Quantity of Waste Generated:

To know the relationship between built-up area of house and quantity of waste generated, Pearson Correlation tool is used. The analysis shows r (120) = 0.123 and p = 0.182. There is no significant relationship between built-up area of house and quantity of waste generated, as the p value is more than 0.05.

4.1.4 Difference between Type of House and Quantity of Waste Generated:

To know the difference between type of house and quantity of waste generated, t-test is used. The analysis shows t = 1.603, df = 114.22, N = 120 and p>0.05 (p = 0.112). There is no significant difference between type of house and quantity of waste generated, as the p value is more than 0.05.

4.1.5 Household Waste Segregation Practices:

The Solid Waste Management Rules, 2016 prescribe segregation of waste into three categories, namely biodegradable waste, non-biodegradable waste and domestic hazardous waste. These rules emphasize the importance of segregation of waste at source as a fundamental step towards efficient household waste management practices.

The study shows that majority of the respondents (63.3%) segregate household waste and only 36.7% of the respondents do not segregate household waste. The study also shows that the responsibility for waste segregation is taken by both male and female members of the household.

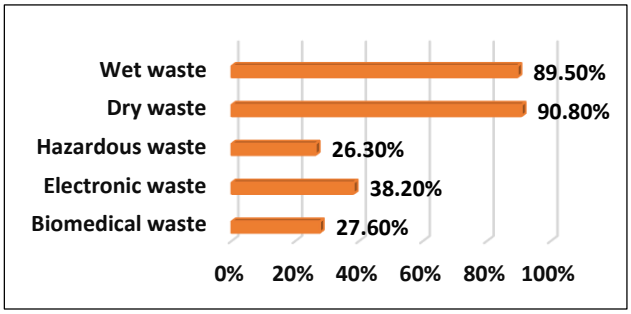

Fig.3. Household waste segregation (Source: Primary data)

The Fig.3 shows that among the respondents who segregate household waste, majority of them segregate dry waste (90.8%) and wet waste (89.5%). In contrast, segregation of electronic waste (38.2%), biomedical waste (27.6%) and hazardous waste (26.3%) is considerably lower. This indicates that respondents are largely consistent in segregating routine household waste.

4.1.6 Waste Disposal:

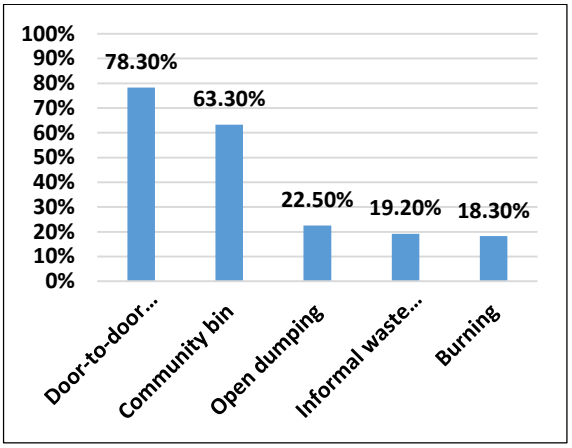

Fig.4. Household waste disposal method (Source: Primary Data)

The data represented in Fig.4 indicate that door-to-door corporation collection is the most commonly adopted waste disposal method, reported by 78.3% of the respondents. This is followed by the use of community bins (63.3%), suggesting that a substantial proportion of households also rely on shared disposal facilities. Around 23% of the respondents practise open dumping and 18.3% burn waste, which are environmentally unsafe methods. Additionally, 19.2% of households depended on informal waste collectors.

The study also states that more than half of the respondents (54.2%) reported that household waste disposal is the responsibility of both male and female members of the household.

