



ASSESSMENT OF SOCIO-ECONOMIC DETERMINANTS OF OPEN DEFECATION IN NIGERIA: A CROSS-SECTIONAL STUDY

By

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ABSTRACT

Open defecation is a major source of concern globally to both government and non-governmental organizations due to its negative impact not only on health status but also on the overall wellbeing of the labour force, national productivity, poverty, inequality, unemployment, and economic growth and development, especially in developing economies. This study aimed at investigating the determinants of open defecation in Nigeria using national demographic health survey data 2019 of the World Bank, which was analyzed using logit regression. From the analysis, it was revealed that household age, household size, literacy, and geopolitical zone are significantly more likely to reduce the risk of household open defecation. However, living in rural areas and being a Yoruba native are significantly more likely to increase the risk of household open defecation practice. It was concluded that age, household size, literacy, settlement in rural areas, tribe, and geopolitical zone of residence are significant determinants of open defecation in Nigeria. The study recommends that the Federal Ministry of Humanitarian Affairs and Poverty Alleviation in collaboration with State Ministries of Rural Development and NGOs should provide incentives to rural households; the Federal Ministry of Works and Housing, State Ministries of Environment, and Local Government Councils should construct toilets with constant water supply in public places; and the National Assembly, State Houses of Assembly, and NESREA should enact and enforce severe penalties against open defecation to address the menace in Nigeria.

Keywords: Household, Literacy, Logit Regression, Open Defecation.

JELCODE: D19, I29, C29, I18

1.0 INTRODUCTION

Access to clean environment has been declared a human right by the United Nations due to its impact on the overall health and chances of labour survival, productivity, participation, economic growth and development (World Health Organization [WHO], 2015; Gayawan, et, al., 2022), signifies a symbol of development (Belay, et, al., 2022). To achieve access to clean environment, goal 6 of the sustainable development goals aim at achieving universal access to adequate and equitable sanitation and hygiene for all and ending open defecation by 2030, because of the



important role of clean environment in economic growth and development. However, about 2.6 billion people has been estimated globally to lack access to clean environment largely as a result of pollution and unclean environment, cause majorly by open defecation (WHO, 2020; Habila & Danjuma, 2022; Ajao et, al., 2022). This has continued to pose threat to the global health status, labour productivity, poverty, inequality, labour participation and the overall economic growth and development and the achievement 2030 sustainable development goals agenda especially in developing economies.

Open defecation has continued to be a global challenge especially in developing economies, for instance about 900 million people have been estimated to be defecating in an open space globally, a situation that has become a major source of concern to policy makers, government, non-governmental organizations and researchers (World Bank, 2020; WHO, 2020). Open defecation is an act of defecating in an open field, bushes, culvert, bodies of water or any open area, which has a serious negative impact on the environment and health, in addition to being a major cause of child mortality, morbidity, malnutrition, stunting growth, low cognitive development and low intelligent quotient (United Nation Children Fund (UNICEF), 2018; WHO, 2020). It has been viewed as a practice where people or household empty their bowels in an open field, water bodies, open trenches or forest against a properly design toilet that ensure proper disposal of human faeces, which serve as a serious threat to the health and environmental health challenge (Rotowa & Ayadi, 2020; Habila & Danduma, 2022). It was reported that every fresh human faeces contain 104 protozoan cysts, 106 virus, 106 bacteria, and 101 helminth eggs (Hajj-Mohammad, et, al., 2019), which has been reported to contaminate open trenches (Jaitawat, et, al., 2004), beach (Park et, al., 2018), and causes diseases such as hepatitis (Junaid, et, al., 2014), diarrhea (Njuguna, 2016), intestinal worm infection (Molla & Mamo, 2018), cholera (Goswami, et, al., 2019), typhoid (Mbae, et, al., 2020), polio (Martinez, et, al., 2015), trachoma (Maceod, et, al., 2019), and schistosomiasis (Cha, et, al., 2019), which has a strong potential of affecting children cognitive development, causes malnutrition, diarrhea, stunted growth, health potentials of children, potential future income, labour productivity and participation (Checkley, et, al. 2008; Humphrey, 2009), malnutrition, stunted growth, intellectual retardation, education and cognitive deficiency, Inflammation of the gut, child mortality, and pneumonia (UNICEF, 2018), causing over 842000 death mostly in developing countries, reducing the productive workforce and national productivity (WHO, 2020).

