PREVALENCE AND ELIMINATION OPTIONS FOR OPEN DEFECATION PRACTICE IN SOUTH- EAST NIGERIA

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Abstract
Open defecation remains a significant public health challenge to the overall well-being in Nigeria. This study explored the prevalence and elimination options for open defecation practice in South- East Nigeria. The study design adopted was mixed methods approach that combines quantitative surveys and qualitative interviews. The study was guided by two objectives, and was anchored on the theory of Planned Behaviour (TPB), developed by Icek Ajzen in 1985 and refined later in 1991 (Ajzen, 1991),as the frameworks of analysis. The version of mixed research design employed involved concurrent simultaneous collection of both quantitative and qualitative data. The general population of the study was 22,265,421 being the projected population of South-East Nigeria by 2022, while the target population was 1905 which was the population of six rural and urban communities of Ebonyi, Enugu and Imo states where open defecation is highly endemic in South-East, Nigeria. The multi stage sampling technique was used to select the respondents. The sample size for the quantitative component of the study was 1049 respondents' statistically derived using Taro Yamane formula. However, 21 participants were purposively selected and interviewed for the qualitative In-depth Interview (IDI) component. The qualitative data were analysed thematically. On the other hand, the quantitative data were analyzed with descriptive statistics such as simple frequency distribution tables, and simple percentages, while Mann-Whitney U statistical tool was run to determine if statistically, a significant difference exists in prevalence of open defecation between rural and urban dwellers. The result of the test shows that open defecation was statistically higher among rural dwellers (M = 550.47) than for the urban dwellers (M =407.17), U 70,627.00=, p = .001. This shows that open defecation are practiced more by persons residing in rural areas. Other findings show that the practice of open defecation is highly prevalent in South-East Nigeria due to ignorance, poverty and lack of adequate sanitation infrastructure. Children and young adults were found to engage more in open defecation in the rural areas and more women engage in the practice in urban slums/areas. The study recommended adequate provision of water and sanitation resources in all the south- East states of Nigeria. The need for poverty alleviation programme by the government to be stepped up in the area was also emphasized. Finally,

substantial awareness campaigns against open defecation should be vigorously mounted in the study area by both nongovernmental organizations and government.

Keywords: Open defecation practices, way forward, South-East Nigeria

Introduction

Open defecation remains a significant public health challenge globally, particularly in Sub-Saharan Africa where improved sanitation facilities are lacking in many households. This practice involves the disposal of human feces in fields, forests, water bodies, or other open spaces, often due to the absence of proper toilet facilities. The consequences of open defecation are severe, contributing to the spread of diseases and environmental contamination (UNICEF/WHO, 2015).

In Nigeria, open defecation is prevalent, especially in rural areas, making it one of the most endemic nations for this practice in Sub-Saharan Africa (UNICEF, 2018). The South-East region of Nigeria, comprising states like Ebonyi, Enugu, Abia, Anambra, and Imo, faces considerable challenges with open defecation. Despite efforts by various stakeholders and government initiatives since 2004 to eliminate open defecation through policies and pilot projects, the practice persists at alarming rates (Water Aid, 2011).

The prevalence rates vary across the states, with significant proportions of the population still resorting to defecating in bushes, fields, or near water sources due to cultural practices, economic constraints, and the perceived inconvenience or impurity associated with using enclosed latrines (Multi-Indicator Cluster Survey, 2011).

Despite these initiatives, the open defecation in South-Eat, Nigeria remains persistently prevalent.

While existing research addresses health and economic implications, there remains a significant gap in understanding the socio-cultural norms, beliefs, and community dynamics that sustain this detrimental practice. Such insights are crucial for developing targeted interventions that are sensitive to local contexts and capable of fostering sustainable behavior change.

This study thus provided evidence-based recommendations and strategies for effectively eliminating open defecation practices in South- East Nigeria, thereby improving public health outcomes, environmental sustainability, and overall quality of life for residents.