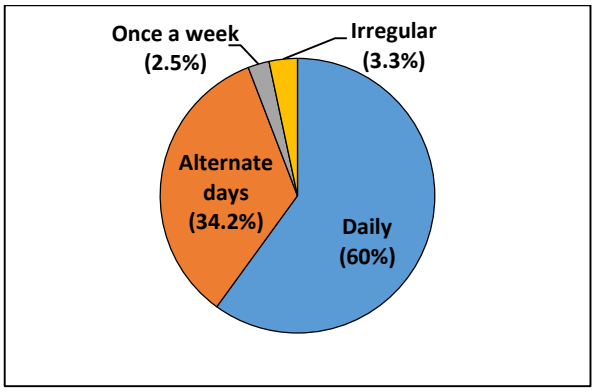

Fig.5. Frequency of waste collection by Chennai corporation (Source: Primary data)

The Fig.5 shows that household waste collection by Chennai corporation is predominantly carried out on a daily basis, as reported by 60% of respondents, indicating a relatively regular and reliable collection system. This is followed by alternate day collection (34.2%) and a small number of respondents reported once-a-week collection (2.5%), while 3.3% experienced irregular collection.

The study shows that on an average, respondents spend around Rs.106 for disposing waste in a month. The minimum amount spent is Rs.0 and the maximum is Rs.500.

It further indicates that the majority of respondents experienced overflow or missed waste collection on an occasional basis (39.2%). This is followed by rare occurrences (30%),

however, 16.7% reported experiencing missed collection frequently, and 7.5% stated that it occurs always. Only 6.7% of respondents indicated that they never experienced waste overflow or missed collection.

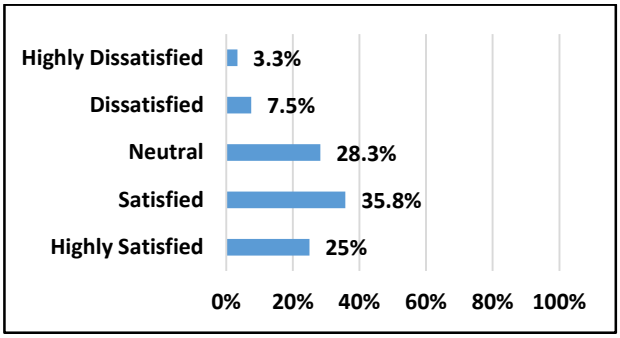

Fig.6. Level of satisfaction with waste collection services (Source: Primary data)

The Fig.6 indicates that around 61% of the respondents are satisfied or highly satisfied with the waste collection services of the Chennai corporation. Meanwhile, 28.3% maintained a neutral opinion. On the other hand, a relatively small proportion expressed dissatisfaction, with 10.8% being dissatisfied or highly dissatisfied.

4.1.7 Recycling, Reuse and Other Waste Management Practices:

The study shows that around 51% of the respondents give their household waste for recycling and only around 49% of the respondents do not give their household waste for recycling.

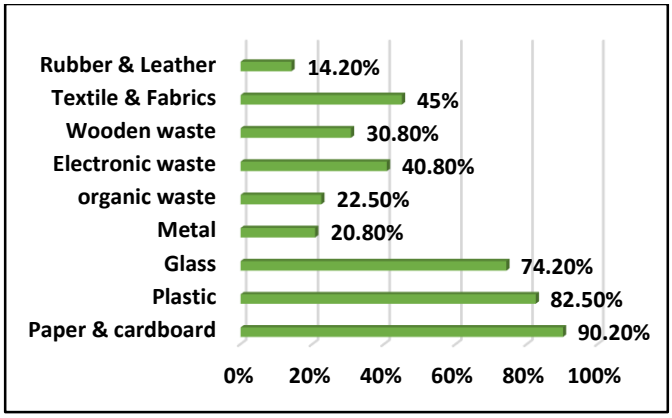

Fig.7. Household waste sent for recycling (Source: Primary data)

The Fig.7 indicates that respondents most commonly send paper and cardboard (90.2%) and plastic (82.5%) for recycling, followed by glass (74.2%), showing strong awareness and participation in recycling these common dry waste materials. Moderate recycling levels are observed for textiles and fabrics (45%), electronic waste (40.8%) and wooden waste (30.8%). In contrast, organic waste (22.5%), metal (20.8%) and rubber and leather (14.2%) show comparatively lower recycling rates

The study shows that among the respondents who send household waste for recycling, maximum reported doing so on a monthly basis (44.3%), followed by half-yearly intervals (37.7%). Only a small proportion recycle on a weekly or daily basis (6.6% each), while very few do so annually (4.9%), indicating that recycling is not a frequent or habitual activity.

