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Knowledge of Sustainable Waste Management Practices in Ilorin, Nigeria: Implication on Attainment of Sustainable Development Goals

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A B S T R A C T

The current study has examined the knowledge of sustainable waste management practice in Ilorin, Nigeria. One hundred participants were randomly selected for this study. The data was analyzed using frequency count, percentage, mean and Pearson Product Moment Correlation (PPMC). The result showed that the average age of the respondents was 34.2 years. In addition, the study found that the participants' knowledg of the statement "Burning of waste materials pollute the air" was the highest ranked knowledge statement on sustainable waste management practices ($\bar{x}$= 2.57). Information on how to convert decompose waste into manure was the highest ranked information needs on sustainable waste management practices ($\bar{x}$= 2.45, P = 0.001). There is a significant relationship between information needs and knowledge on sustainable waste management practices (r = 0.394,) at 1% level of significance. The study therefore has recommended that there should be a creation of public awareness on sustainable waste management practices and that every household should adhere to all the sanitation and environmental laws.

Introduction

Wastes are any discarded materials which could either be decomposable or non-decomposable materials. Decomposable (organic) includes food debris, paper, wood while non-decomposable (inorganic) materials includes plastic, nylon, glass, metals. According to [1], wastes consist of different materials. Waste management practices are all the activities from waste inception to its final disposal. The activities include waste storage, collection and transport, resource recovery and recycling and treatment

According to [2], the world generates about 0.74 kilogram of waste per capita per day. The average quantity of waste generated in Nigeria per year is estimated to be about 27,614,830 million tonnes of wastes materials [3]. This high quantity of waste could be attributed to the fact that most of the non-decomposable wastes materials in Nigeria were not recycled. The waste from food and green materials comprise more than 50 % of waste in low- and middle-income countries like Nigeria [2].

Sustainable development cannot be attained without making the environment to hygiene and eco-friendly. Sustainable waste management practices refer to practices of managing waste which include waste collecting, transportation, processing or disposing in such a way that prevents depletion of resources in order to maintain ecological balance [2]. Sustainable waste management is a system that makes the environment to be eco-friendly, reduces greenhouse gas emissions and makes waste materials to be re-useable or recycled. Sustainable waste management is the process of using material resources efficiently so as to reduce the amount of waste generated and deal with it in a way that actively contributes to the economic, social and environmental goals of sustainable development.

According to [4], sustainable waste management refers to the activities and actions that include collection, transportation, disposal, sorting, processing, recycling and re-using without depleting or degrading the environment or causing harm to human life.

Sustainable waste management is an important strategy of ensuring that the environment and natural resources which include land, water, air, plants and animals are responsibly used, protected and maintained for future generation. This is important as the Sustainable Development Goals (SDGs) of the United Nations which highlights good health and well-being as goal 3, clean water and sanitation as goal 6, sustainable cities and communities as goal 11 and climate action as goal 13. Adherence to sustainable waste, management practices would make our environment sustainable to all. Sustainable waste management practices will make urban centres and rural communities more inclusive, cleaner, resilient and resource efficient. The importance of sustainable waste management practices to the individuals, economy and government cannot be over emphasized as it will lead to less landfills and pollution, create more jobs, keep the cities and environment clean and safe, save energy and conserve the natural resources.

Sustainable Development goals 3, 6, 11 and 13 are essential for making our cities and communities sustainable and available for the coming generations. However, all these are often overlooked or underestimated during planning for hygienic and sustainable cities and communities [2]. As waste pollutes the environment (viz. land, water and air) which affects human health, it is one of the major causes of global warming through the release of green gases.

