Novelty Journals

ISSN 2394-9694

International Journal of Novel Research in Humanity and Social Sciences
Vol. 10, Issue 3, pp: (50-61), Month: May - June 2023, Available at: www.noveltyjournals.com

ECONOMIC OUTCOMES OF HOUSEHOLD WASTE MANAGEMENT PRACTICES IN IBADAN, OYO STATE, NIGERIA

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DOI: https://doi.org/10.5281/zenodo.8099848

Published Date: 30-June-2023

***Abstract: Purpose*- The study aimed at analysing the economic effect of waste management practices on the households in Ibadan.**

***Design/Methodology/Approach*- A sample of 500 households were selected for the study. Heads of households were selected using multi-stage sampling technique. Data were obtained through the use of questionnaire to interview household heads on variables such as absenteeism at work, waste management activities and cost incurred by household members to treat illness. Ordinary Least Square Regression was utilised to analyse the data.**

***Findings*- The results showed that waste management practices did not predict the cost of treating illness (F-statistic = 0.92, p > 0.05) for both subscribers and non-subscribers. Non-subscribers to waste collection service had poor waste management practices and thereby constituted low productivity.**

***Research Limitation Implications*- The economic outcome of waste management in this study was restricted to the indirect economic effect (health impact) of waste management. There could be extension of future research in the area of direct economic outcomes of waste management (environmental impact).**

***Practical Implication*- There should be emphasis on the importance of subscribing to the service of waste collection so that productivity will be enhanced.**

***Originality/Value*- This study stressed the economic relevance of the health impact of household waste management in Ibadan, Oyo State, Nigeria.**

***Keywords*: Economic, Outcomes, waste Management, Households, Ibadan, Nigeria.**

1. INTRODUCTION

Management of residential waste in Nigeria, particularly, Ibadan has suffered negligence from the general public, environmental agencies and the government (Solomon, 2016) and this has led to diseases and infections among the populace. Health challenges from poor waste management practices constitute an economic burden. First, this may occur when economic time is lost to infection; and this thereby influences productivity and efficiency of labour, firm's revenue, household income, and government expenditure. Suchit (2001) and Hafiz, Ghulam, and Adiqa (2020) assert that health, being part of the human capital cannot be overemphasized in determining the productivity of labour. Also, another negative dimension of health issues that arises from waste management is the cost of treating infections. If a large proportion of household income is expended on health as a result of illness due to waste, it may lead to poverty or reduced income; and thereby reduce the living standard of individuals and households (Joshua and Matthew, 2013).

Moreover, improper waste management has negative implications for the economic system; and this occurs when the importance of the process of waste is not appreciated and catered for. Poor waste management can cause economic loss, resulting from untapped inputs from waste. Waste, being part of the economy, because it is a by-product of economic activities may also serve as the input to economic activity, whether through material or energy recovery (Defra, 2011; Tom, 2017). Recycling could also be a source of wealth generation and job opportunities for individuals, organizations, and governments (Oluwaleye, 2012; Nnamdi, Kechinyere, and Innocent, 2021). It may also serve as input for further production of goods. Therefore, waste management has implications for the cost of production, market sales, profit level of firms, individual income level, among others (Defra, 2011). Mismanagement of waste causes reduced lifespan of infrastructural facilities, such as clogging of drainage, flooding (World Bank, 2018). Also, poor waste management practices, such as burning waste on the roads may cause infrastructural damages (Ejaz, Akhtar, Nisar, and Ali, 2010). Burning trash, not only hazardous to human health through reduction in the air quality (Rahul *et al*, 2022), but also infuses more greenhouse gases into the atmosphere (Kate, 2020).

The waste management practices, when it influences health can have an impact on skill acquisition and workers' productivity. For instance, the results by Ogunrinola and Adepegba (2013) revealed that pollution is a significant factor in determining health status and the labour supply performance of respondents. The health status of people affects their productivity (KyungKeun, 2013); therefore, there are associated economic costs of inappropriate waste management. Lucas (1988) likewise affirms that waste pollution has a negative effect on human capital accumulation. By implication, waste-related illnesses pose a great challenge to sustainable economic development by limiting an individual's ability for knowledge acquisition and productive activities particularly, household productivity and cost implication for illness.

Particularly, in the case of Ibadan city, the challenges associated with waste and its management are multifaceted. First, Ibadan city is densely populated with over 4 million people (Wikipedia, accessed 2019). Second, it is the largest city in West Africa and suffers from improper urban geographical planning (Ibraheem and Hassan, 2015). This waste management condition, no doubt has implications for the economic life of people. The city of Ibadan in Oyo State was considered as the study location because the incidence of waste pollution is rampant in the city under study (Boye and Olusegun, 2018). Also, there is uniformity on the issue of waste pollution virtually everywhere in Nigerian cities (Ogwueleka, 2009); therefore, picking Ibadan might demonstrate what is operating in cities other than Ibadan.