Regionally, out of the 900 million people that practice open defecation, South Asia accounted for 496 million, Eastern Asia, Latin America, South Eastern Asia, and Caribbean accounted for 134 million people while Sub-Saharan Africa account for 220 million majority of whom fall within lowest 20 percent income quantile (WHO, 2018, Ntaro, et, al., 2022). Globally, open defecation has decline except in oceanic and Sub-Saharan Africa, while Europe, North America, and Australia have been declared open defecation free having less than one percent of their population practicing open defecation. Despite the reduction in the number of people practicing open defecation globally, Sub Saharan Africa is not on track to eliminate open defecation, given the number of people defecating in an open space, with Nigeria occupying the first position in Africa and second in the World with 46 million still emptying their bowels in an open space, just behind India specifically being regarded as the African home of open defecation (WHO, 2020). Furthermore, number of countries that at least 1 percent of its population practice open defecation falls from 108 to 81, whereas those having at least 5 percent of its population



practicing reduce from 71 in 2000, to 61 in 2020 and the 61 countries are housing over 3.2 billion people.

Access to toilet facilities in Nigeria is far below the global target of 80 percent (WHO, 2020), according to National Demographic Health Survey (2018), only 18 percent of Nigerian households have access to improved toilet facilities such as flush or Very Important Personal (VIP) toilet, 56 percent have access to pit latrine, while 25 (50 million) percent or 10 million households defecate in the bushes, gutters, sidewalks, motor parks, recreational parks, rivers and sheets, a phenomenon that is not just peculiar to the rural areas but also in the cities and even among the educated class, in tertiary institutions, business and residential areas. The situation is severe in the rural areas with more than 38 percent emptying their bowels in open space against 14 percent in the urban areas (WHO, 2020). According to the UNICEF (2022), 59.9 percent or 16 million people practice open defecation in North Central zone, 28 percent in South-West, 22.4 in the South East, 21.8 percent in the North East, 17.9 percent in the South-South and 10.3 percent in the North West.

People spent 2.5 days annually in search bushes and open space to defecate in Nigeria or \$145 million worth of time in open defecation accounting for losses of over \$3 billion or ₦2.5 trillion annually due to poor sanitation with open defecation alone costing the country over ₦800 billion yearly. This is despite market potentials for sanitation, which has been argued that if the estimated 50 million people defecating in the open opt for toilet, the demand for materials and labor on average will be around ₦1250 billion, and contributed to about 88 percent of under-five mortality with diarrhea causing about 600,000 children annually, which affect labour supply and participation (World Bank, 2020).

It is against this background that this study seeks to explore the socio-economic determinants of open defecation in Nigeria to contribute the existing literature and guide policy makers in identifying, which area to focus on in the quest to address open defecation. The rest of the study is structured into literature review, methodology, analysis, conclusion and recommendations.

2.0 LITERATURE REVIEW

Ending open defecation has been a policy thrust of both government and non-governmental organizations at both the local and national international level because of its health and economic implication on labour productivity and participation, inequality, poverty and economic growth and development especially of the developing economies that are predominantly labour intensive based. Scholars have tried to investigate open defecation globally and nationally among the studies are; Ajoa et al., (2022) reported that open defecation though is declining in Nigeria due to the increase in water supply, however, unimproved sanitary environment remains an issue that threatens lives and productive capacity of people in both rural and urban areas and need to be addressed given its long run implication on the overall economy and wellbeing of the masses. It was also reported that household level of education and awareness about the health implication of open defecation, occupation of household, economic status, attitude toward ending open defecation predisposes household chances to practice open defecation, furthermore, availability of undeveloped land, latrine and its condition, clean water and geographical location of household have also been reported to significantly influence open defecation. However, the study