It is found in the study that 45% of the respondents have scrap shop within 1 kilometre (km) distance and 42.5% have between 1 to 5 km. This means that around 88% of the respondents live within 5 km distance of a scrap shop. The findings suggest that physical distance is generally not a major barrier to recycling or selling recyclable materials, as scrap shops are easily accessible to majority of the respondents.

Table.7. Products reused by the respondents

Categories	Shopping bags (%)	Plastic or Glass Bottles (%)	Plastic containers (%)
Always	44.20	20.00	19.20
Often	27.50	24.20	27.50
Sometimes	20.00	29.20	34.20
Rarely	5.00	15.00	7.50
Never	3.30	11.70	11.70

Source: Primary data

The Table.7 indicates that respondents show relatively higher reuse behaviour for shopping bags, with 44.2% always and 27.5% often reusing them. Reuse of plastic containers and plastic or glass bottles is comparatively lower with 34.2% and 29.2% respectively using it sometimes, followed by "Often" reported by 27.5% and 24.2% respectively.

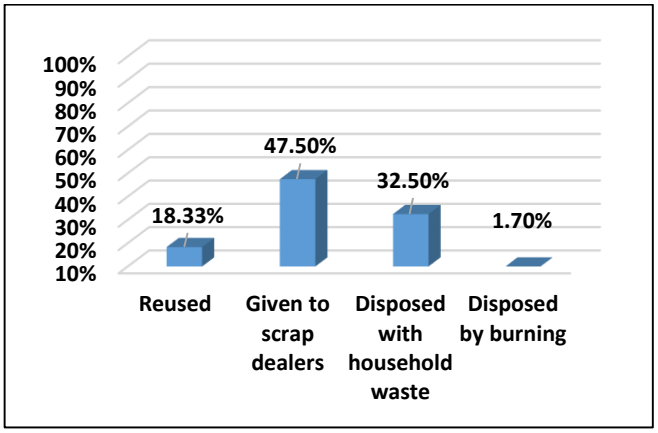

Fig.8. Disposal method of plastic waste (Source: Primary data)

The Fig.8 shows that maximum of the respondents (47.5%) dispose of plastic waste by giving it to scrap dealers, making it the most common method and indicating a positive inclination towards recycling. Around 33% dispose of plastic along with regular household waste and only 18.33% report reusing plastic materials, while a very small proportion (1.7%) practice burning, which is environmentally harmful.

The Fig.9 indicates that over half of the respondents (51.67%) dispose of electronic waste by giving it to scrap dealers, making it the most common method. Only 20% hand over e-waste to authorised recyclers, indicating limited use of formal and environmentally safe disposal channels. Meanwhile, 19.17% dispose of e-waste along with regular household waste and 9.17% store it at home, which may lead to improper handling or accumulation.

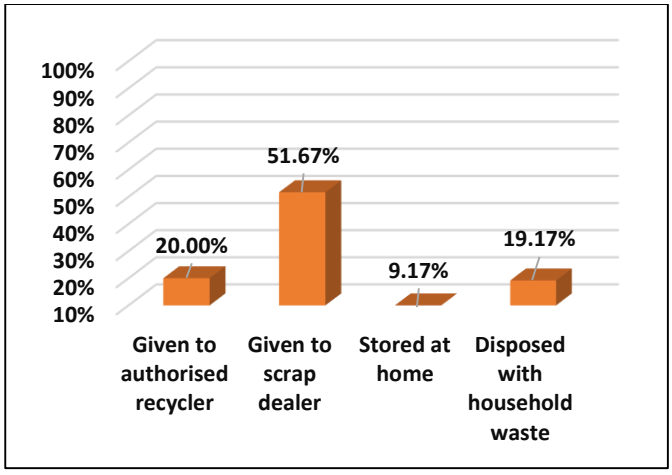

Fig.9. Disposal method of electronic waste
(Source: Primary data)