Several studies in public health though considered waste management and health effect, however, did not link the economic relevance of health issues that arise from waste management to their study. Study by Giovanni *et al* (2021) investigated that health outcomes of waste management were mortality, neo-natal outcomes and adverse birth, respiratory condition, mental illness, vector-borne diseases, cardiovascular cases and gastroenteritis, cancer. Various studies established that there is association assessing health effects related with proximity to incinerator, dumpsite and landfill. For instance, studies such as Emma, (2013); Marco *et al*, (2010); Nkechi, (2013), Emmanuel, (2015) are health-related. The economic implication of such diseases and infections are very crucial for the study. Hence, this study further determined waste management practices, and economic implication of health issues arising from management of waste, particularly, household productivity and cost of illness in the study location.

2. REVIEW OF EMPIRICAL LITERATURE

The direct effect of waste management on the economic outcomes, such as employment, wealth generation, and recycling were reviewed. Also, to appraise the economic impact of diseases concerning the inapt disposal of solid waste and improper waste management generally, both the cost incurred in the hospital visit, drug purchase, and time lost illness were considered as well. Achille and Jaza (2008) identified the economic costs of illness from the disposal of the Yaoundé household waste at the Nkolfolou dumping site in Cameroon. It showed that people living in Yaoundé were twice more exposed to diseases. The medical cost and the loss of earnings are also twice that of those living far away.

To affirm this, Muhammad *et al* (2015) estimated healthcare costs with productive days lost. There was an indirect but significant relationship between the distances to dump sites and productive days lost and also between the distance and healthcare costs. Similarly, Rishikesh (2005) examined the occupational health problems of waste workers. Rishikesh claimed that in the practice of labour-intensive and as a result of close access to waste; workers often fall ill and lost some

working days to illness, which thereby impede a high level of productivity. In addition, Uttam (2018) examined environmental-health association and the effects on the household economy by considering the cost of illness of people.

Moreover, Goldman and Ogishi (2001) equally assessed the economic impacts of waste disposal. The disposal and diversion activities significantly affected economic impacts (such as total sales, value-added, total income, and jobs). Environmental degradation has negative impacts on economic sustainability development. Also, cases of erosions, floods, and severe drops in agricultural output because of improper waste management were identified. The authors suggested that economic instruments and incentives are needed to drive the process involved in development towards the required direction. Likewise, Xia (undated) estimated the economic impacts of environmental pollution in China based on data from the early 1990s. The result of economic loss to solid waste accounted for 5.2 percent of total losses in the country, equivalent to 5.12 billion Yuan. This was therefore supported by Kang'ethe (2016) who examined the effect of solid waste disposal on the livelihoods of residents of a particular location. Solid waste management has significant impact on internally generated revenue (IGR) and youth employment (Edward *et al*, 2017). Ngatatakalama (2016) also analysed the effect of solid waste management on the community welfare and examined the effect of employment opportunities on the welfare of people. Ogunrinola and Adepegba (2013) also appraised the health and economic implications of solid waste disposal among residents of two major waste dumpsites in Lagos, Nigeria. The results revealed that in determining the performance of labour supply and health status of respondents, the major statistically significant variables are pollution variables.

A relationship exists between income inequality and environmental degradation. The Kuznets inverted U-curve hypothesis between income and income inequality was used. The second hypothesis (EKC curve) assumed the relationship between income and environmental degradation. The cross-country and quantitative analysis of various countries or regions could reveal that the Kuznets inverted U-curve hypothesis is applicable, though with some disadvantages. Both low and high-income countries followed trends in income inequality and environmental degradation seem to follow Kuznets' hypothesized curve up to the lower level of high income as income increases, while a divergent trend could be observed among high-income economies, leading to a second inverted U-curve with frequent irregularities in the trend curve as income increases. This irregularity in the curves that were frequently observed among high-income economies was suggested to be responsible by policy and technology (Tatsuyuki, 2017).

Aworawo (2013) claimed that environmental degradation gave birth to human insecurity. Akinbami *et al* (1996) categorize environment into two areas, which were physical and cultural categories. The relationship between the two classes had a great number of negative implications on man and ecosystems. The study analysed the causes, socio-economic and socio-cultural implications for three key environmental issues in Nigeria, out of which solid waste was among.