reported that sensitization of people on the danger of open defecation by health workers, community leaders and family members significantly reduce open defecation (Hapsari & Wardani, 2022; Chakrabaty, et, al., 2020). it was also argued that in Kaduna metropolis predominant of water closet as sanitation option, presence of open sewage dump site, open pit within a compound and abandoned buildings significantly influences open defecation in the metropolis, however, it was also reported that massive sensitization by the community environmental health workers on health implications of open defecation significantly reduce open defecation. In a separate study in Indonesia, Muslims have been reported to be less likely to practice open defecation than other faith, while population density has been identified as a major contributing factor to open defecation (Chakrabaty, et, al., 2020; Ajao, et, al., 2022). In Ghana Trimmer et, al., (2022), reported that Provision of subsidies to household for toilet construction or renovation, incentives to open defecation free communities and toilet ownership play a vital role in reducing open defecation, while communities that received no incentive for toilet ownership and construction are found to be more vulnerable to open defecation.

In Tanzania, Sara and Graham (2014), argued that keeping of livestock especially the once that feed on human excreta influence people to empty their bowels in an open space to enable the animals to feed on, it was also reported that open defecation decision is significantly influence by poverty where household that cannot afford to purchase toilet facilities or construct latrine tend to defecate more in the open space. However, fear of been infected with open defecation related diseases and access to financial services that enable household to access credit to construct toilet are more likely to reduce open defecation. Mushra, et, al., (2021), reported that availability of water in the rural areas, provision of safe excreta disposal by both government and non-governmental organization, emergence of new toilet construction technology, and fear of deadly infection significantly reduced open defecation in India, it was also reported that the introduction of strict legislations by the government of India against defecating in an open space did not only reduce open defecation but also improve the life rural Indian population. Adhakha, et, al., (2022), argued that the Indian government policy of awareness creation about the danger of open defecation that involve civil society organizations, adoption of community led total sanitation program are significantly more likely to reduce open defecation in both rural and urban India. Contrarily, Hadi, et, al., (2022) reported that open defecation is more rampant in western Java India, majorly influence by lack of money to purchase toilet facilities or construct latrine, lack of willingness to accept and implement community total-led sanitation, high level of illiteracy and prevalence of diarrhea, the study also argued that encouraging people to accept CLTS program would go a long way in eliminating open defecation Declaire, et, al., (2022), posited that Ghana lack of follow-up after the declaration of a community as open defecation free for a long period is more likely increase the probability of the community of reverting to open defecation especially after collapse of their toilet due to their reluctant attitude to replace or renovate the toilet. The study further reported that house hold residing distance to major roads, and rocky terrain have high likelihood to practice open defecation that those residing close to the major road and smooth terrain, however, wealth status of household, having male as head of household, having less children less than 14 years of age, being a beneficiary of government social security incentives aimed at poverty reduction and construction toilet significantly reduce open defecation in Haiti and Ghana (Declaire, et, al., 2022; Paul, et, al., 2022). On the other hand,



Immurana et, al., (2022), reported that greater financial inclusion is significantly associated with low open defecation in Ghana, because it gives households opportunity to access chip credit facility to start business earn income and construct toilet. Belay, et, al., (2022) in Ethiopia, that open defecation has drastically reduced from 81.96 percent in 2008 to 32.23 percent in 2016, that historic achievement was consideration of age before marriage, level of education, household source of drinking water, home ownership, level of poverty of the community, region of household habitat of household and access to information regarding the danger of open defecation significantly reduce open defecation, it was reported that though open defecation has reduce but concentrated poor households and primary clusters are still practicing open defecation.

Ntaro, et, al., (2022) reported that contextual factors such as farming in a far distance to home, financial constraint to purchase toilet construction materials, rainy seasons, soft soil that is collapsible and drinking of alcohol are significantly more likely to induce open defecation, while psychological factors such as perceived health risk of open defecation, risk of being attacked during open defecation, time waste in search of where to defecate and perception of maintaining clean environment are significantly more likely to reduce open defecation. A cursory view of the literature reviewed revealed that most of the studies focus more on either health implication open defecation on children, maternal health, and environmental effects Ajoa et, al., (2022), with few focusing on its determinants, are mostly conducted in either India (Adhakha, et, al., 2022; Mushra, et, al., 2021), Ghana (Declaire, et, al., 2022; Immurana et, al., 2022; Trimmer et, al., 2022), Tanzania, Sara and Graham (2014), giving little attention on it socioeconomic determinants, identifying which would help policy makers in designing appropriate policies to cub the menace and it implication on the environment and the overall economic growth and sustainable development .