Study objectives

The specific objectives of this study are to:-

1. Investigate the prevalence of open defecation practice in South- East Nigeria
2. To compare propensity of open defecation practice between rural and urban dwellers
3. Identify the strategies to eliminate open defecation in South- East Nigeria.

Literature Review and Theoretical Framework

The prevalence of open defecation has significant variation in different parts of the world. In a study done by centre for Legislative Research and Advocacy, it was found out that 1.1 billion people practice open defecation (OD) worldwide, and out of which 626 million are Indians. This includes over half the population of India. Only 35 percent of households in India have access to improved toilets. It was revealed that 18 percent of urban India still defecates in the open while the percentage in rural India is as high as 69 percent. 1 in 3 women faces troubles in accessing safe toilet facilities (UNICEF 2013).

It has been revealed that open defecation has a great deal of relationship with education. This lent support to a recent findings' made in a study in Nigeria by Abubakar, (2017) on access to sanitation facilities among Nigerian households; determinants and sustainability implications with a sample size of 40,680 households, the result of the findings indicated heavy reliance on open defecation where the family heads are uneducated (13.9%), trailed in nearly equal percentage by those with secondary and primary education among the household heads. As expected, households in which the heads are educated beyond secondary education were the least to practice open defecation (2.1%). Of those who practiced open defecation, 93% of them were not educated beyond secondary school level. A probable explanation is that more-educated households are more informed regarding health and environmental threats of open defecation (Abubakar, 2017). The education level of the household head is important because decision about latrine adoption in Nigeria is made largely by household heads. So, the researcher established that the relationship between open defecation and education level of household head is higher among uneducated (13.88%) than those with education beyond secondary school level. It seems to affirm that household heads level of education has a great impact on open defecation practice. It is ideal to evaluate this among households' heads in South-east, Nigeria as well.

Furthermore, in South East Nigeria, multiple Indicator Cluster Survey (2011), reveals that about 49% households in Nigeria do not have sanitation facilities or use unimproved facilities. The survey also indicates that majority of the rural dwellers adopt the open defecation system because of the absence of improved sanitation facilities. In Ebonyi State for instance, over 45% of its citizens defecate in the bushes or open field close to water sources. Enugu State is the worst in the South East with over 48% of her citizens defecating in open spaces such as field and bushes. The remaining States in the South East according to the survey has it that, Abia is 1.2%, Anambra 14% and Imo State 15.8% respectively. Regrettably, the survey also shows that majority of Nigerians do not wash their hands after defecation or disposal of child faeces (Multiple Indicator Cluster cited in Ngene & Ekwe, 2016).

Countries like India have made provisions for designated sites for toilets, Routal et al (2015). In a study conducted in WA municipality, Ghana, it was established that to eliminate open defecation, the education of it must be compatible with local setting and cultural beliefs of the people. In addressing the problem of open defecation in the area,

the UN-WATER Deputy Secretary-General, affirmed during his address on the World Toilet-day in November 19 2014 that ending open defecation goes beyond infrastructure.

While education has often been found to be associated with improvements in sanitation and hygiene at household level, this analysis suggests that education may have been an important factor in defecation practice and intention to build a latrine/toilet facility among rural households of Tanzania (Waddington et al 2009). Future intervention and behaviour change communication geared towards redefining social norms were carried out in rural Tanzania on open defecation elimination owing to its health safety and privacy benefits. Also stressed was the issue of financial assistance in Tanzania (Ajzen 1985, Jenkins 2004 & Jenkins 2007). Shared sanitation prevalence is highest in African and South-East Asian regions. There are 13 countries many of which are in West Africa, where shared sanitation actually represents the predominant approach to open defecation elimination. While the shared sanitation facilities in most region meet Joint Monitoring Program (JMP) definition of 'improved' sanitation, less than half of those in Africa meet this definition and this is associated with risk of diarrhoea (Clasen et al, 2010, Norman et al 2010, Frick et al, 2011, Lim et al 2012 & Fuller et al 2014).

