Assessing the Influential Factors of Household's Solid Waste Disposal among Residents in Urban Coimbatore

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Abstract

Population is increasing all over the world, especially in developing countries. Similarly, increased amount of household waste is being produced by this growing population. Household waste is one of the primary sources of MSW comprising of food wastes, paper, plastic, rags, metal and glasses from residential areas. Efficient SWM system is now a global concern which requires a sustainable SWM primarily in the developing countries. People around the globe are aware of the impact of improper waste disposal practices, but the negative attitude of implementation gives rise to chaotic situations. Improper waste disposal causes breeding and may cause infectious diseases like cholera, small pox, and plague, etc. India is the third-largest producer of solid waste, after only China and the United States. It faces significant challenges associated with waste collection, transportation, treatment and disposal. Urban Local Bodies are ill-equipped to handle the increasing quantity of waste, which is a direct result of India's ever-increasing urban population and average income, leading to drastic changes in the consumption pattern in cities. In this backdrop, the objectives of the study are to ascertain the socio- economic profile of the respondents in the selected areas of the study; to determine the households requirements of waste disposal; influential factors that affect the proper waste disposal and to find out awareness about various government programmes on cleanliness among the respondents. The primary data collected from 100 sample residents through direct interview method and residents were randomly selected during December 2022 to January 2023. Besides average and percentages, the

statistical tools like factor analysis, likert summated scale and Garrett rating scale were used in this study. Hence the study found that, no any strict laws for improper waste disposal, inadequate waste collecting bins and improper segregation of waste were the major affected factors for the proper waste disposal of the household. Further, the study suggested that there is a need for government to strengthen district by-laws to ensure proper waste management and concerned authorities should expand and upgrade waste treatment mechanisms.

Keywords: *Residents, disposal, dust bin, government programmes & Solid Waste Management.*

Introduction

In recent times, one of the considerable issues faced by the countries worldwide is the Municipal Solid Waste Management (MSWM). Which extensively remain constant in the nation as the measure of Solid Waste has open up which has created a grave issues in the fundamental technological treatment, poor administration, availability of restricted resources and dumping of the Municipal Solid Waste. Mostly in the Developed Countries the large amount of waste segments are generated as a result of activities related to industries and agriculture, these unpredictable waste shows as a result of urbanization, trivial increment in income is resulted in changing in the consumption pattern as a result of increase in the quantity and type of waste these may leads to biggest challenge for the Municipal Corporation. Solid waste is the unwanted or useless solid materials generated from combined residential, industrial and commercial activities in a given area. It may be categorised according to its origin like domestic, industrial, commercial, construction or institutional and according to its contents such as organic material, glass, metal, plastic paper etc., or according to hazard potential like toxic, non-toxin, flammable, radioactive, infectious etc. With the increase in urbanization, population and changing production and consumption patterns, the waste generation rates have up surged (Kreith & Tchobanoglous, 2002).

To achieve the Economic Growth and Sustainable Development solid waste management is the key to success, because in the emerging trends waste has been generating millions of tonnes per day which is the serious challenge in the present scenario, these are due to increase in population, improper waste disposal, waste is not segregated, no dustbin etc. Solid waste management is the process of collecting, transporting, recycling processing treating and disposing of solid waste. Poor management of the Solid Waste Management (SWM) has an negative impact on environment and health, which in open dumping, uncontrolled burning of solid waste in the landfill are the common method of disposal in the developing countries which may leads to environmental pollution. To overthrow 3R method has to increase (Reuse, Recycle, and Recover) in the household it is important factor to know, because if they utilize the 3R method in the household it will reduce the amount of waste disposed in the landfill.

Solid waste management is a global environmental issue throughout the world where due to the ineffective management of solid waste, waste generation could give rise to health problems and adverse effects on the environment (Hwa 2007). In 2016, the world's cities collectively generated 2.01 billion tonnes of MSW, with a per capita volume of 0.74 kilograms per day. "With rapid population growth and urbanisation, annual waste generation is expected to increase by 70 percent from 2016 levels to 3.40 billion tonnes in 2050."