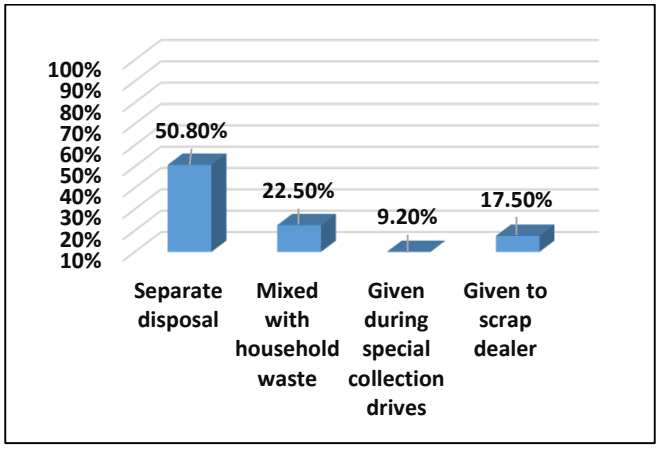

Fig.10. Disposal method of hazardous waste
(Source: Primary data)

The Fig.10 indicates that 50.8% of respondents practice separate disposal of hazardous waste, which reflects a relatively good level of awareness regarding safe handling. However, a considerable proportion still follow unsafe methods, with 22.5% mixing hazardous waste with regular household waste and 17.5% giving it to scrap dealers, which may pose environmental and health risks. Only 9.2% utilise special collection drives, suggesting limited use or availability of formal disposal systems.

The Fig.11 reveals that 35% of the respondents dispose of large items by giving it to recycling shops, 28.3% dispose it by selling it as second hand goods and 20% donate it. Around 17% of the respondents throw such waste in the waste collection.

9.2.5 Challenges Faced in Household Waste Management Practices

The study considers five major challenges faced in household waste management practices, namely, lack of awareness, lack of time, inadequate bins, irregular collections and lack of space.

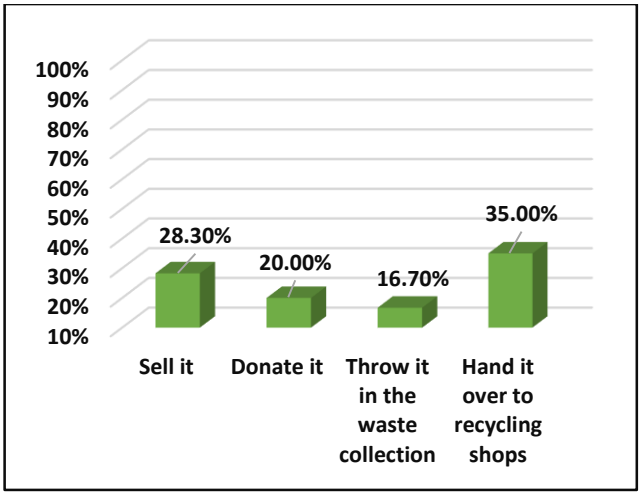

Fig.11. Disposal method of large items
(like furniture and old appliances) (Source: Primary data)

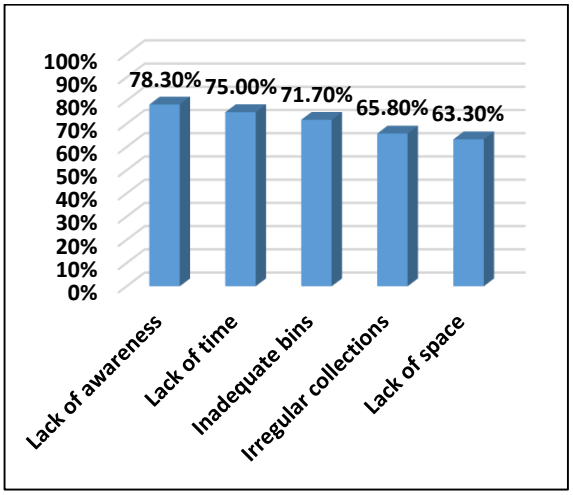

Fig.12. Challenges faced in household
waste management practices (Source: Primary data)

The Fig.12 reveals that majority of the respondents (78.3%), opine that lack of awareness regarding household waste management practices is their most common issue, followed by lack of time (75%). Also, inadequate bins (71.7%) and irregular collections (65.8%) act as a challenge in the waste collection system, leading to improper disposal. Finally, lack of space (63.3%) reflects practical difficulties in storing separate waste at home.