The present state of lack of quality and inadequate away from home toilets in an environment might have compelled 34 million Nigerians to practice open defecation "depositing about 1.7 million Tonnes of faeces into the environment annually" (WSP, 2012). Lack of such facilities at the right place and time contributes to dirty streets that are unsanitary, unpleasant and can spread infection (Greed, 2006). Part of the sanitation target of the Sustainable Development Goals is to eliminate open defecation (OD) by 2030, (United Nations General Assembly, 2015). Interestingly, some countries have done very well in reducing open defecation. For example, in rural Vietnam 45% of the population practiced open defecation in 1990, but in 2015, this was reduced to 1%, in Bangladesh the corresponding figures were 40 and 2% and in Mexico they were 51 and 4% (WHO/UNICEF 2015).

Theoretical Framework

The Theory of Planned Behaviour (TPB), developed by Icek Ajzen in 1985 and refined later in 1991 (Ajzen, 1991), provides a comprehensive framework for understanding human behaviour in relation to intentions, attitudes, subjective norms, and perceived behavioural control. At its core, TPB posits that behavioural intentions are the immediate antecedents of behaviour, influenced by three main factors: attitude toward the behaviour, subjective norms, and perceived behavioural control (Ajzen, 1991). The theory assumes that individuals are rational decision-makers who consider these factors when deciding whether to engage in a particular behaviour. According to Ajzen (1991), attitudes reflect an individual's positive or negative evaluation of performing a behaviour, subjective norms represent perceived social pressures to perform or not perform the behaviour, and perceived behavioural control refers to the perceived ease or difficulty of performing the behaviour under specific circumstances. These constructs collectively shape behavioural intentions, which in turn predict actual behaviour.

Scholars such as Armitage and Conner (2001) have expanded on TPB's applicability across various behaviours, highlighting its robustness in predicting behaviours ranging from health-related practices to environmental conservation efforts. Fishbein and Ajzen (2010) emphasize the theory's utility in health promotion interventions, arguing that understanding and influencing attitudes, norms, and perceived control are essential for designing effective behaviour change strategies. Furthermore, Hagger et al. (2002) have explored the theory's cross-cultural validity, suggesting that while TPB's constructs may manifest differently across cultures, its fundamental principles remain applicable globally. Madden et al. (1992) discuss TPB's integration with other behavioural theories, illustrating its adaptability and complementarity with models like social cognitive theory in shaping health behaviours. Ajzen and Madden (1986) have reinforced TPB's theoretical foundations, underscoring its capacity to explain behaviour across diverse contexts and populations.

Theory of Planned Behaviour help us to understand the prevalence of open defecation practice in South-East Nigeria by examining the behavioural determinants that influence individuals' decisions regarding sanitation practices. In this context, attitudes towards open defecation, shaped by cultural beliefs and perceived health risks, play a critical role. Subjective norms, including social pressures from peers, family, and community, also influence whether individuals continue or discontinue open defecation. Perceived behavioural control encompasses factors such as access to sanitation facilities, economic constraints, and environmental conditions that affect individuals' ability to adopt safer sanitation practices (Ajzen, 1991). Interventions based on TPB can target these determinants by promoting positive attitudes towards latrine use, fostering community norms that discourage open defecation, and improving access to sanitation infrastructure (Fishbein & Ajzen, 2010). For instance, health education campaigns can focus on altering perceptions of sanitation-related health risks and social norms,.

Methodology

The study used a mixed methods research design, incorporating both quantitative and qualitative approaches. The general population of the study was 22,265,421 being the projected population of South-East Nigeria by 2022, while the target population was 1905 which was the population of six rural and urban communities of Ebonyi, Enugu and Imo states where open defecation is highly endemic in South-East, Nigeria. The multi stage sampling technique was used to select the respondents. The sample size for the quantitative component of the study was 1049 respondents' statistically derived using Taro Yamane formula. However, 21 participants were purposively selected and interviewed for the qualitative In-depth Interview (IDI) component. The quantitative data were collected with structure questionnaire schedule processed with SPSS version 24 and analyzed with descriptive statistics such as simple frequency distribution tables, simple percentages as well as graphs and charts, while the stated hypotheses were tested with chi-square (X^2) statistic. The qualitative data were analysed thematically.

