

Original Article

Determinants of Street Littering in an Urban Setting in South-South Nigeria

Awunor NS^{1*}, Okhimamhe AF², Alenoghena IO², Abah SO², Aremu AB³, Oyibo PG¹, Okumagba MT.¹

¹Department of Community Medicine, Delta State University, Abraka, Nigeria.

²Department of Community Medicine, Ambrose Alli University, Ekpoma, Nigeria.

³Department of Anatomy, Islamic University in Uganda, Kampala Campus, Uganda.

*Correspondence: Awunor, Nyemike Simeon

Email: awunorca@delsu.edu.ng


Article Metrics

Date submitted: 04/06/2021

Date Accepted: 03/07/2021

Date Published: 23/08/2021



 <https://doi.org/10.46912/wjmbs.54>

ABSTRACT

Littering is an inherent societal problem which has been marginalized in waste management efforts most especially in some low- and middle-income countries. Though its effect might seem negligible to the individual, its consequences on the environment remain substantial. The objective of this survey is to determine the socio-demographic and behavioural determinants of street littering among inhabitants in an urban Local Government Area (LGA) in Benin City. A descriptive cross-sectional study was carried out in Oredo LGA of Benin City amongst 422 respondents with an interviewer administered structured questionnaire using a cluster sampling technique. Data were analysed using the SPSS version 16 statistical software. The mean age of respondents was 30.01 (± 19.53) years. Respondents' most common method of litter disposal was either by putting them into waste bins (52.6%) or burning the trash (28.7%). Legislation (43.4%) and availability of street bins (40.5%) were the most effective measures identified to curb littering behavior. There was a statistically significant association between street littering tendencies and age ($p < 0.001$), gender ($p < 0.001$) and educational status ($p < 0.009$) of the respondents. In conclusion, age, gender and educational status of respondents were significantly associated with littering behaviour. Environmental policy review, improved health promotion activities and provision of anti-littering infrastructure is recommended.

Keyword: Behavior, Determinants, Edo State, Littering

INTRODUCTION

Littering is a cause of environmental pollution, particularly in those areas where population density is relatively high. It is also a unique form of environmental pollution in that it is a summation of the activities of so many individuals some of whom may not

even realize that they are carrying out an action that can be defined by the term littering behavior.¹⁻³ The act of littering is a worldwide phenomenon that varies with respect to diverse environments and cultures. It is known to have deleterious consequences on the environment such as

flooding, destruction of aesthetics of streets, public places and parks, ⁴ potential health risk from decaying biodegradable materials and injuries from pieces of objects discarded recklessly in public areas and economic losses in millions spent on trying to rid the environment of litter which should not be there in the first place. ⁵⁻⁷

Littering as a public health concern in Nigeria received specific attention during the Buhari/Idiagbon military regime (1983-1985) where the Government stirred up massive nationwide anti-littering campaigns using punishment as deterrent. ⁸ Till date, various State Governments in Nigeria have set up special environmental sanitation days and task force schemes to help curb the act of littering whilst using fines as deterrence.

Oguntayo et al⁹ asserted that sound social responsive behavior especially including a positive morality was necessary for good littering prevention behavior. If these attitudes are translated into a generally accepted behavior, then there might be a reduction in littering behavior by the populace. There are also cultural aspects to littering behaviour which determine what is littered, where is littered and how much of the society is affected by litter.

Various factors affecting littering have been studied in an effort to mitigate littering such as the use of public health education and provision of trash cans, ^{10,11} punishment, fines, imprisonment and rewards. Sometimes, the individual that litters is unaware of his/her littering behavior hence littering may actually be a spontaneous response. Although seemingly involuntary, environmental, socioeconomic and cultural factors may play a major role in the actions observed. It has been observed that punishment and rewards have been used worldwide in trying to enforce anti-littering behaviour. The use of positive signage in addition to other methods have proven effective at reducing littering but sometimes may fall short with regards to sustainability. However, no method has been shown to be inherently superior to the other over time. This may be due to that fact that littering is an activity carried out individually by a large number of people and in order for punishment to be served or incentives given, the litterer must be identified. The fact is

that those that litter are in most cases unknown thereby making it almost impracticable to punish or reward each individual. ¹² Serving punishment in each instance will require a lot of policing efforts while offering individualized rewards may also be quite an expensive venture. Both approaches will be costly, and would require manpower and adequate monitoring to ensure effectiveness ¹³ even though the cumulative reward of a better aesthetic view, reduction in environmental pollution and flooding control will be observed and enjoyed by all.