Achieving sustainable waste management has become a major problem for the populace and the government as wastes are dump almost everywhere on the road, waterways and within and around the residential areas. Numerous studies have been conducted in Nigeria on waste management practices such as that of [5] which examined the solid waste management practices in Abuja Nigeria ,and that of [6] which also assessed the characteristics of solid waste in Abuja, Nigeria. However, there is paucity of information on the knowledge of sustainable waste management practices in Ilorin Metropolis, Kwara State, Nigeria. This creates a great lacuna in knowledge which is the gap that the current study has sought to fill. Accordingly, this study sought to examine the knowledge of sustainable waste management practices in Ilorin Metropolis, Kwara State, Nigeria. The objectives of the study were as follows:

I. Determining the socio-economic characteristics of the respondents
II. Assessing the respondents' knowledge on sustainable waste management practice.
III. Identify the information needs of the participants on sustainable waste management practice.
IV. Describing the respondents' Perception of waste management practice.
V. Identifying the factors militating against sustainable waste management practice.

The Hypotheses of the study:

$H0_1$: There is no significant relationship between information needs on sustainable waste management practices and their knowledge on sustainable waste management practices.

$H0_2$: There is no significant relationship between the factors militating sustainable waste management

and their knowledge on sustainable waste management practices.

METHODOLOGY

The study was conducted in Ilorin Metropolis, Kwara State, Nigeria. Ilorin is the capital of Kwara State, Nigeria. The study involved a two-stage sampling procedure. Ilorin is predominantly an urban centre. The 1st stage involved a purposive sampling of five residential estates in Ilorin Metropolis. The 2nd stage involved a random selection of 100 participants for the study (Mandate Estate=15, Kulende Estate = 20, Irewolede Estate = 20, Ipata Oloje Estate = 14, Oloje Estate = 31).

To determine the information needs of the participants on sustainable waste management, a three-point Likert-typed scale was used and assigned scores were as follows: Not Needed=1, Moderately Needed=2 and Highly Needed=3. The perception of waste management practices was measured on a 5-point likert typed scale where Strongly Disagreed = 1, Disagreed = 2, Undecided = 3, Agreed = 4, and Strongly Agreed = 5. The factor militating against sustainable waste management practices was measured on a 3-point Likert typed scale where, not a factor = 1, serious = 2, very serious = 3. The data were analysed with the use of frequency counts, percentage, mean score and Pearson Product Moment Correlation (PPMC) which was used to test the hypothesis of the study. The statistics software version used for the study was Statistical package for social science (SPSS).

RESULTS AND DISCUSSION

The Socio-economic Characteristics

The result presented in Table 1 reveals that about 56% of the participants were males while 44% were females. The average age of the participants was 34.2 years. Besides, 50% of the participants were divorced while 30% were single. Also, 60% of the participants had tertiary education while 25.0% had primary education, 60% of the participants were Muslims while 40.0% were Christians.

The result in Table 1 furthurly revealed that the mean income of the participants was 30,070.00 naira. About 75% of the participants were not willing to pay for waste disposal while 28.0 % were willing to pay. This implied that majority of the participants were not willing to pay for wastes disposal. The average amount the participants were willing to pay for waste disposal was 707.00 naira. The result in Table 1 also reveals that 37.0% of the respondent dropped their waste at the waste collection truck, 28% burn their waste while about 15.0% of the participants dumped waste materials in the drainage. The result showed that about 43% of the participants put their waste materials in plastic bins, 24% of the participants put their waste materials in polythene bags while 22.0% of the respondent stored their wastes in baskets. The average household size was 6 persons.

The result in Table 2 reveals the knowledge of the statement "Burning of waste materials pollutes the air" was the highest ranked knowledge area on sustainable waste management practice ($\bar{x}$= 2.57), waste should not be dumped around residential house as it can deplete the ground, water, air and soil ($\bar{x}$= 2.44). poultry wastes can be used to make compost which will enrich the soil ($\bar{x}$= 2.40), dead animals must be buried and not dump so as not to cause odour in the environment ($\bar{x}$= 2.31). This indicated that knowledge on sustainable waste management practices is required for hygienic environment and healthy living. The implication of thess results is that the environment will be clean and free of infections and diseases. This result furthurly reveals that the participants needs more training and of information sustainable waste management practices.