4.2 LEVEL OF AWARENESS IN EFFICIENT HOUSEHOLD WASTE MANAGEMENT PRACTICES

The study focuses on assessing the awareness of the respondents by raising twelve questions relating to efficient household waste management practices. Each question is provided with multiple options with one correct answer. Based on the responses, the level of awareness is ascertained.

Table.8. Level of awareness in efficient household waste management practices

Q. No.	Question	Correct response	Respondents' Awareness	
			Number	%
1	Do you consider paper as dry waste?	(A) Yes	99	82.50
2	Do you consider plastic bottles as dry waste?	(A) Yes	100	83.33
3	Do you consider glass as dry waste?	(A) Yes	99	82.50
4	Do you consider metal cans as dry waste?	(A) Yes	96	80.00
5	Do you consider food scraps as dry waste?	(B) No	93	77.50
6	Do you consider fruit peels as dry waste?	(B) No	95	79.17
7	Do you consider garden waste as dry waste?	(B) No	94	78.33
8	Where would you dispose of leftover food and vegetable peels?	(A) Green bin	103	85.83
9	Where would you dispose of empty plastic bottles?	(B) Blue bin	82	68.33
10	Diapers should be considered as	(C) Sanitary waste	69	57.50
11	Circular economy mainly focuses on	(A) Reduce-Reuse-Recycle	83	69.17
12	Which of the following practices helps reduce plastic waste at home?	(A) Using cloth bags for shopping	101	84.17

Source: Primary data

Table.8 shows that 85.83% of the respondents have given the correct response to "Where would you dispose of leftover food and vegetable peels" and 84.17% of the respondents have given the correct response to "Which of the following practices helps reduce plastic waste at home?". Also, 83.33% of the respondents have given the correct response for the question "Do you consider plastic bottles as dry waste?" and 82.50% each of the respondents have given the correct response for "Do you consider paper as dry waste?" and "Do you consider glass as dry waste?".

Only around 69% of the respondents have given the correct response for the question "The main focus of circular economy". This is followed by question on the disposal of plastic waste, as 68.33% identified the correct response. Awareness was lowest with respect to sanitary waste, as only 57.50% of the respondents' identified diapers as sanitary waste. Each correct response corresponds to a score of 1, allowing respondents to achieve a total score ranging from 0 to 12. By converting this score into percentages, the awareness percentage of the respondents is calculated.

Table.9. Descriptive statistics on awareness in efficient household waste management practices

Statistics	Percentage
Mean	77.36
Median	83.33
Minimum	8.33
Maximum	100.00

Source: Computed data

The Table.9 shows that the mean percentage of awareness on household waste management practices is 77.36. The median is 83.33%, which shows that for half of the respondents, the percentage of awareness is around 83. The minimum percentage of awareness is 8.33 and the maximum is 100%.

4.3 LEVEL OF AWARENESS

The level of awareness of the respondents is classified into high, moderate and low. If the respondents are able to score above 75 per cent, they are considered as having high level of awareness, if they score between 50 per cent and 75 per cent, considered having a moderate level of awareness and if they score below 50 per cent, considered having a low-level of awareness.

Table.10. Level of awareness in efficient household waste management practices

Level of awareness	Number of respondents	Percentage
Low	15	12.5
Moderate	31	25.8
High	74	61.7
Total	120	100.0

Source: Primary data

Table.10 shows that the majority (61.7%) of the respondents have a high level of awareness, while 25.8% possess a moderate level and only 12.5% exhibit a low level of awareness. Although overall awareness levels are reasonably high, the variation in knowledge suggests that certain groups still require targeted awareness and educational interventions.