Results/Findings

Socio-Demographic Characteristics of the Respondents

The socio-demographic information of the respondents such as sex, age, educational attainment, marital status, place of residence, occupational, annual income, religious affiliation, were statistically analyzed, using the data obtained from the survey conducted. The information is presented in the table.

Questionnaire items 1 - 8 were used to analyze the socio-demographic characteristics of the respondents. The findings are presented in Table 1.

Table 1: Socio-Demographic Characteristic of the Respondents

Description	*Demographic Variables*	*Frequency*	*Percentage (%)*
Gender	Male	770	83.3
	Female	156	16.8
	Total	**926**	**100**
Age	18 – 22	148	11.1
	23 – 27	148	12.5
	28 – 32	75	8.1
	33 – 37	318	34.3
	38 - 42	155	16.7
	43 – 47	75	8.1
	48 – 52	77	8.3
	53 and Above	7	.8
	Total	**926**	**100**
Educational attainment	None	7	.8
	Vocational	88	9.5
	Primary	467	50.4
	Secondary	202	21.8
	Tertiary	162	17.5
	Total	**926**	**100**
Marital Status	Married	614	66.3
	Single/Never married	216	23.3
	Separated	7	.8
	Divorced	75	8.1
	Widowed	14	1.5
	Total	**926**	**100**
Place of Residence	Rural/riverine	563	60.7
	Urban/Slum	364	39.3
	Total	**926**	**100**
Occupation	Retired	14	1.5
	Farming/hunting/fishing	467	50.4
	Trading	61	6.6
	Paid employment	148	16.0
	Artisan	88	9,5
	Student	148	16.0

	Total	**926**	**100**
Annual Income	No income	229	24.7
	Below N300,000	102	11.0
	N300,000 – N500.000	588	63.5
	N600,000 – N800 – 000	7	,8
	N900,000 and Above	0	0
	Total	**926**	**100**
Religious Affiliation	Christianity	526	56.8
	Islam	0	0
	African Traditional Religion	400	43.2
	Total	**926**	**100**

Field survey: 2023

Table 1 shows the socio-demographic characteristics of the respondents. In the table it can be seen that 770(83.3%) were males while the rest were females. As for age the table shows that 318(34.4%) were 33-37 years of age; the table also shows that 467(50.4%) were primary school holders while 7(.8%) had no form of education. It can also be observed that 614(66.3%) were married while 7(.8%) were separated from marriage. In terms of place of residence, the study shows that 564(60.7%) reside in rural/riverine area the rest reside in the cities. This implies the population is mostly rural/riverine residents suggesting that some of the places considered urban does not actually qualify as urban centers. The table also shows that 467(50.4%) were farmers while 14(1.5%) were civil service retirees. It can also be observed that 588(63.5%) earned 300,000 to 500,000 annually, while none of the respondents earned up to a million naira in a year. The income data implies that a majority of the respondents are of average or below poverty level. Lastly, in terms of religious affiliation 526(56.8%) were Christians, while the rest of the respondents were traditional religious worshippers. This implies that a majority of the respondents are Christians as the Southeast regions is mostly populated by Christians of different denominations.

Prevalence of Open Defecation in South- East Nigeria

The findings are shown in tables 1, 2, 3,4 respectively.