Doriana and Adela (2015) similarly described the countries' recent trends in solid waste, particularly in European Union that undertook various waste management policies and have derived economic profit from effective waste management. The study also examines the effect of environmental problems on national GDP growth. Defra (2011) investigated the economics of waste and waste policy and identified the major principles for policy interventions in the area of waste by the public. It, therefore, concluded that waste should be geared towards the efficient and cost-effective outcomes. Moreover, there were cost impacts of environmental policy instruments in which equilibrium tax interactions were identified as applicable (Goulder, 2000).

3. METHODOLOGY

3.1 *Conceptual Framework*

The framework in Figure 1 is adapted from the work of Howard and Andy (2019) who conceptualized the link between global environmental change and Non-Communicable Diseases risk. This work establishes the relationship that exists among waste management, intervening variables, and economic outcomes.

The diagram in Figure 1 depicts the relationship that exists among waste management, health, and economic outcomes. Waste management involves a myriad of stakeholders: private and public institutions, communities, households, individuals, government, and non-governmental organizations. The nature of the action of each of the stakeholders with the generated waste has negative or positive implications for the environment, quality of health, and economic activities as captured in the conceptual framework in below:

Novelty Journals

ISSN 2394-9694

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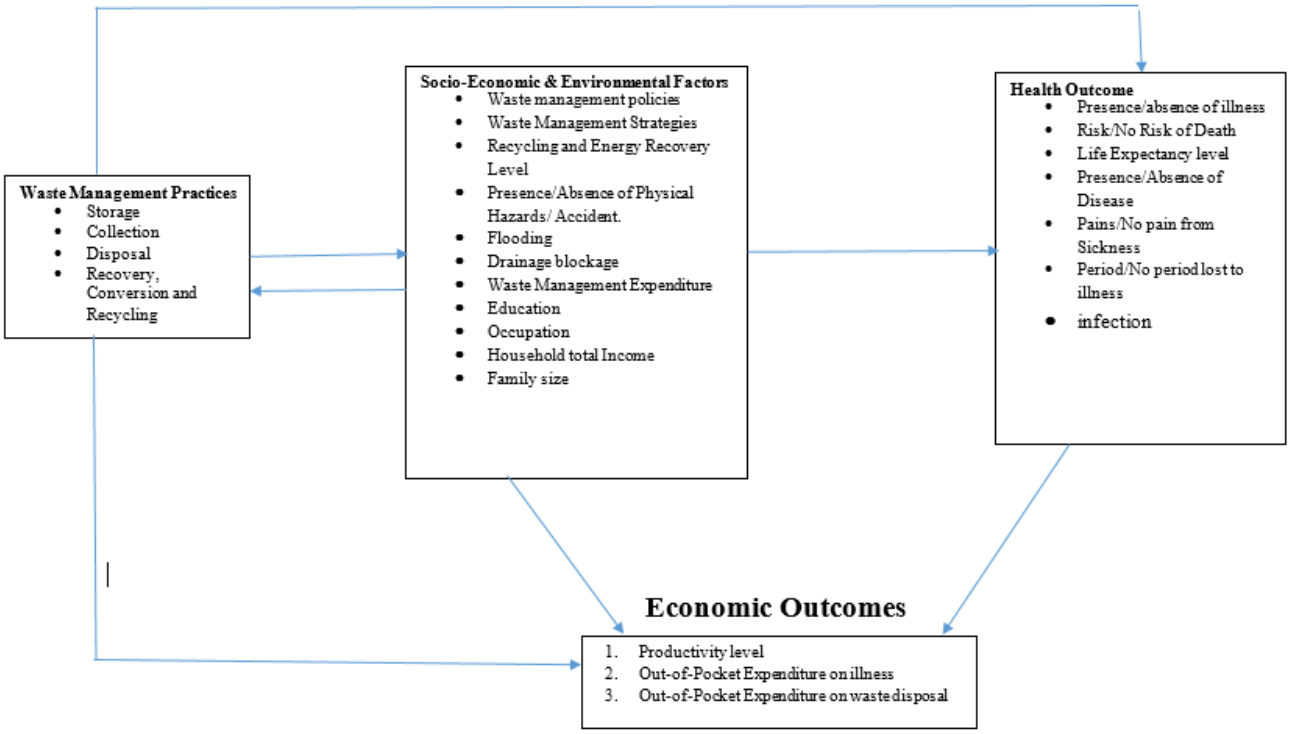

FIGURE 3.1: The Transmission Framework among Waste Management, Health, and Economic Outcomes.