Waste dumping and open burning continue to be the principal methods of waste disposal in India. Most of the cities and towns dispose of their waste by depositing it in low-lying areas outside the city. "The stench and ugly sight of garbage dumped on the road side, sometimes overflowing from drains or floating on the surface of the rivers is not at all uncommon in India. Also, with clogging of the drains with garbage, there is water logging and flooding of residential areas, roads and even railway tracks in the rainy season disrupting normal life. People also litter the streets and public places excessively. Solid waste management (SWM) has emerged as one of the most massive development challenges in urban India.

Numerous studies indicate that the unsafe disposal of waste generates dangerous gases and leachates, due to microbial decomposition, climate conditions, refuse characteristics and land-filling operations. Some of the key challenges for the SWM system include a lack of waste segregation and doorstep collection, the use of inappropriate technologies for treatment, and the indiscriminate disposal of waste. A callous public attitude towards waste further exacerbates the situation. By making changes in the method of waste disposal and Solid Waste Management (SWM) can significantly control the generation of waste, because the amount of waste generated is increasing day by day. Improper segregation, irregular collection, inadequate waste collecting bins and improper administrative body are some of the factors which affect the proper waste disposal in different ways, due to these indicators solid waste management became failure. The expanding volumes of waste being produced would not be an issue if waste was seen as an asset and oversaw legitimately (Kumar 2016).

According to annual report of Tamil Nadu Pollution Control Board 2019-20, there are 21 Corporations, 138 Municipalities and 490 Town Panchayats in the State of Tamil Nadu. The total quantity of solid waste generation is 16066.392 Tons/day of which 15683.92 Tons/day of solid waste is being collected and 9708.82 Tons/day of solid waste is treated and 5975.1 Tons/day of municipal solid waste is dumped in the dumpsites of Local Bodies located in the State of Tamil Nadu. The board is advocating the concept of waste segregation at source, waste reduction, recycle and reuse to avoid any environmental issues during handling. And also various waste processing facilities like window composting, vermin composting, micro compost centres, Onsite composting and Bio-methanation are followed in Tamil Nadu. Hence, Tamil Nadu government has taken effective initiatives in managing the environment pollution including waste management.

Scope of the study

Due to various reasons such as urbanization, Economic growth, rapid population growth, and industrialization has resulted in improper waste management, which has become one of the major problems in urban areas. Waste is produced by human activity, in different forms There are so many factors which affecting the proper waste disposal, these may result in health issues. To overcome from the problem, Solid Waste Management (SWM) is an important tool to make it possible, so the municipal has to collect the waste in order to reduce the volume of waste goes to the landfill, if these waste are treated in a proper manner we can make green economy, treatment changes the form of waste and make over it and easier to handle those treated waste, waste can be converted into energy. From the treated waste we can make compost from biodegradable and plastic can be reused for road construction etc., therefore waste should be recover, recycle and reuse. The following are Objectives of the study -

To ascertain the socio- economic profiles of the residents in the selected urban areas of Coimbatore city.
To determine the household requirements and influencing factors for the proper waste disposal.
To find out resident's awareness about various government programmes on cleanliness.

Hypothesis of the study
There is no significant association between educational qualification and awareness about improper waste disposal.
There is no strict law for improper waste disposal, inadequate waste collection bins and improper segregation of waste were the major affected factors for the proper waste disposal of the households.

Earlier Studies

Yoada et al. (2014) use a mixed method approach to assess the disposal practices and perceptions of households in Urban Accra. The study concludes that the majority of the waste generated by households largely consisted of food and plastics. The generated waste is stored in uncovered bins without being segregated. A large proportion of the households practiced indiscriminate and crude dumping in gutters, streets roads, etc. The author suggests improving people's practices and perceptions, provision of more community bins and more engagement of private contractors to handle the waste management practices efficiently.