2.1 **Pollution Haven Hypothesis**

The Pollution Haven Hypothesis argues that regions with weak environmental regulations and limited infrastructure often become havens for environmentally harmful practices (Copeland & Taylor, 2004). In Nigeria, rural communities exemplify this hypothesis. The study's findings reveal that rural households are significantly more likely to practice open defecation compared to their urban counterparts. This outcome reflects the absence of adequate sanitation infrastructure, poor enforcement of environmental laws, and limited financial resources to construct toilets. Thus, rural Nigeria becomes a "haven" for unsanitary practices, reinforcing the Pollution Haven Hypothesis. The persistence of open defecation in these areas highlights how poverty and weak governance perpetuate environmental degradation and health risks (World Bank, 2020).



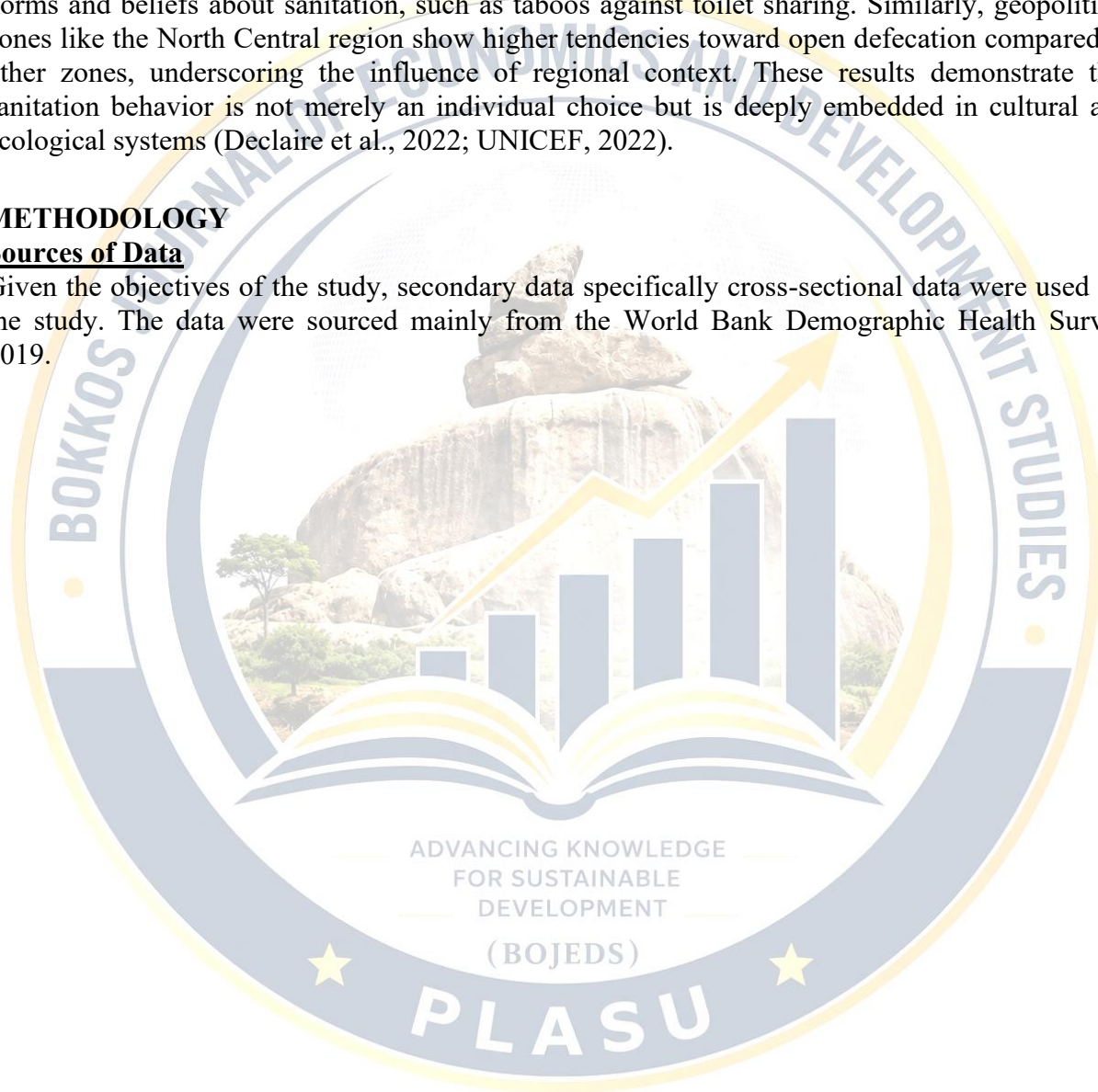
2.2 **Ecological Systems Theory**

Bronfenbrenner's Ecological Systems Theory emphasizes that individual behavior is shaped by multiple layers of environment, including family, community, culture, and policy (Bronfenbrenner, 1979). The findings on tribal and regional differences strongly support this theory. Hausa and Igbo households were significantly less likely to practice open defecation, while Yoruba households were more likely to engage in it. These variations reflect cultural norms and beliefs about sanitation, such as taboos against toilet sharing. Similarly, geopolitical zones like the North Central region show higher tendencies toward open defecation compared to other zones, underscoring the influence of regional context. These results demonstrate that sanitation behavior is not merely an individual choice but is deeply embedded in cultural and ecological systems (Declaire et al., 2022; UNICEF, 2022).

3.0 **METHODOLOGY**

3.1 **Sources of Data**

Given the objectives of the study, secondary data specifically cross-sectional data were used for the study. The data were sourced mainly from the World Bank Demographic Health Survey 2019.





3.2 **Model Specification**

Base on the literature review and the objective of the study, the structural form of the model is specified as in equation [1]

$$Opendifecation_i = F(Age_i, Agesqre_i, Hsize_i, Literacy_i, Rural_i, Hausa_i, Yoruba_i, Igbo_i, Geozone_i) \dots (1)$$