Table2: Respondents opinion on whether open defecation is practiced in their communities

Variable	*Frequency*	*Percentage*
Yes	676	73.0
No	95	10.3
Don't Know	155	16.7
Total	**926**	**100.0**

Field survey: 2023

Table 2 shows that 676(73.0%) respondents confirmed that open defecation is practiced in their community, while 95(10.3%) did not confirm the practice of open defecation in

their community. The response on practice of open defecation can be attributed to the fact that a majority of the respondents reside in rural/riverine areas where the phenomenon of open defecation is endemic. The quantitative data corroborated with this qualitative data as the respondents stated thus;

The practice is very much in our community. Most people enter the bush, primary school or any form of enclosure they use it for defecation. Many people do it **(Male, Farmer, 48 years of Age, Rural residence).**

Another respondent corroborated the first assertion stating thus:-

> This your topic is a little funny open defecation… (that is those people that defecate anywhere anyhow). It happens. I think they do it in some of the public schools that are not fenced. You know everywhere here is like urban there are not much of bushes or streams, but around schools, Motor Parks and any open environment. My guess is they mostly do it at night or very early in the morning. **(Female, Retired Teacher, 72 years of Age, Urban residence)**

The study further interrogated the extent or frequency of open defecation in the study area. The responses are presented in table 2.

Table 3: Respondents opinion on the Prevalence of Open Defecation in their communities

Variable	*Frequency*	*Percentage*
Very High	212	31.4
High	112	16.6
Undecided	96	14.2
Low	161	23.8
Very Low	95	14.1
Total	**676**	**100**

Field survey: 2023

Table 3 shows that 212(31.4%) respondents said open defecation is very high in their community, while 95(14.1%) said it was very low. This response supports the earlier findings on the existence of open defecation in the study area. The qualitative data provided data are in agreement with data with the quantitative data.

A respondent stated as follows;

> Well for me many people are practicing it. Yes, go to the public schools or the bush paths you will see it. It is very prevalent. Well that of stream is not very much often again but that of bush path is very common **(Male, Student, 18 years of age, Rural residence)**

The study further sought to identify the age category of people that are mostly involved in open defection so as to understand the demographics of the phenomenon. The response is contained in table 7.

Table 4: Respondents view on the age group mostly involved in Open Defecation in their communities

Variable	*Frequency*	*Percentage*
1-10	363	53.7
11-20	68	10.1
21-30	224	33.1
31-40	14	2.1
41 and above	7	1.0
Total	**676**	**100**

Field survey: 2023

Table 4 shows that 363(53.3%) respondents said that children under 1-10years and young adults between 21-30years are mostly involved in open defecation practice. while 7(1.0%) said it is people between the ages of 41 years and above. The age category mostly involved is persons who perhaps do not have their own personal accommodations and, in the urban areas may not have enough resources to rent accommodations with modern toilet facilities.

Comparative Analysis of Open Defecation Practice between Rural and Urban Dwellers

Table 5: Mann-Whitney U test showing the difference in prevalence of open defecation between rural dwellers and urban residential area respectively.

Ranks			
	Residence	N	Mean Rank
Prevalence of Open defecation	Rural dwellers	562	550.47
	Urban dwellers	364	407.17
	Total	926	
Test Statistics			
Mann-Whitney U	70,627.00		
Asymp. Sig. (2-tailed)	.001		

Mann-Whitney U statistical tool was run to determine if statistically, a significant difference exists in prevalence of open defecation between rural and urban dwellers. The result of the test shows that open defecation was statistically higher among rural dwellers (*M* = 550.47) than for the urban dwellers (*M* =407.17), *U* 70,627.00=, *p* = .001. This shows that open defecation is practiced more by persons residing in rural areas. This could be as a result of the many open spaces, bushes empty spaces and farmlands that abound in the rural areas

Strategies to Eliminate Open Defecation in South- East Nigeria

First, the respondents were asked if there are ways by which open defecation can be eliminated. The responses are shown in table 5.