The objective of this study is to determine the socio-demographic and behavioural determinants of street littering among inhabitants in an urban LGA in Benin City, Nigeria.

MATERIALS AND METHODS

This descriptive cross-sectional study was carried out in Oredo Local Government Area, Benin City, Edo State, Nigeria. The respondents included 422 adults in various households in the study area who were selected using a cluster sampling technique. Data was collected using an interviewer administered structured questionnaire and analyzed using SPSS version 16 statistical software (SPSS Inc. Chicago, Illinois, USA). Categorical variables were expressed as frequencies (percentages) and compared using the Pearson's chi-square test. Statistical significance was set at $p < 0.05$. Ethical approval was received from the research and ethics committee of Ambrose Alli University and permission to carry out the study was obtained from Oredo Local Government (LGA) Council. Informed consent was also obtained from the respondents.

RESULTS

Socio-Demographic Characteristics of Respondents

Four hundred and twenty-two respondents participated in this study. The mean age (SD) of respondents was 30.01(±19.53) years, 51.2% were females and 66.6% were married. Thirty-seven (8.8%) of respondents had no formal education while over half of the respondents had at

least secondary level of formal education. The highest proportion (56.9%) of the respondents earned less than 20,000 naira (about 56 USD) as their monthly income while just 2.8% earned greater than 100,000 naira as their monthly income (about 277USD). Table 1

Environmental Factors and Littering Behavior amongst Respondents

A majority of respondents (64.7%) described their housing environment as clean while 25.8% described their housing environment as averagely clean with about 10% of respondents stating that they believed that their housing environment was either dirty or very dirty. In this study, 58.1% of respondents admitted to sometimes littering, 34.4% admitted to littering rarely while 1.2% of respondents stated that they never remember littering. Although majority of respondents had varied opinions with regard to the most appropriate way to dispose litter, over half of them stated that the most appropriate way to dispose litter was by either putting them into waste bins (52.6%) or burning the trash (28.7%). Sixty-nine respondents (16%) stated that they would litter an environment especially when someone is paid to clean it. The most littered items in Oredo Local Government Area of Edo state as described by respondents were cans, sachets, polythene bags and nylon packs and polyethylene terephthalate (PET) bottles used in food, water and drink packaging (78.9%). Cigarette butts accounted for 7.9% of litter while only about 2.8% of substances listed were bulky items. Table 2

Perception towards Anti-littering Measures by Respondents

Findings show that legislation (43.4%) and availability of Street bins (40.5%) seem to be the most effective measures identified by respondent to curb littering behaviour. Other activities towards keeping the street clean such as the moral or religious conviction not to litter were only present in less than 20% of patients studied while only 9.0% of patients admitted that public awareness campaigns will make a difference as regards their littering behaviour. In addition 4.5% of respondents

stated that irrespective of the measure employed to stem the menace of littering, they would not stop littering. Two hundred and forty-nine (59.0%) of respondents were willing to volunteer in a street cleaning campaign while 21.6% were unsure if they would actively participate in an anti-littering campaign. Majority of respondents 290 (68.7%) believed that everybody should be responsible for street cleanliness while 19.2% believed the government was responsible for street cleanliness. Table 3

Socioeconomic Determinants and Littering Behaviour amongst Respondents

From the data, respondents between the ages 21-30 (42.4%) self-reported that they rarely littered their environment. There was an association between age and littering behavior among respondents ($p < 0.001$). Regarding sex, females (39.5%) self-reported that they

Table 1: Socio-Demographic Characteristics of Respondents (n=422)