Equation [1] is transformed into econometrics form as in equation [2]

$$Opendifecation = \alpha_0 + \alpha_1 Age_i + \alpha_2 Agesqre_i + \alpha_3 Hsize_i + \alpha_4 Literacy_i + \alpha_5 Rural_i + \alpha_6 Hausa_i + \alpha_7 Yoruba_i + \alpha_8 Igbo_i + \alpha_9 Geozone_i + v_i \dots (2)$$

Where α_0 is the intercept, α_i is the slop parameters to be estimated V_i is the error term.

Given the characteristics of the data, especially the dependent variable, which is dummy in nature, the model is transformed in its binary form as in equation [3]

$$\text{Log} \left[\frac{\text{Pr}(Opendifecation)}{1 - \text{Pr}(Opendifecation)} \right] = \alpha_0 + \alpha_1 Age_i + \alpha_2 Agesqre_i + \alpha_3 Hsize_i + \alpha_4 Literacy_i + \alpha_5 Rural_i + \alpha_6 Hausa_i + \alpha_7 Yoruba_i + \alpha_8 Igbo_i + \alpha_9 Geozone_i + v_i \dots (3)$$

Where $pr(Opendifecation)$ is the probability of an individual practicing open defecation while $1 - pr(Opendifecation)$ is the probability of an individual not practicing Open defecation.

3.3 **Variable Measurement**

The study is aim at examining the socio-demographic determinants of Open defecation in Nigeria, to achieve the study objective, variables for the study are as follows:

- Open Defecation**: this is a dummy that takes the value of one if the household is practicing open defecation and zero if otherwise.
- Age**: this is the household head age in years.
- Agesqre**: this is the squire root of age of the head of household head, which measures the non-linearity of the age.
- Household Size (Hsize)**: this is the number of people in a household, measured in number.
- Literacy (0/1)** dummy that takes the value of one if the respondent completed elementary, secondary of tertiary education and zero if otherwise.
- Rural**: This is a dummy that takes the value of one if the household in the rural area and zero if otherwise.
- Hausa**: This is a dummy that take the value of one if the household Hausa language as a major language and zero if otherwise.
- Yoruba**: This is a dummy that take the value of one if the household Yoruba language as a major language and zero if otherwise.
- Igbo**: This is a dummy that take the value of one if the household Igbo language as a major language and zero if otherwise.