Odonkor et al. (2020) surveyed the SWM practices among households in Ghanaian districts. The study found that community bins were located at distant places, the number of waste collection points was very few and the distance from the community to the final disposal site covered a journey of 1-2 hours. Poor sanitation in the study area resulted in the morbidity of diseases such as malaria, diarrhea, cholera and other related diseases. Keeping in few the major findings the authors recommend district assembly provides waste collection bins to every household to avoid indiscriminate disposal.

Chikowore (2021) examines the social and demographic factors influencing waste disposal practices in Chitungwiza, Zimbabwe. The study reveals that gender, income and employment are the factors influencing residents' waste management practices. Research further suggests environmentalists formulate strategies on SWM keeping in view the social-economic status of the participants. Abdullah et al. surveyed the household's awareness on privatization of solid waste management and their satisfaction of the services offered but did not cover the health implications. Saat et al. surveyed the practices and attitude on household waste management with a small sample size of less than 30 which limits its applicability to other region.

A Variation in approach has been adopted, Dhokhikah et.al. (2015) identifies participation of households in solid waste management by dividing the factors affecting into two major categories socio-economic characteristics and supporting factors in eastern surabaya. The socio-economic factors include Gender, Age, Educational background and Family income while the supporting factors include individual knowledge about solid waste management, information from mass media, household waste reduction training, environmental team, and availability of waste banks. The supporting factors had a more dominant effect on solid waste management compared to economic factors. The result indicated lack of time and knowledge and laziness were the primary reasons for the lack of sorting, recycling and composting. It also observed that there is a strong correlation between Environment and behaviour.

According to Alexis and James (2009), Government policy and finances, waste characterisation, collection and segregation, household education and economics, municipal solid waste management administration, planning and personnel education, local recycled material market, technological and human resources and land availability are the factors influence the recycling of municipal solid waste in developing countries. The study also found that waste collection and segregation, the municipal solid waste management plan and local recycled material market are those requiring the greatest collaboration with other factors.

Recycling behaviour is likely to be influenced by situational factors such as the amount of effort exerted, inconvenience, storage space and access to recycling schemes Boldero (1995).

Methodology

The city of Coimbatore has a population of over 1.5 million people and is growing rapidly. With this growth comes an increase in waste generation. The Municipal Corporation of Coimbatore (MCC) is responsible for managing the city's waste. MCC has been struggling to keep up with the increasing amount of waste being generated. In 2016, MCC collected and disposed of only about 60% of the total waste generated in the city. This resulted in large amounts of uncollected waste being dumped in open spaces or burned, causing environmental pollution and public health concerns. In 2017, MCC launched a new waste management program with the help of private contractors. Under this program, private contractors are responsible for the door-to-door collection of waste, transportation, and disposal at designated landfill sites. The program has been successful in reducing the amount of uncollected waste and improving overall waste management in Coimbatore.

The city produces about 1,200 tonnes of solid waste per day, but only about 50% of this is collected and disposed of properly. The rest is either dumped in open spaces or burned, which creates air pollution and health hazards. With this background, the present study was conducted in urban areas of Ganapathy and Saibaba Colony in North Coimbatore was selected purposively, the residents who are willing to participate in the survey such as homemakers, teachers and other professionals of 100 samples selected based on random sampling method and the data were collected during the period December 2022 to January 2023. The interview schedule consisted of socio-demographic background, Household requirement for waste disposal, Factors affecting the proper waste disposal and Awareness on Government programs. Besides average and percentages, statistical technique like Likert's summated scale, Factor analysis and Garrett ranking technique were applied. The below graph-1 depicted that survey of selection of sample households.