Characteristic	Frequency	Percent
Age (in years)		
20	101	23.9
21-30	196	46.5
31-40	53	12.6
41-50	39	9.2
51	33	7.8
Mean (SD)	30.01 (19.53) years	
Gender		
Male	206	48.8
Female	216	51.2
Marital status		
Married	141	33.3
Unmarried	281	66.7
Educational status		
None	37	8.8
Primary	49	11.6
Secondary	179	42.4
Tertiary	157	37.2
Monthly income (Naira)		
<20,000	240	56.9
21,000-50,000	131	31.0
51,000-100,000	39	9.2
>100,000	12	2.8

rarely littered their environment. There was an association between sex and littering behavior among respondents ($p < 0.001$). With regards to marital status, unmarried individuals (39.5%) self-reported that they rarely littered their environment. There was no association between marital status and littering behavior among respondents ($p = 0.065$). Concerning educational status, respondents with a tertiary level of education (40.1%) self-reported that they rarely littered their

environment. There was an association between educational status and littering behavior among respondents ($p = 0.009$). Finally, respondents with a monthly income of greater than 100,000 naira (66.7%) self-reported that they rarely littered their environment. There was no association between monthly income and littering behavior among respondents ($p = 0.091$). Table 4

Table 2: Environmental Factors and Littering Behavior amongst Respondents

Characteristic	Frequency	Percent
Self-description of Housing Environment		
Clean	273	64.7
Average clean	109	25.8
Dirty	19	4.5
Very Dirty	21	5.0
Littering of a Clean Environment		
Never	5	1.2
Rarely	145	34.4
Sometimes	245	58.1
Most times	17	4.0
All the times	10	2.4
Appropriate Way to Dispose Litter		
Waste bin	222	52.6
Burning	121	28.7
Burying	42	10.0
Pouring into drain	29	4.7
Fling	12	2.8
Others	5	1.2
Dispose litter in an environment where someone is paid to clean		
Yes	69	16.4
No	353	83.6
Most Littered Item*		
Can/ Sachet/ Polythene bags/ Nylon/ PETS Bags/Packs	248	78.9
Cigarette butts	25	7.9
Food items	44	14.0
Bulky items	9	2.8

*Multiple Responses

Table 3: Perception towards Anti -littering Measures by Respondents

	Frequency	Percent
Anti-littering Measures		
Legislation	183	43.4
Availability of Street Bins	171	40.5
Clean street	90	21.3
Fines	67	15.9
Moral/ Religious Conviction	48	9.9
Better street cleaning	47	9.7
Public awareness campaign	45	9.0
Nothing can stop me	19	4.5
Willingness to Volunteer in a Street Cleaning Campaign		
Yes	249	59.0
No	82	19.4
Not sure	91	21.6
Responsibility for Street Cleanliness		
Everybody	290	68.7
Government	81	19.2
Citizens	19	4.5
Don't know	32	7.6

Table 4: Socioeconomic Determinants and Littering Behaviour amongst Respondents

Characteristic	Littering of the street n (%)			Total n (%)	p-value
	Rarely	Sometimes	Most times		
Age (in yrs)					
20	40 (39.6)	57 (56.4)	4 (4.0)	101 (100.0)	< 0.001
21-30	81 (42.4)	101 (52.9)	9 (4.7)	191 (100.0)	
31-40	6 (11.3)	42 (79.2)	5 (9.4)	53 (100.0)	
41-50	15 (38.5)	19 (48.7)	5 (12.8)	39 (100.0)	
51	3 (9.1)	26 (78.8)	4 (12.1)	33 (100.0)	
Sex					
Male	48 (23.8)	147 (72.8)	7 (3.5)	202 (100.0)	<0.001
Female	97 (39.5)	98 (45.6)	20 (9.3)	215 (100.0)	
Marital Status					
Married	51 (28.5)	115 (64.2)	13 (7.3)	179 (100.0)	0.065
Unmarried	94 (39.5)	130 (54.6)	14 (5.9)	238 (100.0)	
Educational Level					
None	11 (29.7)	21 (56.7)	5 (13.5)	37 (100.0)	0.009
Primary	18 (36.7)	24 (49.0)	7 (14.3)	49 (100.0)	
Secondary	53 (29.6)	120 (67.0)	6 (3.3)	179 (100.0)	
Tertiary	63 (40.1)	80 (54.1)	9 (5.7)	157 (100.0)	
Monthly Income					
(Naira)	79 (32.9)	143 (59.6)	18 (7.5)	240 (100.0)	0.091
<20,000	40 (30.5)	84 (64.1)	7 (5.3)	131 (100.0)	
21,000-50,000	18 (46.1)	20 (51.3)	1 (2.5)	39 (100.0)	
51,000-100,000	8 (66.7)	3 (25.0)	1 (8.3)	12 (100.0)	
>100,000					