4.3.1 Relationship Between Age and Awareness Regarding Efficient Waste Management Practices:

To know the relationship between age and awareness regarding efficient waste management practices, Pearson Correlation tool is used. The analysis shows r (120) = 0.083 and p = 0.367. There is no significant relationship between age and awareness regarding efficient waste management practices, as the p value is more than 0.05.

4.3.2 Relationship Between Annual Family Income and Awareness Regarding Efficient Waste Management Practices:

To know the relationship between annual family income and awareness regarding efficient waste management practices, Pearson Correlation tool is used. The analysis shows r (120) =

0.026 and p = 0.778. There is no significant relationship between annual family income and awareness regarding efficient waste management practices, as the p value is more than 0.05.

4.3.3 Relationship between Duration of Stay in Chennai and Awareness Regarding Efficient Waste Management Practices:

To know the relationship between duration of stay in Chennai and awareness regarding efficient waste management practices, Pearson Correlation tool is used. The analysis shows r (120) = 0.004 and p = 0.967. There is no significant relationship between duration of stay in Chennai and awareness regarding efficient waste management practices, as the p value is more than 0.05.

4.3.4 Difference between Gender and Awareness Regarding Efficient Waste Management Practices:

The mean awareness score for males is 71.73% and for females is 81.52%. To know the difference between gender and awareness regarding efficient waste management practices, t-test is used. The analysis shows t = -2.302, df = 87.75, N = 120 and $p<0.05$ (p = 0.024). There is a significant difference between gender and awareness regarding efficient waste management practices, as the p value is less than 0.05.

4.3.5 Difference between Type of Accommodation and Awareness Regarding Efficient Waste Management Practices:

To know the difference between type of accommodation and awareness regarding efficient waste management practices, one-way ANOVA test is used. The analysis shows F = 0.076, df = 2, N = 120 and $p>0.05$ (p = 0.927). There is no significant difference between type of accommodation and awareness regarding efficient waste management practices, as the p value is more than 0.05.

4.4 COMPARISON OF IMPORTANT PROVISIONS OF SOLID WASTE MANAGEMENT RULES, 2016 AND SOLID WASTE MANAGEMENT RULES, 2026

The Solid Waste Management Rules, 2016 laid the foundation for scientific waste segregation and collection in India. The Solid Waste Management Rules, 2026 further strengthen this framework through stricter enforcement, expanded segregation standards, and technology-driven governance. Table.11 compares the important provisions of Solid Waste Management Rules, 2016 and Solid Waste Management Rules, 2026.

Table.11. Comparison of Important Provisions of Solid Waste Management Rules, 2016 and Solid Waste Management Rules, 2026

Dimension	SWM Rules, 2016	SWM Rules, 2026
Policy objective	Establish scientific waste collection, segregation, processing and disposal	Strengthen enforcement, monitoring, circular economy and sustainability
Application	Mainly focuses on urban local bodies, urban agglomerations, and specific villages (population above 3000)	Applies to both urban and rural local bodies
Segregation at source	Segregation into biodegradable, non-biodegradable and domestic hazardous waste	Segregation into wet, dry, sanitary and special care waste
Colour-coded bins	Green - biodegradable; Blue - recyclable; Black - other waste	Green -Wet waste; Blue - Dry waste; Red - sanitary waste
Duties of Waste Generators	Focus on segregation	Adds pollution prevention duty, biomedical waste non-mixing clause and stricter container norms
Duties of Local Authorities	Door-to-door collection, processing, landfill management, awareness programmes	Stronger emphasis on monitoring, reporting and enforcement mechanisms
Digital Governance Framework	No centralized online portal	Introduction of a centralized online portal for registration, compliance monitoring and waste management data tracking
Decentralised treatment	Composting/bio methanation encouraged	Strong promotion of home/community composting and energy recovery
Environmental Compensations	There is no mention of Environmental compensation	Introduction of Environmental compensation
Bulk Waste Generators	No explicit concept of “Extended Bulk Waste Generator Responsibility”	Explicit introduction of Extended Bulk Waste Generator Responsibility
Policy on fines	Local bodies are empowered to prescribe and impose fines through bye-laws	Stricter enforcement of penalty mechanisms, requiring local bodies to prescribe and implement spot fines through bye-laws
Informal sector integration	Recognition of waste pickers	Continued integration with formal system
Governance approach	Framework-based compliance	Technology-driven and performance-based governance