- j) ***Geopolitical zone (Geozone)***: This is the household geopolitical zone of habitat that is, North East (NE), North West (NW), North Central (NC), South East (SE), South West (SW) and South-South (SS), which are dummy that takes the value of one if the household live in either of the geopolitical zone and zero if otherwise.

3.4 **Method of Data Analysis**

To achieve objective of the study, the dependent variable (Open Defecation) that dummy, because of which the assumption of linear regression model of normal distribution, linearity and homogeneity have broken dawn. Logit regression was also chosen over Probit (normic regression) as an alternative logistic regression, because of the fact that its coefficient tends to be 1.6 to 1.8 times higher than that of the Probit and hence, have a higher Kourtosis (Flatter tails) that account for extreme values.

4.0 PRESENTATION OF RESULT

Base on the objectives of the study, the results of the determinants of open defecation is presented in table 1.

Table 1: Logit Regression Result of the determinants of Open Defecation in Nigeria.

	Open defecation	Marginal Effect
Age	-0.015248 (3.00)**	-0.00255 (0.000)**
Age square	0.00013 (2.56)*	0.0002 (0.000)*
Hsize	-0.01274 (3.22)**	-0.00213 (0.001)**
Literacy	-0.63886 (38.32)**	-0.10669 (0.003)**
Rural	0.55278 (36.68)**	0.09231 (0.002)**
Hausa	-0.39396 (20.62)**	-0.06579 (0.003)**
Yoruba	0.01772 (0.88)	0.00295 (0.003)
Igbo	-0.00166 (0.10)	-0.00028 (0.003)
NE	-0.70518 (35.07)**	-0.11776 (0.003)**
NW	-0.65429 (40.86)**	-0.10927 (0.003)**
SE	-0.13862 (7.98)**	-0.02315 (0.003)**
SS	-0.21125 (23.90)**	-0.03528 (0.001)**
SW	-0.06939	-0.01159



	(6.95)**	(0.002)**
_cons	0.325	
	(2.65)**	
N	41,821	

Source: Authors' Computation Using Nigeria 2019 DHS

Empirical result of the study as presented in Table 1 indicates that as age of the head of household increase by a year, the likelihood of open defecation practice significantly reduces by about 15.25 percent, this is confirmed by the marginal effect in model two, which shows that increase in age of the household head is significantly more likely to reduce the risk of open defecation practice by about 0.25 percent. This implies that in Nigeria, individuals who are in their productive age have low tendencies of defecating in an open space. However, as the age of household head increase beyond productive age (age square), as presented in Table 1, the risk of defecating in an open field significantly increase by about 0.013 percent, which is confirmed by its corresponding marginal effect in model two that reveal that as age of the household increase, the risk of open defecation significantly increases by 0.002 percent. This shows that older people prefer to empty their bowel in an open space due to the risk associated with using any form of toilet facilities due to old age. This is in line with the findings of Hadi, et, al., (2022); Declaire, et, al., (2022); Paul, et, al., (2022). This age-related pattern reflects the Ecological Systems Theory, which emphasizes how individual health perceptions and cultural norms interact with broader environmental contexts to shape sanitation behavior. Older individuals' reluctance to use toilets highlights the role of personal and cultural ecological layers in influencing open defecation practices.

Moreover, as the household size increases, as presented in Table 1 model one, the probability of open defecation significantly reduces by about 1.274 percent, this is confirmed by the coefficient of marginal effects in model two that shows that as the members of household increase, the likelihood of open defecation significantly decreases by about 0.213 percent. This implies that as the members of household increase, the risk of open defecation significantly falls because with the number of people in the household, they can collectively construct toilet for their personal use rather than defecating in an open space, especially when the number of infants is low in the household. This is in line with the findings of Hadi, et, al., (2022); Declaire, et, al., (2022); Paul, et, al., (2022). This outcome also supports the Ecological Systems Theory, as household composition and collective action within the microsystem reduce vulnerability to open defecation.