DISCUSSION

This was made up of self-reported data on the role of socioeconomic and behavioural factors in the littering of Benin City. The mean age (SD) of respondents was 30.01(±19.53) years, and about half of the respondents were female. Two third of them were married and over half had at least secondary education. In terms of the monthly earnings of the respondents, over half of them earned less than N20,000 (56USD) monthly; and this implies that most of the interviewees lived on less than two dollars daily.

Two third of the respondents generally felt that their housing environment was clean but about a tenth of them stated that their environments were littered. This opinion reveals that majority of respondents lived in a relatively clean environment. But less than a tenth of them reported that their environments were very dirty. This may not be unrelated to the cultural values of the study area; which places a premium on environmental cleanliness. Nonetheless, over half of the respondents stated that they engaged in activities that could litter their environment. The various littering items ranged from cans, polythene bags, bags/packs cigarette butts to food items. This similar to observations in the work done by Abdul Aziz in Bintulu, Sarawak, Malaysia³.

The tendency of the respondents to litter their environment is in keeping with a previous report from Mexico City¹⁴, where 58% of the interviewees engaged in the generation of recyclable municipal solid waste. Conversely about 1.2% of the respondents in this study stated that they never engaged in littering activities. However, this is at variance with another report, in which 80.5% of the participants would never engage in littering¹⁵. It is also incongruent with results from a study by Munoz-Cadena et al where about 42% of the respondents did not engage in any form of littering¹⁴.

Half of the respondents stated that the most appropriate way to dispose litter was by the use of waste bins and about a quarter of them stated that burning was the most appropriate method of litter disposal. This is in keeping

with previous reports^{14,15}. Also, sixty-nine respondents (16%) stated that they would litter an environment; even where someone is paid to clean it. This may not be unrelated to the continuous dilution of our old cultural and societal values; which placed emphasis on self-efforts in environmental cleanliness^{16,17}.

The most littered items included: cans, sachets, polythene bags and nylon packs and PET bottles used in food, water and drink packaging (78.9%). However, cigarette butts accounted for less than a tenth of items that littered the environment. Furthermore, forty percent of the respondents believed that the use of legislation and the availability of street bins could considerably reduce littering behaviour. This is lower than a previous report from the kingdom of Bahrain¹⁵ in which 67.65% of the respondents opined that fines from government legislation could effectively reduce street littering. This opinion was held by fewer respondents in this study probably because of inconsistencies in government policies and legislation in Nigeria and other developing countries. Other activities towards keeping the street clean such as the moral or religious conviction not to litter were only present in less than 20% of patients studied while only 9.0% of patients admitted that public awareness campaigns will make a difference as regards their littering behavior. Then again, this was at variance with another observation where 71.81% of the respondents stated that awareness campaign was a very important preventive measure towards street littering¹⁵. Nonetheless, less than a tenth of the respondents believed that none of the measures could deter people from engaging in street littering. This was indeed a fatalistic opinion and corroborates previous observations^{14,17}.

Two thirds of the respondents believed that everybody should be responsible for street cleanliness. This is slightly at variance with a previous report in which up to 92.96% of the respondents believe that cleaning of the environment was a shared responsibility¹⁵. Furthermore, only about half of the interviewees were willing to

participate in volunteer street cleaning campaign. Close to 20% of them believed that street cleaning is solely the responsibility of the government.