Knowledge on Sustainable Waste Management Practices

The result in Table 2 reveals knowledge the statement *"Burning of waste materials pollute the air"* was the highest ranked knowledge area on sustainable waste management practice ($\bar{x}$= 2.57), waste should not be dumped around residential house as it can deplete the ground water air and soil ($\bar{x}$= 2.44), poultry wastes can be used to make compost which will enrich the soil ($\bar{x}$= 2.40), dead animals must be buried not dump so as not cause odour in the environment ($\bar{x}$= 2.31). This indicates that knowledge on sustainable waste management practices is required for hygienic environment and healthy living. The implication of this is that the environment will be clean and free of infections and diseases. This result further reveals that the participants needs more training and information sustainable waste management practices.

Information Needs on sustainable Waste Management Practices

The result in Table 3 reveals that information on how to convert decomposable waste into manure ($\bar{x}$= 2.45) was the highest ranked information needs on sustainable waste management, information on sanitation laws and days ($\bar{x}$= 2.42) was ranked second, information on health risk of poor waste management practices ($\bar{x}$= 2.41) was ranked third. Information on environment protection agencies ($\bar{x}$=2.40) and information on how to prevent disease epidemics outbreak ($\bar{x}$=2.39). This result implied that the participants needed information on sustainable waste management practices so as to attain the sustainable goals of good health and well-being, clean water and sanitation, sustainable cities and communities and climate action. This indicated that the participants required capacity building on

sustainable waste management practices in the study area.

Perception on Sustainable Waste Management Practices

The result in Table 4 reveal that the perception statement *"Waste generates gases that can cause respiratory problem like asthma"* ($\bar{x}$= 3.80) was the highest ranked statement, *"Improper waste disposal attracts pest and rodents to household"* ($\bar{x}$= 3.75) was ranked second, *"Waste contributes to climate change (food drought) through greenhouse gas emission*" ($\bar{x}$= 3.64), every household should pay waste collectors for their domestic ($\bar{x}$= 3.62), *"Waste management should solely be government responsibility*" ($\bar{x}$= 3.50). The implication of this was that the participants' perception on waste would influence their waste management practices. The participants' perception would influence their choice on waste management practice. This inferred that development of positive attitude towards the sustainable waste management practices would make the environments hygienic and sustainable to all.

Factors Militating against Sustainable Waste Management

The result in Table 5 reveals the factors militating against sustainable waste management practices. Bad odour and foul smell of waste material ($\bar{x}$= 2.39) was the highest ranked factor, long distance to public waste collection truck/points ($\bar{x}$= 2.33), poor enforcement of environment laws by the government ($\bar{x}$= 2.26), high rate of poverty in the society ($\bar{x}$= 2.26), high rate of poverty in the society ($\bar{x}$= 2.26) and inability to observe sanitation day in cleaning the environment ($\bar{x}$= 2.26). This indicates that there were several factors affecting sustainable waste management practices. This result concurred with the findings of [6] who reported that inadequate financial support to environmental agencies and poor implementation of environmental laws and regulations were the major constraints affecting waste management in Abuja, Nigeria.

Testing of Hypotheses:

H0$_1$: There is no significant relationship between information needs of the participants on sustainable waste management practices and their knowledge on sustainable waste management practices.

The result of Pearson's product moment correlation analysis presented in Table 6 revealed that there was a significant relationship between information needs and Knowledge on Sustainable Waste Management Practices (r=0.394, p=0.001) at 1 percent level of significance. This implies that the participants' knowledge on sustainable waste management had influence on their information needs. The adduced reason for this was that the majority of the participants were educated, as education will make them be inquisitive.

H0$_2$: There is no significant relationship between the factors militating against sustainable waste management and their knowledge on sustainable waste management practices.