Households that are literate, as shown in Table 1 model one, are 63.886 percent significantly more likely to reduce the risk of open defecation. This is also evidenced in the coefficient of marginal effect in model two, which shows that literate households are significantly less likely to practice open defecation than illiterate households by about 10.669 percent. This implies that educated households are significantly less likely to practice open defecation than illiterate households in Nigeria, because literate households are more informed about the danger of defecating in an open field. This coincides with the findings of Declaire, et, al., (2022); Paul, et, al., (2022); Immurana et, al., (2022). Literacy here reflects the Ecological Systems Theory, as education provides awareness and reshapes cultural attitudes toward sanitation, embedding hygienic practices within broader ecological contexts.



Rural households, on the other hand, are 55.278 percent significantly more likely to practice open defecation than their urban counterparts as presented in Table 1 model one. This is evidenced in the coefficient of marginal effect in model two that reveals that households living in rural areas are 9.231 percent significantly more likely to practice open defecation than households living in urban areas. This is because of the availability of open space in rural areas and the absence of public conveniences, which are more often provided in urban areas by authorities and donor agencies. This corroborates with findings of Declaire, et, al., (2022); Paul, et, al., (2022); Immurana, et, al., (2022). This finding directly supports the Pollution Haven Hypothesis, which argues that regions with weak infrastructure and poor enforcement of sanitation laws become havens for environmentally harmful practices. Rural Nigeria, with its poverty and weak governance, exemplifies this hypothesis.

Being Hausa native, as presented in Table 1 model one, is 39.396 percent significantly less likely to practice open defecation in Nigeria. This is confirmed by the coefficient of marginal effect in model two that reveals that Hausa natives are 6.579 percent significantly less likely to practice open defecation. Similarly, being an Igbo native is 0.166 percent less likely to practice open defecation as presented in model one and confirmed by the coefficient of the marginal effect that reveals that Igbos are 0.028 percent less likely to risk practicing open defecation in Nigeria. However, being a Yoruba native is more likely to increase the probability of open defecation by 1.772 percent, confirmed by the coefficient of marginal effect, which reveals that Yorubas are 0.295 percent more likely to practice open defecation than Hausas and Igbos. This implies that tribe significantly influences household decision to practice open defecation due to cultural differences, as some cultures prohibit sharing of toilets. This is in line with the findings of Declaire, et, al., (2022); Paul, et, al., (2022). These tribal differences reflect the Ecological Systems Theory, which emphasizes how cultural norms and beliefs within ecological layers strongly influence sanitation behavior.

The geopolitical zone of habitat of the household, as presented in Table 1 model one, reveals that households living in the North East, North West, South East, South-South, and South West are significantly less likely to practice open defecation than households living in the North Central. This is confirmed by the coefficient of the marginal effect in model two that reveals that households residing in these zones are significantly less likely to practice open defecation. This implies that households of the North Central are more likely to practice open defecation than other geopolitical zones, mainly due to cultural reasons related to toilet sharing. This is in line with reports of UNICEF (2022); Ajoa et, al., (2022); Declaire, et, al., (2022); Paul, et, al., (2022). These regional disparities also reflect the Ecological Systems Theory, as sanitation behavior is shaped by regional ecological contexts such as cultural beliefs, infrastructure availability, and community norms. At the same time, the Pollution Haven Hypothesis explains why regions with weaker enforcement and poorer infrastructure, like the North Central, become more vulnerable to open defecation.

5.0 DISCUSSION OF FINDINGS

The findings of this study provide important insights into the socioeconomic determinants of open defecation in Nigeria. The results reveal that age, household size, literacy, rural residence, tribal affiliation, and geopolitical zone significantly influence household sanitation behaviour.



The analysis shows that households headed by individuals in their productive age are less likely to practice open defecation, while older household heads tend to revert to it. This reflects the **Ecological Systems Theory**, which emphasizes how individual health perceptions and cultural norms interact with broader environmental contexts. Older individuals perceive toilets as unsafe due to physical limitations, and cultural beliefs reinforce their preference for open defecation.

Household size was also found to reduce the likelihood of open defecation, as larger households can pool resources to construct toilets. This outcome supports the ecological perspective that family-level systems influence sanitation behavior, showing how collective action within the microsystem reduces vulnerability.

Literacy emerged as a strong determinant, with literate households significantly less likely to practice open defecation. This finding aligns with both the **Ecological Systems Theory** and **Human Capital Theory**, as education provides awareness of health risks and reshapes cultural attitudes toward sanitation. Literate households are embedded in systems that value hygiene, making them less likely to engage in open defecation.