Source: The Author, 2020

Howard and Andy's study was based on climatic change with the environmental and health effects on people. Howard and Andy derived the model from the review of literature based on the health and climatic change and vital policy responses and on safeguarding human health in the Anthropocene epoch to safeguard the highest possible standards of health globally. The Rockefeller Foundation/Lancet Commission on Planetary Health described the effects of the changes on human health. This study adapted the model, but few contributions were made to the following concepts. For instance, the study examined the waste management practices by households rather than the climatic change that Andy and Howard considered. Also, the authors further considered both the environmental and health effects of climatic change. This study equally considered both the environmental and health effects of waste management on households as Howard and Andy. Another major contribution of this study was the economic impact of waste management that was further introduced into the model. The implications of waste management practices can be considered in three aspects, which are environmental outcomes, health outcomes, and economic outcomes. These can be described as follows:

3.1.1 Environmental Outcomes:

The pathway from waste management practices to intervening variables is the one that birthed the environmental effects, which includes existence or no existence of water pollution, Soil Quality, Eco-system effect, the value of the residential property, level of tourism and recreation, state of infrastructural facilities, recycling, and energy recovery level, existence or no existence of air pollution, loss or no loss of property, and the presence or absence of physical hazards/accidents. On the other hand, there is environmental impact on waste management practices. For instance, waste management policies and strategies go along way in influencing the household disposal strategies and storage pattern, among others.

3.1.2 Health Outcomes:

Health impact on the residents has two pathways, which are directly channelled from household waste management practices and indirectly from intervening variables (environmental impacts). Examples of health impacts are presence or absence of illness, risk or no risk of death, Life expectancy rate, health status, mal/good nutrition, starvation or food surplus, presence or absence of waterborne disease, pains or no pains from sickness, period or no period lost to illness, and the presence or absence of airborne diseases.

3.1.3 Economic Outcomes:

Considering the economic impacts, the pathways are generated from waste management practices, environmental impact and the health impact of waste management practices. The economic outcomes of environmental impacts and health impacts are productivity level, income level, employment level, production cost, and increasing or decreasing out-of-pocket expenditure on illness. The economic outcomes of waste management practices, which is direct cost is waste disposal fees or none by households. While the economic impacts that mainly emanate from only the environmental impact are profit or loss level, the quantity of farm produced, the quality level of firm's products, conservation or utility of firm's virgin inputs, high or low cost of inputs, increasing or decreasing of investment by waste collection firms/ government, waste collection fees or none by households, health cost and level of acquired skill.

The fourth is the implication of socio-economic variables on waste management practices. Here, the pathway emanates from intervening variables to waste management practices. It is argued by some authors that socio-economic variables such as age, gender, occupation, education, and income level have significant impacts on waste management practices such as waste generation, storage, collection, disposal, and recycling. For instance, Dwini *et al* (2018), claimed that education has an impact on waste management. Also, Goldman *et al* (1990) asserted that there was a strong relationship between age and waste management while the Centre for Disease Control Prevention (2015) stated that gender has a significant impact on waste management practices.

The study used primary data, collected using a semi-structured questionnaire, which was by a survey on 500 households. A multi-stage technique was adopted in selecting participants in the survey. This method of sampling was employed because of step-wise stages of sample selection were involved. This can be shown below as:

3.2 Sample Selection

Step A1: Selection of Local Government

There are 11 local Government areas in Ibadan; which consists of 5 urban and 6 semi-urban local government areas. The urban local governments are Ibadan-North Local Government, Ibadan-North East Local Government, Ibadan-North West Local Government, Ibadan-South East Local Government, and Ibadan South West Local Government; while the semi/peri-urban local government areas are: Akinyele Local Government, Ido Local Government, Ona Ara Local Government Area, Oluyole Local Government, Egbeda Local Government, and Lagelu Local Government. Therefore, two local government areas were purposively selected from urban and semi-urban areas. The names of the local government areas were Ona Ara local government area, Egbeda local government area (semi-urban areas); Ibadan-North local government area, and Ibadan South-West local government area (urban areas). This was because the selected local governments were identified for high rate of illicit dumping of waste in the public areas.

Step A2: Selection of Areas

In each local government area, 2 streets were purposively selected. The streets/ areas were purposively selected because they were known for the high levels of indiscriminate waste disposal. Therefore, the total sum of streets considered for the study was 8. The names of the 2 selected streets/areas from Ona Ara local government area were: Idi-Osan Amuloko Area and Sawia, in Olorunsogo. In Egbeda LGA, Adegbayi Olode and Alakia Isebo were selected. In Ibadan North local government area were: Iyemetu Aladorin and Alawada and Ibadan South West was Oke-Ado area and Gege Junction.