The result of Pearson's product moment correlation analysis presented in Table 7 reveals that there was a significant and inverse relationship between the factors militating against sustainable waste management and the knowledge of the participants (r= -0.214, p=0.033) at 5 percent level of significance. This implies that the knowledge of the participants had an influence on the factors militating against their sustainable waste management practices. This result furthurly implies that the higher the knowledge of the participants on sustainable waste management practices was, the lower the factors militating against sustainable waste management practices would be.

Conclusion

According to the findings of the current study, it concluded that the majority of the participants were not willing to pay for waste collection. This implies that willingness to pay for waste collection among the residents was low. The knowledge of the statement *"Burning of waste materials pollute the air"* was the highest ranked knowledge statement on sustainable waste management practice. This denotes that the participants had knowledge that burning of waste materials pollute the air. Information on how to convert decomposable waste into manure was the highest ranked information needs on sustainable waste management practices.

The implication of sustainable waste management practices on SDGs is that the environment will be clean, hygienic and habitable. Sustainable waste management practice will help reduce the negative effects of climate change as it is a form of climate action which is needed to combat global warming which occurrs as a result of release of greenhouse gases into the atmosphere.

Recommendation

In order to develop the capacity of the populace on sustainable waste management practices and to turn waste materials to wealth through job creation, waste re-use and recycling process should be conducted. The study therefore recommends that;

I. There should be provision of public awareness campaign on the benefits of sustainable waste management practices to the populace on the environment and the Nigerian economy.
II. The government agencies should ensure every household adhere to all sanitation and environmental laws.

III. Government should help low-income residential areas in evacuation of waste as most of the participants were not willing to pay for waste collection and disposals.

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Conflict of Interest Statement

The authors of this study declare that there is no conflict of interest between them.

References

[1] Environmental Protection Department Air Management Group (2001). A Guidance Note on the Best Practicable Means for Municipal Waste Incinerators, USA.

[2] Silpa K, Yao L, Bhada-Tata P, and Woerden F K (2018). *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648.

[3] Oguntoyinbo, O. O. (2012). "Informal Waste Management System in Nigeria and Barriers to an Inclusive Modern Waste Management System: A Review." *Public Health* 126 (5): 441–47.

[4] Wan C., Shen G.Q & Choi S (2019). Waste Management Strategies for Sustainable Development. In: Leal Filho W. (eds) Encyclopedia of Sustainability in Higher Education. Springer, Cham.

[5] Imam A., Mohammed B., Wilson D.C & Cheeseman C.R. (2007). Solid waste management in Abuja, Nigeria. Waste Management 28 (2008) 468–472.

[6] Abur B.T., Oguche E.E & Duvuna G.A (2014). Characterization of Municipal Solid Waste in the Federal Capital Abuja, Nigeria. *Global Journal of Science Frontier Research: Environment & Earth Science Volume 14* Issue 2.