Rural households were found to be more likely to practice open defecation compared to urban households. This directly supports the **Pollution Haven Hypothesis**, which argues that regions with weak infrastructure and poor enforcement of sanitation laws become havens for environmentally harmful practices. Rural Nigeria, with its poverty and weak governance, exemplifies this hypothesis. The ecological perspective complements this by showing how rural community norms and environmental contexts reinforce open defecation.

Tribal differences also play a role, with Hausa and Igbo households less likely to practice open defecation, while Yoruba households are more likely. This reflects the **Ecological Systems Theory**, as cultural norms and beliefs strongly influence sanitation behavior. For example, Yoruba cultural taboos against shared toilets increase open defecation practices, while Hausa and Igbo norms reduce them.

Finally, regional disparities were evident, with households in the North Central zone more likely to practice open defecation compared to other zones. This finding reflects both theories: the **Pollution Haven Hypothesis** explains why regions with weaker enforcement and poorer infrastructure become more vulnerable, while the **Ecological Systems Theory** highlights how regional ecological contexts—such as cultural beliefs, infrastructure availability, and community norms—shape sanitation behavior.

In summary, the findings demonstrate that open defecation in Nigeria is not driven by a single factor but by the interplay of **structural poverty, cultural norms, educational attainment, and ecological contexts**. The **Pollution Haven Hypothesis** explains the structural vulnerabilities in rural and poorly regulated regions, while the **Ecological Systems Theory** captures the cultural, household, and regional influences. Together, these theories provide a comprehensive framework for understanding and addressing open defecation in Nigeria.



6.0 CONCLUSION AND RECOMMENDATION

This study investigated the socioeconomic determinants of household decision to practice open defecation in Nigeria. It was established from the study that household who are at their productive age are significantly less likely to practice open defecation, however, as they attain their old age, their chances of emptying their bowel in an open space increase due to the risk of using toilet at their age. Household size, literacy, Hausa, Igbo, residing in the north-east, north-west, south-east, south-south and south-west are significantly more likely to reduce the probability of open defecation. However, living in a rural area and being a Yoruba native is more likely to increase the probability of open defecation in Nigeria. On the bases of the findings, the study recommends:

- 1) Provision of Subsidies for Rural Households: The Federal Ministry of Humanitarian Affairs and Poverty Alleviation, in collaboration with State Ministries of Rural Development and relevant NGOs, should provide targeted subsidies and incentives to rural households to encourage toilet ownership and construction.
- 2) Construction of Public Toilets in Strategic Locations: The Federal Ministry of Works and Housing, State Ministries of Environment, and Local Government Councils should construct and maintain public toilets in markets, schools, motor parks, and recreational centers, ensuring constant water supply for effective usage.
- 3) Expansion of Literacy and Sanitation Awareness Campaigns: The Federal Ministry of Education, the Universal Basic Education Commission (UBEC), and the National Orientation Agency (NOA) should expand literacy programs and integrate sanitation awareness campaigns into adult education and school curricula.
- 4) Implementation of Community-Led Sanitation Programmes: The National Environmental Standards and Regulations Enforcement Agency (NESREA), in partnership with Community Development Associations and Traditional Councils, should implement community-led total sanitation (CLTS) programs tailored to cultural contexts, addressing taboos and beliefs about toilet sharing.
- 5) Design of Age-Friendly Toilet Facilities: The Federal Ministry of Health, the National Primary Health Care Development Agency (NPHCDA), and State Ministries of Health should design age-friendly toilet facilities and provide support services for elderly populations to ensure safe and comfortable usage.
- 6) Legislation and Enforcement of Anti-Open Defecation Laws: The National Assembly, State Houses of Assembly, and NESREA should enact and enforce strict anti-open defecation laws, stipulating heavy penalties for offenders while simultaneously providing affordable alternatives such as subsidized toilet construction.
- 7) Integration of Sanitation into Poverty Reduction Programmes: The National Social Investment Program (NSIP), the Federal Ministry of Finance, Budget and National Planning, and development partners such as the World Bank and UNICEF should integrate sanitation infrastructure into poverty reduction and social protection programs, supporting households to pool resources for toilet construction.



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