Step A3: Selection of Households

To select households in each selected street/area, the household listing was conducted. Then random sampling was employed to select sampling units within the selected streets/areas. Systematic sampling was adopted as the first house was chosen between 1 and 3, then subsequent households were considered at the interval of 2. Thereafter, a semi-structured questionnaire was administered to the selected household heads.

The health production function (Freeman, 1993) was employed as the theoretical model by some authors like (Gupta, 2006; Chowdhry and Imran, 2010; Adhikari, 2012 and Muhammad *et al*, 2015), to optimally estimate the best possible option of health cost was adopted.

Novelty Journals

ISSN 2394-9694

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The individual health production function was as follow:

$$H = H\ (\ WMA, P,\ Z) \quad 1$$

Where the number of days lost to illness of the household member was a proxy of Health presented as H. It was negatively related to the waste management activities (WMA); *W*MA represented the waste management activities.

P was the exposure level to waste pollution (whether air, water, and land pollution). The number of workdays lost was positively linked to waste pollution level. This occurs when waste is not appropriately managed, and Z involved the vector of health characteristics for individuals. Such vector *Z* was the individual characteristics, which represented different variables like education, gender, among others**.**

The utility function of an individual was described as

$$U = U\ (C,\ L,\ H, WMA) \quad 2$$

H was health status; L was leisure and C was consumption of other commodities.

The individual allotted the non-labour income (Y); wage rate (w); the income received from work such that the addition of the two elements produced the total income of a Household (T-L-H) and per-unit cost of Waste management (*W*MC).

The individual's budget constraint could be explained thus:

$$Y + w\ (T - L - H)\ = C + WM_C WMA + E_C + H_C \quad 3$$

Amounts of money spent on waste management and other commodities that were being consumed by an individual were constrained by the individual's budget. In particular, total expenditure on these goods should not exceed the household's income, *w* is the wage rate, C- was the cost of other commodities and cost of W*MA,* which could also mean the cost of the environmental effect of waste management were given by WM_C, and H_C was the cost of the health effect of waste management correspondingly, H_C and was the economic cost of waste management. The total cost of consumer goods was assumed to be one. The individual maximized *U* by choosing *C, L, W*M$_C$, *E$_C$, and H$_C$* subject to the budget constraint (3).

Where it was assumed that the price of waste management activities was (WM$_C$), wage rate (w), non-labour income (Y), and other exogenous variables such as individual characteristics. Individual maximizes (1) with regards to Z, WMA, and L given the budget constraint (3). As thus,

$$Max\ F = U\ (Z,\ L,\ H, P)\ + \lambda[Y + w\ (T - L - H) - Z - WM_C WMA - E_C - H_C] \quad 4$$

Where, λ represented the Lagrange multiplier (Muhammad *et al.*, 2015).

The first derivative of the optimization problem- Cost of illness (COI), which was the cost paid on ailments was therefore measured as the total sum of COI of individual as the sum of earnings lost as a result of days lost to illness and health cost stated below:

$$COI = W\frac{dP}{dH} + WM_c\frac{dWMA}{dP} \quad 5$$

Therefore, to analyse the health implication of waste management activities, Poisson functions were adopted as employed by Gupta (2006); Chowdery and Imran (2010); Adhikari (2012) in estimating health production function and cost assessments.

$$H_i = E(H_i + U_i) = \lambda_i + U_i \quad 6$$

According to the model in equation (6), λ_i is considered as the average value of the number of days to illness. Therefore, the expected value of Health Expenditure plus error term is in turn equal to the average value of the number of workdays lost plus the error term.

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ISSN 2394-9694

International Journal of Novel Research in Humanity and Social Sciences
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Equation (6) was linearized to obtain equation (7)

$$\ln \lambda_i = \beta_1 \ln Z_i + U_i \quad 7$$

In equation (7), Z_{it} was the vector of independent variables and β_1 was the vector of regression coefficients.

The estimated reduced form equation of the health production function was specified as:

$$H = f(\alpha + \beta_2 WMA + \beta_3 Edu + \beta_4 Inc + \beta_5 Gen + \beta_6 Siz + \beta_7 Age + \beta_8 Age^2 + \beta_i Aware + ... + \in_a) \quad 8$$

Where $\in_a$ was the stochastic variable, β_i was the vector of regression coefficients, and age was squared to explain for non-linearity. In the equation, the dependent variable to be used for health outcome was the number of days lost to illness (Muhammad *et al.*, 2015):

Summing equation (8) over all the members in the household produced a household health production function.