Table 1: The Result of the Socioeconomic Characteristics of the Respondents

VARIABLE	FREQUENCY	PERCENTAGE (%)	MEAN
1. **Gender**			
Male	56	56	
Female	44	44	
Total	100	100	
2. **Age**			
≤30	50	50	34.2 years
31-40	31	31	
41-50	7	7	
51-60	3	3	
≥61	9	9	
Total	100	100	
3. **Marital Status**			
Single	30	30	
Married	13	13	
Separated	50	5	
Widowed	5	5	
Divorced	2	2	
Total	100	100	
4. **Educational Status**			
No Formal Education	4	4	
Primary	25	25	
Secondary	11	11	
Tertiary	60	60	
Total	100	100	
5. **Religious Affiliation**			
Christianity	40	40	
Islam	60	60	
Total	100	100	
6. **Monthly Income**			
≤ 20.000	42	42	30,070.00 Naira
21,000 – 40,000	39	39	
41,000 – 60,000	11	11	
≥ 61,000	8	8	
Total	100	100	
7. **Are you willing to pay for Waste Collection and Disposal**			
Yes	25	25	
No	75	75	
Total	100	100	
8. **Amount willing to pay for waste collection/disposal (Naira)**			
≤ 200	28	28	
200 – 400	9	9	707.00 Naira
500 – 1000	49	49	
1500 – 3000	9	9	
≥ 4000	5	5	
Total	100	100	
9. **Choice of Disposal of Domestic Waste**			
Burning of Waste	28	28	
Dump on landfill or Pit	9	9	
Burying waste to decompose	9	9	
Dumping in drainage or gutter	15	15	
Dumping at Waste Collection Truck	37	37	
Dumping in the bush	2	2	
Total	100	100	
10. **Household Waste Storage Item**			
Plastic bin	43	43	
Basket	22	22	
Polythene bag	24	24	
Paper boxes	4	4	
Old buckets	7	7	
Total	100	100	
11. **Household family size**			
≤ 3	19	19	
4 – 8	75	75	6 person
9 – 12	4	4	
≥ 13	2	2	
Total	100	100	

Sources: Field Survey 2022

Table 2: The Result of Knowledge on Sustainable Waste Management Practices.

Knowledge on Sustainable Waste Management Practices	No knowledge freq(%)	Moderate knowledge freq(%)	High knowledge freq(%)	Mean	Stand Deviation	Rank
1. Food debris waste could be used as animal feeds and manures	6(6.0)	49(49.0)	45(45.0)	2.40	0.62	4
2. Waste could generate income and serve as source of employment for household	10(10.0)	58(58.0)	32(32.0)	2.22	0.61	7
3. Poultry wastes can be used to make compost which will enrich the soil	2(2.0)	53(53.0)	45(45.0)	2.43	0.54	3
4. Plastic, glass and nylon can take century to decompose in the soil, hence it must be recycled.	9(9.0)	63(63.0)	28(28.0)	2.19	0.58	9
5. Waste must be sorted into organic (decomposable) waste and inorganic (non-decomposable) waste before dumping.	12(12.0)	61(61.0)	27(27.0)	2.15	0.61	11
5. Waste oil, paint, insecticides must not be burned or buried as they can cause cancer and also contaminate the soil and ground water.	10(10.0)	50(50.0)	40(40.0)	2.30	0.64	6
6. Recycling is a necessary as everything can be re-use for something else.	9(9.0)	60(60.0)	31(31.0)	2.22	0.60	8
7. Waste should not be dump around residential houses as it can deplete the ground water, air and soil burning of waste materials pollute the air.	4(4.0)	48(48.0)	48(48.0)	2.44	0.57	2
8. Burning of waste materials pollute the air,	43(43.0)	50(50.0)	7(7.0)	2.57	0.50	1
9.Insecticides/herbicides containers must be rinse thoroughly, with water before dumping to prevent further dangerous chemical reaction.	14(14.0)	53(53.0)	33(33.0)	2.19	0.66	10
10. Dead animals must be buried not dump so as not cause odour in the environment.	5(5.0)	59(59.0)	36(36. 0)	2.31	0.56	5

Sources: Field Survey 2022,

Table 3: The Result of Information Needs on Sustainable Waste Management Practices

Information needs	Not Needed freq (%)	Moderately Needed freq (%)	Highly Needed freq (%)	Mean	Stand Deviation	Rank
1. Information on how to sort and recycle non & decomposable waste	10 (10.0)	58 (58.0)	32 (32.0)	2.22	0.61	9
2. Information on how to convert domestic food waste into animal feeds	7 (7.0)	51 (51.0)	42 (42.0)	2.35	0.61	6
3. Information on how to convert decomposable waste into manure	4 (4.0)	47 (47.0)	49 (49.0)	2. 45	0.58	1
4. Information on environmental protection agencies.	1 (1.0)	58 (58.0)	41 (41.0)	2.40	0.52	4
5. Information on how to prevent disease epidemics out break	61 (61.0)	3 (3.0)	36 (36.0)	2.39	0.49	5
6. Information on sanitation laws and days	3 (3.0)	52 (52.0)	45 (45.0)	2.42	0.55	2
7. Information on how to create wealth from waste	9 (9.0)	50 (50.0)	41 (41.0)	2.32	0.63	8
8. Information on private waste collection agencies	9 (9.0)	52 (52.0)	39 (39.0)	2.33	0.64	7
9. Information on waste recycling plants	14 (14.0)	57 (57.0)	29 (29.0)	2.19	0.73	10
10. Information on health risk of poor waste management practices	8 (8.0)	53 (53.0)	39 (39.0)	2.41	0.84	3