Selection of Sample
Graph-1
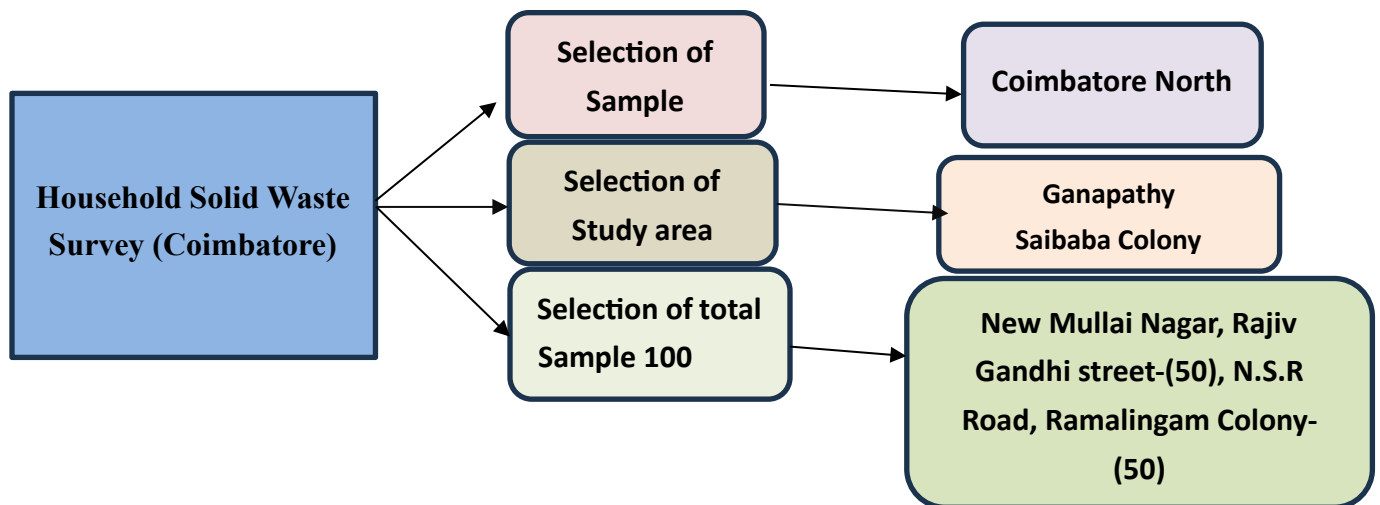
Result And Discussions

Socio-Demographic Profile of the household

Solid waste management (SWM) in the household is the process of segregating, collecting, disposing, transporting and treat those waste in a scientific manner. A demographic profile is a form of demographic analysis in which information is gathered about a group to better understand the group's composition or behaviour for the purpose of providing more relevant services. In this section, an attempt was made to study the socio-economic profile of the respondent involves age, sex, occupational distribution, and other influencing factors discussed in the below table.1.

Table-1

Socio-Demographic Profile

Socio-Economic Profile	Characteristics	Frequency	Percent (%)
Age	20-25	5	5
	25-35	28	28
	35-45	32	32
	45 and above	35	35
Gender	Female	100	100
Type of the Family	Nuclear	93	93
	Joint	7	7
Number of Members in the Family	1-2	12	12
	2-4	60	60
	4-6	21	21
	6-8	7	7
Education Qualification	Primary education	43	43
	Secondary education	22	22
	Undergraduate	22	22
	Post graduate	9	9
	Not educated	4	4
Marital Status	Married	93	93
	Unmarried	2	2
	Widow	5	5
Occupation	Homemaker	56	56
	Private company	10	10
	Sales executive	6	6
	Others	28	28
Monthly Income (In Rs.)	5000-15000	36	36
	15000-25000	22	22
	25000-35000	25	25
	35000-45000	13	13
	45000 and above	4	4
	Total	100	100

Source: Estimation based on field survey (2023)