Source: Ministry of Environment, Forest and Climate Change (2016, 2026)

Comparison of the important provisions of Solid Waste Management Rules, 2016 and the Solid Waste Management Rules, 2026 indicates that there are no fixed monetary penalties at the national level. Instead, both delegate the authority to Urban Local Bodies to determine fine amounts through municipal bye-laws. Consequently, the penalty structure in Chennai remains unchanged, while the 2026 Rules primarily strengthen enforcement, monitoring, and reporting mechanisms rather than revising fine rates.

4.4.1 Penalties for Solid Waste Management Violations in Greater Chennai Corporation (Bye-laws):

The byelaws of Greater Chennai Corporation specify penalties for solid waste management violations. Table.12 presents the existing schedule of selective penalties prescribed by the Greater Chennai Corporation for various solid waste management violations to ensure compliance with segregation and proper disposal practices.

Table.12. Schedule of Selective Penalties for Solid Waste Management Violations in Greater Chennai Corporation (Bye-laws)

Sl. No.	Sub section/ Details of section rules	Penalty amount (Rs.)
1	Throwing garbage in public and private place/littering from vehicles	500
2	Category under non-segregation of waste A) Individual House Holds B) Apartments/group house holds C) Bulk waste generator	 100 1000 5000
3	Horticulture, Wood waste not properly dumped at public place	200
4	Burning of solid waste a) Private premises b) Public places c) Burning of solid waste generated from commercial places	 2000 5000 2000
5	Vendors/shopkeepers without a bin	100
6	Littering around bin/ littering in sewer/ canal/ water bodies	500

Source: (Greater Chennai Corporation, n.d.)

5. SUGGESTIONS

5.1 SUGGESTIONS TO THE GOVERNMENT

- Launch large-scale awareness and education programmes through schools, media, and community campaigns.
- Provide financial incentives or subsidies for households practicing waste segregation and recycling.
- Allocate more funds for infrastructure development such as bins, vehicles, and recycling units.
- Frame policies that encourage source segregation and circular economy practices.

5.2 SUGGESTIONS TO THE CORPORATION

- Continue to enhance the effectiveness of door-to-door waste collection services.
- Supply adequate separate bins (wet, dry, hazardous) to households and public spaces.
- Implement strict enforcement of waste management rules with fines for non-segregation and littering.
- Organize zone-level awareness drives, workshops, and demonstrations on composting and recycling.

5.3 SUGGESTIONS TO THE GENERAL PUBLIC

- Practice waste segregation at source (wet, dry, hazardous).
- Actively participate in community clean-up and waste management programmes**.**
- Reduce waste generation by reusing, recycling, and composting.
- Cooperate with collection staff and follow municipal guidelines.
- Encourage neighbours and family members to adopt sustainable waste practices**.**

6. CONCLUSION

Household waste generation is steadily increasing in the Chennai city due to rapid urbanisation, population growth and changing consumption patterns. The current study helps to identify the types of waste generated by households, waste segregation practices and the level of awareness in efficient household waste management practices. Further, the study compares the important provisions of Solid Waste Management Rules, 2016 and Solid Waste Management Rules, 2026. Although respondents possess basic knowledge about waste management, many fail to practice proper segregation, recycling and sustainable disposal consistently in their daily routines, resulting in ineffective waste handling. Lack of awareness, inadequate facilities and irregular collection services were identified as major challenges affecting effective household waste management.