Table 6: Respondents view on Availability of Processes to Reduce Open Defecation

Variable	*Frequency*	*Percentage*
Yes	905	97.7
No	14	1.5
Don't Know	7	.8
Total	**926**	**100**

Field survey: 2023

Table 6 shows that 905(97.7%) said yes, there were ways to eliminate or stop open defecation within the study area while (7%) said they don't know. The quantitative data corroborated with the qualitative data as the respondents affirmed the responses on the quantitative data. For example, a respondent stated thus…

> Yes, a lot of awareness are being created by the health workers from the local government councils and the practice can be reduced (**Female, Retired Teacher, 74 years of Age, Rural resident).**

Another respondent stated thus

> Yes, it can be reduced drastically due to efforts by the government and the community youths who decided to sanction anyone that is caught doing so (**Male, Retiree, 78 years of Age, Rural resident**).

The respondents were further asked to identify ways by which open defecation can be eliminated. The responses are presented in table 6.

Table 6: Respondents views on ways by which Open defecation could be eliminated

Variable	*Frequency*	*Percentage*
Provision of Adequate Water Supply	615	66.4
Adequate Public Health Sensitization on Human excreta	68	7.3
Provision of Free or Low-Cost Toilet Facilities by the Government	236	25.5
Intervention and Behaviour Change Communication	7	.8
Total	**926**	**100**

Field survey: 2023

Table 6 shows that 615(66.4%) said it is through the provision of adequate water supply in houses while (7%) said intervention and behavior change communication. Perhaps some of the respondents do have toilet facilities within their residential area however due to lack of water they tend to use open defecation.

Another IDI further suggested strategies for the elimination of open defecation as follows:-

> The way forward for the elimination of open defecation in Nigeria should involve a multifaceted approach including public awareness campaigns, investment in sanitation facilities, enforcement regulations, and collaboration between government, non-governmental organisations and local communities…. by addressing the root causes and prioritizing implementation of effective inclusive solutions, Nigeria can make significant strides towards eradicating open defecation hereby improving public health, contributing to socio-economic development and more sustainable citizens future (**Male, Civil Servant 58 years , Urban resident**)

Discussions

The study investigated Open Defecation Practice in South- East Nigeria: Way Forward for Elimination. With respect to the first specific objective of how prevalent open defecation is within the study area, the respondents acknowledged that open defecation were practiced in their communities. The qualitative findings supported the quantitative data as well.

Although the qualitative data provided more insights as the respondents clarified that open defecation was highly prevalent in the study area prior to the period of the study, it however tend to be gradually reducing due to public health awareness and intervention programs. This finding is slightly in disagreement with the findings of UNICEF (2013) in India where it was reported that open defecation is still as high as 65% as 1 in 3 women were still confronted with difficulties in accessing safe toilet facilities.

This study also found that children and young adults between the ages of 21 – 30 are mostly engaged in open defecation in Southeast Nigeria. The study found a strong association between open defecation and water borne diseases. Some diseases such as dysentery, diarrhea and cholera were found to be associated with open defecation in south east, Nigeria.

With regards to the way forward for the elimination of open defecation in Southeast, Nigeria, the respondents overwhelmingly agreed that there are ways by which open defection can be eliminated, meaning that the practice is controllable. The respondents suggested that adequate supply of water within households and increased regular environmental sanitation will help in eradicating open defecation. These suggestions are in agreement report by Nigerian Federal Ministry of Health (2015) stated that its National Task force on sanitation in conjunction with States and Local Government Public Health Officers are providing interventions through policies, programs and projects that does not only create awareness on public sanitation but also enforces violators of the environment. The qualitative data also provided strategies and insightful way forward for the elimination of open defecation in South-East, Nigeria involving a multifaceted approach such as public awareness campaigns, investment in sanitation facilities,

enforcement regulations, and collaboration between government, non-governmental organisations and local communities for the improvement of public health and to sustainable socio-economic development in South-East in particular and in Nigeria at large..