Age: the above table revealed that majority (35 percent) of the households belonged to the age category of 45 years and above were participated in the survey. Followed by 32 percent of them were belonged to the age category is 35 years to 45 years which is the next highest percentage among the other age groups. Gender: one hundred household's women only were surveyed. Our study is supported by Mukherji et al. who found that women, because of traditional gender roles associated with their household activities, have a closer engagement with waste management at household level. Type of the family: in the present study, the largest portion of (93%) of households were belonged to nuclear family type while the remaining households (7%) were belonged to joint family system. Size of the Family: Sixty percent of the households have 2 to 4 members in their family and the least seven percent of the households have 6 to 8 members in their family which is belong to joint family. Educational Qualification: Education is a process of living through a continuous reconstruction of experiences. It is the development of those capacities in the individual which will enable her/his to control her/his environment and fulfil her possibilities (Sikliger, 2011). The table showed that majority (43 percent) of the households completed primary education and only four percent were illiterate. Marital Status: majority of them were married (93%); followed by five percent of the women were widowed and the lowest percentage of women were unmarried (2%). Monthly Income: in the survey the highest number (36 percent) of the households earning monthly income range between Rs 5,000 /- Rs 15,000 /- and only four percent of them were earning income range between Rs. 45,000/- and above. Occupation: the highest portion of household were homemakers (62 percent) but they earned income through tailoring, hand craft works, taking home tuitions.

Household Requirements for Waste Disposals- Garrett Ranking Test

Waste management is a life-threatening issue and waste management needs to become more sustainable; it needs to be environmentally effective, economically affordable and socially acceptable (McDougall, 2005). The following table indicates the household requirements for waste disposal for their locality. The respondents were asked to rank the various household requirements for their waste disposal daily. The requirements of the household were listed and the respondents were asked to rank these requirements in their order of priority. The ranks were then converted into percent position and from the percent position the individual scores were determined on a scale of 100 points by using Garrett's Rating Scale. The average scores and the ranks corresponding to each requirement were presented in table 2.

Table 2

Household Requirements for Waste Disposal- Average Score and ranks

Factors	Total Score	Garrett Mean Score	Garrett Mean Rank
Increase in number of dustbins	5672	56.72	I
Clearance of waste from public bins at regular interval	5580	55.80	II
Door to door collection	5551	55.51	III
Waste recycling Organisation	3965	39.65	VI
Staff to organize	4006	40.06	V
Bins not too far away to keep	5209	52.09	IV

Source: Estimation based on field survey (2023)

The foremost household requirement for waste disposal by the respondents were to increase the number of dustbins (1st rank) the score is 56.72, "Clearance of waste from public bins at regular interval" (2nd rank) the score is 55.80, "Door to door collection" (3rd rank) the score is 55.51. The "Waste recycling Organization" (6th rank) had given the least requirement from the respondents.

Factors Affecting the Proper Solid Waste Disposal

Factors influencing separation and recycling behaviors as a whole have been mostly studied in industrialized countries (Amini et al 2014, Desa et al 2011, Mamady 2016, Oztekin et al 2017), however factors influencing negative behaviours such as waste burning, and dumping have not received much attention (Tadesse et al 2008) or have focused predominantly on rural areas (Wang et al 2018). Ittiravivongs and Vassanadumrongdee & Kittipongvises (2018), socio-demographic variables became insignificant factors that influenced waste segregation participation. Knussen et al., & White & Hyde also indicate that the strongest variable influence participation in waste segregation program was past behaviour on regular source separation at home or recycling habit. In this section, the current research discussed the factors that affected the proper waste disposal of households.

Factor Analysis

Factor analysis was used in the present study to identify the underlying pattern of relationship between various factors that affected the proper waste disposal and whether these factors can be grouped in terms of a composite variable. The respondents were asked questions relating to their affecting factors on a five-point scale ranging from -2 (strongly disagree) +2 (strongly agree). To determine the appropriateness of applying factor analysis, the KMO and Bartlett's test measures were computed and the results are presented in table 3.

]**Table- 3**

KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure		0.566
Bartlett's Test of Sphericity	Approx. Chi-Square	214.089
	Df	66
	Sig.	0.000

Source: Estimation based on field survey (2023)

KMO statistics for the factors affected the proper waste disposal were .566 signifying acceptable adequacy of sampling, Bartlett's test of Sphericity was also found to be significant at one percent level, providing evidence of the presence of relationship between variables to apply factor analysis. The communalities for each variable were assessed to determine the number of variables accounted for by the variables to be included in the factor rotations. All the variables had values greater than 0.50 signifying sustainable portions of the variables accounted for by the factors. The Eigenvalues, their relative explanatory powers and factors loadings for 11 components identified within the data set. The Eigenvalue greater than one alone was considered for inclusion in the analysis.