The findings indicate that improved awareness programmes, better municipal support, strict enforcement of segregation rules and active community participation are essential to strengthen household waste management practices. Adopting simple measures such as source segregation, composting, reuse, and recycling can significantly reduce the volume of waste sent to landfills and contribute to environmental sustainability.

Therefore, coordinated efforts from households, local authorities, and policymakers are necessary to achieve efficient and sustainable waste management and to ensure a cleaner and healthier urban environment in Chennai.

REFERENCES

[1] O. Arabiyat, J. Al-Bakri, F. Kolsch, S. Al-Omari and H. Aladwan, “Enhancing Sustainable Solid Waste Management through Separate Source Collection”, *Global Journal of Environmental Science and Management*, Vol. 10, No. 3, pp. 1345-1358, 2024.

[2] A. Deshpande, V. Ramanathan and K. Babu, "Assessing the Socio-Economic Factors Affecting Household Waste Generation and Recycling Behavior in Chennai: A Survey-based Study", *International Journal of Science and Research Archive*, Vol. 11, No. 2, pp. 750-758, 2024.

[3] R. Dubey, D. Rathore and A. Dwivedi, "Municipal Solid Waste Management in an Urban Setting in India: A Case Study of Prayagraj City", *International Research Journal of Multidisciplinary Scope*, Vol. 6, No. 1, pp. 725-737, 2025.

[4] Corporation of Chennai, "Solid Waste Management Bye-Laws, 2019", Available at https://chennaicorporation.gov.in/images/swm_go.pdf, Accessed in 2020.

[5] Tamil Nadu Pollution Control Board, "Solid Waste Management Rules, 2016", Available at https://tnpcb.gov.in/municipalSolidWaste.php, Accessed in 2016.

[6] Directorate of Municipal Administration, "Solid Waste Management", Available at https://www.tnurbantree.tn.gov.in/sanitation-solid-waste/, Accessed in 2019.

[7] V. Malagi, S. Jerome, Vijaymalar, S. Shibu, S. Yohannan, J. Sivani and K.P. Sibin, "Assessment of Knowledge and Awareness Regarding Domestic Waste Management in a Rural Community of Bengaluru, India", *European Journal of Medical and Health Research*, Vol. 3, No. 1, pp. 67-72, 2025.

[8] Ministry of Environment, Forest and Climate Change, "Solid Waste Management Rules, 2016", Available at https://investmeghalaya.gov.in/resources/homePage/17/megeodb/rules/Solid_Waste_Management_Rules.pdf, Accessed in 2020.

[9] Ministry of Environment, Forest and Climate Change, "India's New Solid Waste Management Rules, 2026", Available at https://recircle.in/indias-new-solid-waste-management-rules-2026/, Accessed in 2026.

[10] K.C. Sahoo, R. Soni, M. Kalyanasundaram, S. Singh, V. Parashar, A. Pathak, M.R. Purohit, Y. Sabde, C.S. Lundborg, K.S. Annerstedt, S. Atkins, K. Rousta and V. Diwan, "Dynamics of Household Waste Segregation Behaviour in Urban Community in Ujjain, India: A Framework Analysis", *International Journal of Environmental Research and Public Health*, Vol. 19, No. 12, pp. 1-15, 2022.

[11] A.M. Satimin, A. Nawawi, R. Nawawi, J. Baistaman, S.H. Ya'acob and W.N.F.B. Wan Mohamad Nazarie, "Assessing the Role of Knowledge in Shaping Household Solid Waste Management Practices: A Study in Kota Bharu Kelantan", *Journal of Tropical Resources and Sustainable Science*, Vol. 13, No. 3, pp. 95-101, 2025.

[12] United Nations Environment Programme, "Global Waste Management Outlook 2024: Beyond an Age of Waste-Turning Rubbish into a Resource", Available at https://www.unep.org/resources/global-waste-management-outlook-2024, Accessed in 2024.

[13] Greater Chennai Corporation, "Solid Waste Management", Available at https://chennaicorporation.gov.in/gcc/department/solid-waste-management/, Accessed in 2025.

[14] World Bank Group, "Solid Waste Management", Available at https://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management, Accessed in 2023.