Sources: Field Survey 2022

Table 4: Perception on Waste Management Practices

Perception statements	Mean	Stand Deviation	Ranks
1. Waste management should solely be government responsibility	3.50	1.09	5
2. Improper waste disposal invites pests and rodents to household	3.75	1.06	2
3. Waste contributes to climate change (flood/drought) through greenhouse gas emission	3.64	0.99	3
4. Waste generate gases that can cause respiratory problem like asthma	3.80	0.95	1
5. Waste management is a potential source of employment and wealth	3.50	1.07	6
6. Every household should pay waste collectors for their domestic wastes	3.62	1.07	4
7. Urbanization is now affecting availability of dumping sites within and around the locality.	3.50	0.98	7
8. Indiscriminate refuse waste disposal causes conflicts within the neighborhood	3.40	1.08	8
9. It is right to throw domestic waste like empty water container and pure water nylon on the street	2.02	1.33	10
10. Dumpling refuse around residential houses cannot cause disease outbreak	2.03	1.32	9

Sources: Field Survey 2022

Table 5: Factor Militating against Sustainable Waste Management

Factors	Not factors freq (%)	Serious freq (%)	Very serious freq (%)	Mean	Stand Deviation	Rank
1. No agricultural land where decomposable waste can be dumped.	22 (22.0)	62 (62.0)	16 (16.0)	1.93	0.61	10
2. Inadequate information on how to recycle waste productively	14 (14.0)	60.(60.0)	26 (26.0)	2.12	0.62	8
3. High cost of hireling private waste collectors.	11 (11.0)	63 (63.0)	26(26.0)	2.15	0.59	7
5. There is no time in sorting decomposable waste and non-decomposable waste.	25 (25.0)	47 (47.0)	28 (28.0)	2.04	0.75	9
6. Delay in removal by waste collection agents	8 (8.0)	59 (59.0)	33 (33.0)	2.25	0.59	6
7. Long distance to public waste collection truck/point	8 (8.0)	52 (52.0)	40 (40.0)	2.33	0.61	2
8. Poor enforcement of environment laws by the government	4.(4.0	66 (66.0)	30 (30.0)	2.26	0.53	3
9. Bad odour and foul smell of waste material	3 (3.0)	55 (55.0)	42 (42.0)	2.39	0.55	1
10. Non observance of sanitation day in cleaning the environment.	7 (7.0)	60 (60.0)	33 (33.0)	2.26	0.57	5
11. High rate of poverty in the society.	13 (13.0)	48 (48.0)	39 (39.0)	2.26	0.68	4

Sources: Field Survey 2022

Table 6: The Result of Correlation between Information Needs and Knowledge on Sustainable Waste Management Practices.

Variable	r-value	p-value	Remarks
Knowledge and Information Needs on Sustainable Waste Management	0.394***	0.001	Very Significant

***significant at 1%**

Table 7: The Result Correlation between Factors Militating against Sustainable waste management and Knowledge on Sustainable Waste Management Practices.

Variable	r-value	p-value	Remarks
Factors Militating against Sustainable waste Management and Knowledge and Knowledge on Sustainable Waste Management Practices	-0. 214**	0.033	Significant

significant at 5%