Common socio-demographic variables that influenced littering behaviour in this study included: age, gender and the educational status of the respondents. There was a statistically significant association between the age of the respondents and the littering behavior. Regarding gender, more females (39.5%) self-reported that they rarely littered their environment. In this study, males were more likely to litter compared to females while younger adults littered more compared to older adults. A British study has shown similar findings in this present study in addition to suggesting that under same environmental conditions and presence of indicators, males will still considerably litter more than females as observed in this study that showed a significant association between gender and littering ($p < 0.001$).¹⁸ There was an association between gender and littering behavior among respondents ($p < 0.001$). This is in keeping with a previous results^{15,19,20} in which age and gender were reported to influence attitude and behaviour towards street littering. Young people litter more as they are more likely to disobey laws and they also tend to care less about the littering and its consequences in addition to generally not being afraid of punishment strategies set in place to curb littering.²¹

It has been reported that younger people, religious individuals and educated members of the society are more likely to volunteer in a street cleaning campaign.²² Our results indicate that many respondents would volunteer in a public street cleaning campaign if any were to be organized. Individual willingness of participants is useful in keeping the streets free of litter and should be encouraged by deliberately organizing environmental street cleaning exercises towards promoting litter free streets.⁸

With regards to marital status, there was no association between marital status and littering behavior amongst respondents however it was observed that the unmarried tend to engage in littering behaviour most times when compared with the married. This may not be unrelated to

societal values which places a higher expectation on the married couple with regards to hygiene practices compared to the unmarried. Concerning educational status, the highest proportion of respondents with a tertiary level of education (40.1%) self-reported that they rarely littered their environment. There was an association between educational status and littering behavior among respondents, higher educational attainment improves the lived experiences of individuals through a better appreciation of the consequences of their actions on health and the environment. Higher educational attainment also improves the earning capacity of most individuals particularly in low- and middle-income countries with a resultant effect on quality of life. Finally, while respondents with a monthly income of greater than 100,000 naira (66.7%) self-reported that they rarely littered their environment, there was no significant association between monthly income and littering behavior among respondents. A limitation to this study was the inability of the researchers to explore non-human factors, possibly through the use of checklists or interviews, beyond the control of respondents with a direct effect on littering. These include availability of refuse bins, frequency of collection of refuse by relevant authorities and volume of refuse generated per unit time. Such factors could make educational or financial capacity of respondents of little effect in the prevention and control of littering. This study however, shows that the educational level of respondents plays a stronger role in determining littering behavior when compared to the effect of monthly income on the individual.

CONCLUSION

Perceptions on what constitutes appropriate anti-littering behavior influenced the self-reported actions of respondents. Age, gender and educational status were significantly associated with littering behavior amongst respondents.

Recommendations

Consequent on the above findings, it is recommended that

policy makers increase awareness on the deleterious effect of street littering and the necessity for instituting anti-littering measures among the populace. Health promotional activities and appropriate anti-litter infrastructure should be provided towards sustenance in reducing street litter. Overall, creating an enabling environment, through evidence-based policy making, to deter littering and encourage appropriate behavior change, is vital.

Acknowledgment

The authors acknowledge the effort of Dr J. Benjamin-Ohwodede in editing and proofreading this document.

Conflict of interest

The authors declare that there is no conflict of interest.