This was expressed as;

$$H^* = \Sigma_{i-1}^{n} H_i \quad 9$$

$$H^* = g(b_1 + b_2 WMA + b_3 Edu + b_4 Inc + b_5 Gen + b_6 Siz + b_7 Age + b_8 Age^2 + B_9 Aware + . + \in) \quad 10$$

$$E^* = g(b_1 + b_2 WMA + b_3 Edu + b_4 Inc + b_5 Gen + b_6 Siz + b_7 Age + b_8 Age^2 + B_9 Aware + ... + \in) \quad 11$$

4. RESULTS

The situation of household waste management practices on household resources in Ibadan can be shown in Table i. The joint effect of all the variables on the cost of treating illness was not significant as given by p-value at (P>0.05) and F-Statistic was the test for the joint significance of all the variables, which was 0.919 in the city as against the prediction. Even though some variables were significant as evident from Table i, which were duration of waste temporary storage and distance of residence to the dumpsite. The variables had an impact on the health of household members in Ibadan as they were significant at (P<0.10). Therefore, the amount spent as a result of the occurrence of illness was not on the account of waste management practices of the people of Ibadan. This was in contrary with the findings of the study of CDC (2021) which claimed that diseases have significant economic costs. The cost of treating illness, however, could be incurred on other illnesses apart from the illness related to waste management practices of people in the city. By implication, such illnesses did not necessarily occur as a result of waste management practices. Also, the cost incurred in treating illness may not necessarily emerge because of waste management practice. Even though, less than half of the population of the sick subscribed, it could also be that majority of those that had illness as a result of the waste issue were the majority that subscribed for health insurance scheme, which could thereby make the cost of illness (out-of-pocket expenses) relatively insignificant.

TABLE i: The Result Analysis of the Effect of WM Practices on Cost of Treating Illness.

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)*	3.062	0.209		14.625	0.000
	Burn in compound	-0.074	0.091	-0.075	-0.816	0.416
	Throw in drainage	0.186	0.117	0.150	1.590	0.114
	Throw in bush	-0.004	0.127	-0.003	-0.031	0.975
	Throw in uncompleted building	0.149	0.226	0.059	0.663	0.509
	Place of waste storage	-0.085	0.099	-0.073	-0.862	0.390
	Time of waste storage*	-0.267	0.102	-0.251	-2.607	0.010
	Dist. of residence to dumpsite***	0.185	0.108	0.155	1.719	0.088
	Toilet Facility	-0.032	0.111	-0.028	-0.288	0.774

WML		0.077	0.103	0.067	0.745	0.458
Household total Income		0.007	0.100	0.007	0.069	0.945
Education		-0.048	0.094	-0.048	-0.506	0.614
Awareness		0.018	0.141	0.013	0.129	0.898
Prob>chi^2	0.540					
R^2	0.086					
F- Statistic	0.919					

a. Dependent Variable: log.amt

Source: The Author, 2021

Some types of illnesses were identified in Table ii, which showed that two hundred and eighty people were reportedly ill among interviewed residents in Ibadan. Out of which 73 people (46.2%) subscribed for Health Insurance Scheme (HIS); while 53.8% of respondents did not subscribe. Therefore, less than the average of those that were ill in the past three months were on HIS. From Table ii below, it was established that the percentage of those that subscribed for the health insurance scheme was relatively lower than those who did not. Since a larger percentage of the sick did not subscribe for HIS, a substantial part of the household income would be devoted to treating the illness, which though may not be waste-related, and this thereby has negative economic implications.

TABLE ii: Crosstab for those that fall ill in the past 3 months and Health Insurance Scheme Subscription Rate.

			Does any Family Member Fall Ill within the past 3 months		
			Yes	No	Total
Are you on HIS	Yes	Count	73	85	158
		% within are you on HIS	46.2%	53.8%	100.0%
	No	Count	207	55	262
		% within are you on HIS	79%	21%	100.0%
Total		Count	280	140	420
		% within are you on HIS	66.7%	33.3%	100.0%

Source: Author, 2021

Absenteeism is when an employee is frequently and habitually absent from work. It excludes paid leave or occasions where the employer has granted the worker time off. The reason could be due to family-related issues, illness, harassment, and job hunting.

In Table iii, both "none of the time" and "a little of the time" comprised a low absenteeism scale of productivity. "Some of the time" identified as moderate; while "most of the time" and "all of the time" were categorized as high absenteeism at work in the past 3 months before the period of the survey among residents in Ibadan, as presented in Table iii.