Table-4

Rotated Component Matrix

Factors affecting Waste Disposal	Components			
	1	**2**	**3**	**4**
No any strict laws for improper waste disposal	0.834			
Unawareness about the effects of improper waste disposal	0.695			
Improper fund allocation for waste collection	0.594			
No recycling centres nearby	0.562			
Irresponsibility of the household	0.522			
Improper segregation of waste		0.828		
Improper disposal of waste		0.767		
Improper administrative body			0.785	
Irregular collection of waste			0.685	
Inadequate waste collecting bins				0.837
Size of the waste collecting vehicle				0.523
Eigenvalue	2.576	1.822	1.473	1.087
Percentage of variance	21.468	15.180	12.277	9.057
Total variance explained	21.468	36.648	48.925	57.982

Extraction Method: Principal Component Analysis. Rotation Method:
Varimax with Kaiser Normalisation. Rotation converged in 11 iterations.

The results indicates that for the sample data, Eigenvalue of the all factors was greater than one indicating that these factors alone were appropriated for inclusion in the analysis. These factors together accounted for nearly 58 percent of the variations in the factors. Factor1 had significant loading on Five dimensions namely 'No strict laws for improper waste disposal', 'Unawareness about the effects of improper waste disposal', 'Improper fund allocation for waste collection', 'No recycling Centre nearby', 'Irresponsibility of the household'. These dimensions explained 21 percent of the variance. Factor 2 had significant loading on two dimensions namely 'Improper segregation of waste' and 'Improper disposal of waste'. These dimensions explained 15 percent of the variance. Factor 3 had significant loading on 2 dimensions namely 'Improper administrative body' and 'Irregular collection of waste'. These dimensions explained nearly 12 percent of the variance. Factor 4 had significant loading on two dimensions namely 'Inadequate waste collecting bins' and 'Size of the waste collecting vehicle'. These dimensions explained 9 percent of the variance. To sum up, no any strict laws for improper waste disposal, Inadequate waste collecting bins and Improper segregation of waste were the major affected factors for the proper waste disposal of the household.

Awareness on Government Programs

Being aware of natural cycles is a huge step toward developing nature connectedness. This will be the first stage to raise environmental awareness. According to Anija-Obi (2001), environmental education is a field of study that seeks to promote among citizens, not only awareness and understanding of the environment, but the relationship of man with the environment and mandatory actions of responsibility to allow survival, while improving the life quality standard. In India, there are so many schemes related to cleanliness of our surroundings and cities. Hence, this section explains the awareness about the government programmes on solid waste disposal of the residents.

Factor Analysis

Factor analysis was used to identify the underlying pattern of relationship between the various dimensions on awareness about the government programmes related to cleanliness and whether these programmes can be grouped in terms of a composite variable. The respondents were asked questions relating to the awareness on government programmes related to clean environment, a five-point scale ranging from -2 (strongly disagree) +2 (strongly agree). To determine the appropriateness of applying factor analysis, the KMO and Bartlett's test measures were computed and the results are presented in the table 5.

Table-5

KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure		0.527
Bartlett's Test of Sphericity	Approx. Chi-Square	314.979
	Df	36
	Sig.	0.000

Source: Estimation based on field survey (2023)

KMO statistics for awareness on government programmes on cleanliness were .527 signifying higher than acceptable adequacy of sampling, Bartlett's test of Sphercity was also found to be significant at one percentage level, providing evidence of the presence of relationship between variables to apply factor analysis. The communalities for each variable were assessed to determine the number of variables accounted by the variables to be included in the factor rotations.

All the variables had values greater than 0.50 signifying sustainable portions of the variables accounted for by the factors. The Eigenvalues, their relative explanatory powers and factor loadings for 08 linear components identified within the data set. The Eigenvalue greater than one alone was considered for inclusion in the analysis.