REFERENCES

1. Nyawira Wanjohi - University Of Nairobi P. an Assessment of Attitude and Behaviour Towards Littering Among the Citizens of Nairobi City By Purity Nyawira Wanjohi C50/69954/2013 a Research Project Submitted in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Arts in . 2016.
2. Eastman L, Nunez P, Crettier B, Thiel M. Identification of self-reported user behavior, education level, and preferences to reduce littering on beaches – a survey from the SE Pacific. *Ocean Coast Manag.* 2013;78:18–24.
3. Abdul Aziz NA, Lukhman AA, Chubo JK, Daud DSRA. Public Perception to Littering in Greenspaces: A Case Study in Bintulu, Sarawak, Malaysia. *J Phys Conf Ser.* 2019;1358(1). doi:10.1088/1742-6596/1358/1/012031
4. Arafat HA, Al-Khatib IA, Daoud R, Shwahneh H. Influence of socio-economic factors on street litter generation in the Middle East: Effects of education level, age, and type of residence. *Waste Manag Res.* 2007;25(4):363-370. doi:10.1177/0734242X07076942
5. Raffoul L, Mahon R, Goodridge R. *Roadside Litter in Barbados: Sources and Solutions.* Barbados: Centre for Resource Management and Environmental Studies (CERMES), University of the West Indies, Faculty of Pure and Applied Sciences, Cave Hill Campus: Bridgetown, Barbados; 2006.
6. Kayhanian M, Stransky C, Bay S, Lau SL, Stenstorm MK. Toxicity of urban highway runoff with respect to storm duration. *Sci Total Env.* 2008;389:386–406.
7. Armitage N, Rooseboom A. The removal of urban litter from stormwater conduits and streams: Paper 1—The quantities involved and catchment litter management options. *Water SA.* 2000;26:181–188.
8. Manton J. Environmental Akalism and the war on filth: the personification of sanitation in urban Nigeria. *Africa (Lond).* 2013;83(4):606-62.
9. Opayemi AS, Oguntayo R, Popoola AO, Alabi A. Psychosocial factors as determinants of littering prevention behavior Psychosocial factors as determinants of littering prevention behavior. 2020;(January). doi:10.22034/IJHCUM.2020.01.07
10. Dobbs I. Litter and Waste Management: Disposal Taxes versus User Charges. *Can J Econ.* 1991;24:221-227.
11. Convery F, McDonnell S, Ferreira S. “The most popular tax in Europe? Lessons from the Irish plastic bags levy.” *Environ Resour Econ.* 2007;38:1-11.
12. Torgler B, García-Valiñas MA, Macintyre A. Justifiability of littering: An empirical investigation. *Environ Values.* 2012;21(2):209-231. doi:10.3197/096327112X13303670567378
13. Ong I, Sovacool B. A comparative study of littering and waste in Singapore and Japan. *Resour Conserv Recycl.* 2012;61:35–42.
14. Muñoz-Cadena CE, Lina-Manjarrez P, Estrada-Izquierdo I, Ramón-Gallegos E. An approach to litter generation and littering practices in a Mexico City neighborhood. *Sustainability.* 2012;4(8):1733-

1754. doi:10.3390/su4081733
15. Freije AM, Naser HA, Abdulla KH. Attitudes and opinions towards public littering in the Kingdom of Bahrain. *Arab J Basic Appl Sci.* 2019;26(1):353-360. doi:10.1080/25765299.2019.1628688
 16. Nkwocha E, Okeoma I. Street littering in Nigerian towns: towards framework for sustainable urban cleanliness. *African Res Rev.* 2009;3(5):147–164.
 17. Tanyanyiwa VI. Motivational Factors Influencing Littering In Harare's Central Business District (CBD), Zimbabwe. *IOSR J Humanit Soc Sci Ver IV.* 2015;20(2):58-65. doi:10.9790/0837-20245865
 18. Brooks L, Davoudi S. Litter and Social Practices. *J Litter Environ Qual.* 2017;1(1):16-25.
 19. Ojedokun O. Development and Psychometric Evaluation of the Littering Prevention Behavior Scale. *Ecopsychology.* 2016;8(2):138-152. doi:10.1089/eco.2015.0081
 20. Ojedokun O. The Role of Socio-demographical and Psychological Factors in Taking Littering Prevention Actions. *Int J Adv Psychol.* 2013;2(4):197. doi:10.14355/ijap.2013.0204.03
 21. Stein RS, Ferguson KC. Litter: A Review of Litter Studies, Attitude Survey and Other Litter—Related Literature; Final Report. Artesia, NM, USA,,: Keep America Beautiful; 2007.
 22. Alkhatib AI, Arafat AH, Daoud R, Shwahneh H. Enhanced solid waste management by understanding the effect of income, marital status, and religious convictions on attitudes and practices related to street littering in Nablus-Palestinian territory. *Waste Manag.* 2009;29:449-455.