TABLE iii: Absenteeism Scale for Productivity in the past three months

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
	N (%)	N (%)	N (%)	N (%)	N (%)
How many days did you miss an entire day at work because of a health issue?	207 (49.3)	148 (35.2)	34 (8.1)	26 (6.2)	5 (1.2)
How many days did you miss an entire day at work because of other issues?	196 (46.7)	161 (38.3)	48 (11.4)	12 (2.9)	3 (0.7)
How many days did you miss part of the day at work because of health issues?	205 (48.8)	157 (37.4)	36 (8.6)	19 (4.5)	3 (0.7)
How many days did you miss part of the day at work because of other reason?	189 (45)	169 (40.2)	40 (9.5)	14 (3.3)	8 (1.9)

Source: The Author, 2021

Novelty Journals

ISSN 2394-9694

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Vol. 10, Issue 3, pp: (50-61), Month: May - June 2023, Available at: www.noveltyjournals.com

Furthermore, Table iv, had low absenteeism to be between 0 and 8, moderate to be 9-12, and high absenteeism to be 13-20. Table iv had the highest percentage of 84% of participants with low absenteeism at work in the past 3 months prior to the interview. By implication, 84% of respondents had low frequency (<=8) of absenteeism. The percentage of moderate absenteeism at work by the respondent was 11%. The lowest percentage of 5% of the respondents had high absenteeism at work in the past 3 months. Therefore, 21 people had a high frequency (13-20) of absenteeism. The result showed that the majority of the people did not have absenteeism at work or had very little experience of absenteeism in the past 3 months preceding the period of the survey. Only 5% and 7.4% respectively out of the total population had a high level of absenteeism at work. The table established the descending order of the frequencies of absenteeism from low frequency to high frequency.

TABLE iv: Absenteeism at Work in the Past 3 Months

Frequency (No of Absenteeism)	Frequency of Participants)	Percent of participants
Low (<= 8)	353	84.0
Moderate (9 - 12)	46	11.0
High (13+)	21	5.0
Total	420	100.0

Source: The Author, 2021

Absenteeism are scales conventionally used to measure productivity. In this analysis, productivity was measured using absenteeism. Therefore, the study considered the relationship between waste management practices and the productivity level of an individual household head in Ibadan. Moreover, it is predictable to have a positive relationship between waste management practices and productivity. The expectation in line with the study of Rishikesh (2005) which claimed that close access to waste most often makes workers fall ill and thereby lose some productive days to illness, however, was contrary to the findings of the study. In Table v, the joint effect of all variables using pooled results showed that there was no relationship between waste management practices and productivity at (P>0.10). However, "waste burning" and "Place of waste storage" pointed out that waste management practices only predicted productivity of household members in Ibadan at (P<0.10). Therefore, the way people disposed of their waste in Ibadan did not affect their productivity at the workplace. This may be explained by factors such as if the ailment is no so severe as to prevent from performing efficiently at work.

TABLE V: The Pooled Result of the Effect of Waste Management practices on Productivity (Absenteeism)

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	T	Sig.
(Constant)*	0.932	0.117		7.953	0.000
Burn in compound***	-0.052	0.029	-0.149	-1.784	0.077
Place of Waste Storage***	0.060	0.033	0.146	1.809	0.073
Duration of Waste Storage	0.001	0 .033	0 .002	0.021	0.983
Distance from Residence	0.050	0.035	0.119	1.418	0.158
Awareness	0.023	0.023	0.081	0.984	0.327
Household Total Income	-0.044	0.040	-0.104	-1.122	0.264
F-Statistic	1.652				
Prob>chi^2	0.115				

a. Dependent Variable: log.absenteeism]
Source: The Author, 2021

In Table vi, there was no relationship between waste management practices and productivity for the subscribers to waste collection service. This could be because, waste management practices other than subscription for waste collection services were not rampant; hence, the indiscriminate practices were relatively minimal and perhaps, was carried out only when the waste collection agents failed to come at the stipulated period. In effect, the waste management practice was carried out in a formal and standardized arrangement, which could not have any negative impact on the cost of treating illness and the

Novelty Journals

ISSN 2394-9694

International Journal of Novel Research in Humanity and Social Sciences
Vol. 10, Issue 3, pp: (50-61), Month: May - June 2023, Available at: www.noveltyjournals.com

productivity of subscribers for waste collection services in Ibadan. The results of the finding implied that higher money spent on service utilization by subscribers to waste collection agencies could serve as preventive measures against any adverse implication on human productivity. Therefore, subscribers to waste collection services in Ibadan engaged in more proper and effective waste management practices which did not affect their productivity unlike non-subscribers.