Table -6

Rotated Component Matrix

Government Programs	Component		
	1	**2**	**3**
Swachh Bharat mission	0.772		
Waste to wealth mission	0.696		
Promotion of waste to energy	0.602		
Swachh Sagar, Surakshit Sagar campaign	0.537		
Swachhata Hi Sewa Campaign		0.881	
Compost Banao, Compost Apnao campaign		0.81	
Swachh Survekshan			0.816
National water mission (Jal shakthi abhiyaan)			0.719
Eigenvalue	**2.686**	**1.539**	**1.427**
Percentage of variance explained	**29.848**	**17.095**	**15.852**
Total variance explained	**29.848**	**46.943**	**62.795**

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser, Normalization, Rotation converged in 08 iterations.

The result indicates that for the sample, The Eigenvalue for all factors should be greater than one indicating as, those factors can be appropriate for inclusion in the factor analysis. These factors together accounted for nearly 63 percent of the variation in the factor. Factor1 had significant loading on four dimensions namely "Swachh Bharat Mission", "Waste to wealth mission", "Promotion of waste to energy", "Swachh Sagar, Surakshit Sagar campaign" and these dimensions explained 30 percent of the variance. Factor 2 had significant loading on two dimensions namely "Swachhata hi Sewa campaign", and "Compost Banao, Compost Apnao campaign" and these dimensions explained 17 percent of the variance. Factor 3 had significant loading on two dimensions namely "Swachh Survekshan" and "National water mission (Jal Shakthi Abhiyaan) and these dimensions explained 16 percent of the variance. To conclude, there were many government programmes associated with cleanliness India awareness campaign on proper waste disposal. Major programmes such as Swachhata Hi Sewa campaign, Swachh Survekshan and Swachh Bharat Mission were aware of the respondents.

Conclusion

To be conclude, solid waste management is the serious issue now a days due to improper management in the society, there are so many factors which affecting the proper waste disposal in the environment, if those factors are recognized and rectify by the public there is an enormous change in the solid waste disposal. Due to this, the environment become clean and also reduce the health impact caused by these improper waste disposal in the landfill. Not only the waste disposal and the management public should

also aware of the Government programs related to the waste management. The study revealed that, the foremost household requirement for waste disposal by the respondents were to increase the number of dustbins. Further the study found that, there is no any strict laws for improper waste disposal, inadequate waste collecting bins and improper segregation of waste were the major affected factors for the proper waste disposal of the household. The study suggested that, many cleanliness programme didn't reach the public for proper household solid waste disposal. Hence, government should take initiatives to create more awareness campaign to reach out every citizens of India for proper waste disposal system. If there should be a proper co-ordination between public and government for the success of solid waste disposal system in India.

Recommendations

Government should encourage private/government partnership in wastes management at an affordable rate. It is very important that the related professionals such as the sanitary inspectors become involved as they play a vital role in promoting awareness on proper refuse management.

Various education and awareness programs should be initiated to urge the residents to quit illegal dumping and burning of waste and rather resort to appropriate practices of SWM.

Knowledge of waste management should be promoted. Education should be focused in groups rather than one-to-one contact. This can be achieved through organizing workshops, seminars and conferences on solid waste management at schools, colleges and residence associations.

Legislation on banning the indiscriminate use of plastic should be strictly enforced as the public is used to stick rather than carrot methods of implementation.

There is a terrible need for community participation in proper solid waste management

References

Abdullah Z, Salleh MS, Ismail (2017), "Survey of Household Solid Waste Management and Waste Minimization in Malaysia: Awareness, Issues and Practices", International Journal of Environmental & Agriculture Research (IJOEAR), Vol.3 (12), pp. 38–48.

Alexis and James (2009), "Sustainable recycling of municipal solid waste in developing countries", Waste Management, Vol. 29, No.2, pp.915-23.