TABLE Vi: Result of the Effect of Waste Management Practices on Productivity (Absenteeism)

Do you subscribe for WC services	Model	Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
Yes	(Constant)*	1.095	0.176		6.210	0.000
	Burn in compound**	-0.112	0.050	-0.310	-2.219	0.031
	Place of waste stored	0.034	0.070	0.066	0.483	0.631
	Duration of waste stored	-0.085	0.061	-0.194	-1.402	0.167
	Distance of residence to dumpsite	0.042	0.056	0.105	0.752	0.456
	Awareness***	0.060	0.035	0.239	1.714	0.093
	Household Total Income	0.015	0.055	0.042	0.278	0.782
	F-Statistic	1.664				
	Prob>chi2	0.132				
No	(Constant)*	0.602	0.196		3.073	0.003
	Burn in compound	-0.008	0.036	-0.024	-0.224	0.823
	Place of waste stored**	0.101	0.039	0.268	2.560	0.012
	Duration of waste stored	0.057	0.039	0.160	1.443	0.153
	Distance of residence to dumpsite	0.060	0.047	0.136	1.298	0.198
	Awareness	0.042	0.047	0.094	0.899	0.371
	Household Total income***	0.071	0.038	-0.209	-1.867	0.065
	F-Statistic	2.141				
	Prob>chi2**	0.040				

a. Dependent Variable: log.absenteeism

WLM and drainage were omitted in the analysis because of multi-collinearity

Source: The Author, 2021

4.1 CONCLUSION

The finding showed that waste management practices did not have any impact on the economic outcomes (cost of treating illness and the productivity of workers) in the city. This implies that waste management practices even though might be associated to health outcomes but did not affect the overall analysis of both subscribers and non-subscribers for productivity and out-of-pocket expenses on illness. This could be that if the effect of illness was not severe, it may not prevent them from being productive at work. The effect on health could also be that it was not fatal and might not necessarily involve expensive drugs or affect productivity. Also, it may premise on the fact that those that might have been ill were possibly operating on health insurance scheme, which made the cost of treating illness to be very minute. On the contrary, when analysis was run separately, waste management practices of non-subscribers affected their productivity by reducing both the quality and quantity of labour force. Therefore, poor waste disposal strategy has a significant impact on the productivity of the people.

4.2 RECOMMENDATION

- *Indiscriminate* dumping and ineffective waste management affected the productivity level of non-subscribers but did not affect the productivity level of subscribers. This emphasises the importance of subscribing to the service of waste collection so that productivity will be enhanced.

- Households' economy could be affected if a higher proportion goes into health care. From the analysis, the percentage of those that were sick within the past three months and were covered by health insurance was 40.3% in Ibadan. The percentage of those who were sick and subscribed for health insurance schemes (HIS) was relatively lower than those who

did not subscribe for HIS. It was also observed from the findings that quite a larger percentage that was ill did not spend money to treat themselves. This may be due to the inability to afford the cost of treatment. Therefore, there is a need to sensitize the public on the advantage of subscribing to health insurance schemes, which may reduce their out-of-pocket expenses on healthcare. More emphasis should be placed on HIS as it has a vital role to play in the economic life of people.

- Some could be willingness to pay for waste management in order to subscribe but could not afford. In addition, from government perspective, waste management regulation declares that it is illegal for any household in Oyo State to engage in self-disposal of waste; government, therefore, should invest heavily in terms of financial support and subsidize waste collection charges for those who are willing to pay for waste management service but cannot afford to pay the charges.

4.3 STUDY LIMITATION

Apart from indirect economic effect of waste management (health impact), there is also a direct effect of waste management (environmental impact) such as waste recycling and waste conversion. However, for the purpose of concentration, the economic outcome of waste management in this study was restricted to the indirect economic effect (health impact) of waste management. The aspect of the direct effect of waste management on economic outcome is a suggestion for future research.

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APPENDIX - A

Criteria for Waste Management Level

Very High Level	Provision of Drums or Collection device Central Arrangement/ Institutional Arrangement to collect Waste from house to house at the established frequency and very good personal hygiene before waste collection
High Level	Provision of Drums or Collection device but collected at irregular time intervals and fairly good personal hygiene before waste collection.
Medium	Personal provision of Waste Collection and Disposal but not formally approved Collection Arrangement. An individual effort such as burning, dumping in the bush.
Low	No Provision/Subscription for formally approved Waste Collection Arrangement. Waste dumps either in an undesignated place or stored for a long period. At times, the waste litters the surroundings and swept and burnt on spot or disposed of through other means.
Very Low	No Provision for waste collection. Waste litters the surroundings and accumulates for a too long a time, and ends up in the drainages, rivers, roads e.t.c. Also, when waste is disposed at where it can deteriorate the infrastructure and disfigures the public arena such as deliberate disposal of waste on roads, in rivers, or drainages. Low personal hygiene before disposal.

Source: Author, 2021

Note:

* means Significant at 1% ** at 5% and *** at 10% level

HIS- Health Insurance Scheme