Al-Khatib.I., Arafat., Eid.J atsnd Ali.,(2007), "Trends and Problem of Solid Waste Management in Developing Countries; A Case study in seven Palestinian districts", Waste Management, Vol.27, pp.1910-1919.

Amini et.al. (2014) The Influence of Reward and Penalty on Households' Recycling Intention", APCBEE Procedia 10, pp.187 – 192.

Ashwani Kumar et,al., (2016), "Analysing the Factors Affecting the Sustainable Municipal Solid Waste Management (MSWM)", Indian Journal of Science and Technology, Vol 9, No.47, DOI: 10.17485.

Boldero,J.(1995), "The Prediction of household recycling of newspaper; the role of attitude, intention and situational factors", Journal of Applied social psychology, Vol.25, pp.440-462.

Chikowore, N. (2021). Factors influencing household waste management practices in Zimbabwe. Journal of Material Cycles and Waste Management, 23(1), 386-393. https://doi.org/10.1007/s10163-020-01129-9.

Desa et.al. (2011), "A Study on the Knowledge, Attitudes, Awareness Status and Behaviour Concerning Solid Waste Management", Procedia - Social and Behavioural Sciences, Vol.18, pp.643-648.

Ehrampoush MH, Mogahadam MB (2005), "Survey of knowledge, attitude and practice of Yazd University of Medical Sciences students about solid wastes disposal and recycling", Iranian J Env Health Sci Eng. Vol. 2(2), pp. 26–30.

Femi F, Oluwole O. (2013), "Management of municipal solid wastes. Academia.edu Available http://www.academia.edu/4254191/Management_of_Municipal_Solid_Waste (accessed on 30-03-2015).

Ittiravivongs A (2011), "Factors Influence Household Solid Waste Recycling Behaviour In Thailand: An Integrated Perspective", WIT Transactions on Ecology and the Environment. Vol.167, pp.1-12.

Mukherji SB, Sekiyama M, Mino T, Chaturvedi B.(2016), "Resident Knowledge and illingness to Engage in Waste Management in Delhi", India Sustain, VOL.8, PP. 1065. https://doi.org/10.3390/su8101065.

Odonkor, S. T., Frimpong, K., & Kurantin, N. (2020), "An assessment of house-hold solid waste management in a large Ghanaian district", Heliyon, Vol.6 (1), pp. 30-40. https://doi.org/10.1016/j.heliyon.2019.e03040

Saat NZM, Hanawi SA, Subhi N, Zulfakar SS, Wahab MIA (2018), "Practice and attitude on household waste management in Tumpat and Kuala Krai, Kelantan. Res J Social Sci. Vol. 11(1), pp. 14–7. https://doi.org/10.22587/rjss.2018.11.1.3.

Saphores JDM, Ogunseitan OA, Shapiro AA. (2012), "Willingness to engage in a proenvironmental behavior: an analysis of e-waste recycling based on a national survey of U.S. households", Resour Conserv Recycl, Vol.60, pp. 49-63.

Silpa Kaza et al., (2018), "*What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050* (Washington: World Bank Publications, 2018).

Sujauddin et.al. (2008), "Household solid waste characteristics and management in Chittagong, Bangladesh", Waste Management, Vol. 28, No.9, pp.1688-95.

Tadesse (2019), "Assessment of Solid Waste Management (SWM) Practices in Hawassa University Campuses", Journal of Applied Sciences and Environmental Management, Vol.23, No.6, pp.1081-1086.

Wang et al., (2018), "Compliance with household solid waste management in rural villages in developing countries", Journal of Cleaner Production, Vol. 20, pp. 293-298.

White KM, Hyde MK. (2012), "The role of self-perceptions in the prediction of household recycling behavior in Australia", Environ Behav, Vol.44, pp. 785-99.

Yoada, R. M., Chirawurah, D., & Adongo, P. B. (2014). Domestic waste disposal practice and perceptions of private sector waste management in urban Accra. BMC Public Health, Vol.14 (1), pp. 1-10. https://doi.org/10.1186/1471-2458-14-697.