Conclusion

This study investigated the multifaceted nature of open defecation, identifying critical barriers to its elimination and proposing comprehensive strategies to address these challenges. The findings show that successful elimination of open defecation requires multi-pronged approach. This includes increased investment in sanitation infrastructure, particularly in rural areas where the practice is most prevalent. Enhancing community engagement and education on the health risks associated with open defecation. Moreover, strengthening policy frameworks and ensuring effective implementation of existing regulations are vital to sustain progress.

To achieve the goal of eliminating open defecation by 2030 as outlined in the Sustainable Development Goals(SDGs). Nigeria must prioritize sanitation in its national agenda. This involves not only increasing budget allocations but also fostering partnership with international organisations, private sectors, and non-governmental organisations. Collaboration across these sectors can mobilize resources, share best practices, and ensure accountability

Thus while the challenge of eradicating open defecation in Nigeria is daunting. It is achievable through sustainable commitment, innovative approaches, and collective action. By addressing the root causes and implementing targeted interventions, Nigeria can make significant strides towards creating a healthier and more dignified living environment for all its citizens,

Recommendations

Based on the findings in this study, the following recommendations are hereby put forward:

1. Increase Investment in Sanitation Infrastructure and government funding: Nigerian government should significantly increase budget allocations for sanitation infrastructure, especially in rural and underserved urban areas.
2. Health Education Campaigns: The government should mount vigorous nationwide health education campaigns to raise awareness about the dangers of open defecation and the benefits of proper sanitation
3. Integrate Sanitization with Water Supply and Hygiene: The government should integrate sanitation programs with adequate water supply and hygiene initiatives to create a holistic approach to public health Access to clean water and hygiene education is crucial for sustaining sanitation improvements..
4. Local Government and Community Engagement: Engagement of local governments and community leaders in planning and implementing initiatives is critical to ensuring the relevance and sustainability of the interventions.

References

Abubakar I. (2017). *Access to Sanitation Facilities among Nigeria Households: Determinants and Sustainability Implications*. Sustainability, 9(4), 547

, I. (1985). From Intentions to actions: A theory of planned behavior New York Ny USA.

, I. (1991). The theory of planned behaviour. Organizational Behaviour and Human Decision Processes, 50(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. British Journal of Social Psychology, 40(4), 471-499. https://doi.org/10.1348/014466601164939

Evers C. B. (2008). Relationships between Recreation and Pollution When Striving for Wellbeing in Blue Spaces. *Int. J. Environ. Res. Public Health* 2022, *19*(7), 4170;

Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behaviour in physical activity: Predictive validity and the contribution of additional variables. Journal of Sport and Exercise Psychology, 24(1), 3-32. https://doi.org/10.1123/jsep.24.1.3

Kertens, S. M., Hutton, G., Indra, F., Grietje, Z, (2016), An Integrated Approach to Evaluate Benefits and Costs of Wastewater and Solid Waste Management to Improve the Living Environment: The Citarum River in West Java, Indonesia. *Journal of Environmental Protection 7(11):1439-1465*

Multiple Indicatory Cluster Survey (2008). Situation of Open Defecation in States and FCT

O'Reilly, K., & Budds, J. (2023). Sanitation citizenship: state expectations and community practices of shared toilet use and maintenance in urban India. Environment and Urbanization, 35(1), 238-254. https://doi.org/10.1177/09562478221148027

Okafor, A. C. and Nwuede, G. O. (2016). Urban Solid Waste Management And Environmental Sustainability In Abakaliki Urban, Nigeria. European Scientific Journal 12(23):155

Owolabi, R and Adebowale O (2017). Health Information Management Personnel Service Quality and Patient Satisfaction in Nigerian Tertiary Hospitals. Global Journal of Health Science 9(10)

Tiwani. A., and Sadhana, C. (2016). Assessment of Ambient Air Quality in the Vicinity of Cement Industries. International Journal of Applied Research and Technology 1(1): 39-46

Unicef (2015). Child Feaces Disposal in Nigeria 2015 International Bank for Reconstruction and Development/The World Bank and Unicef.

Valicer B. N. (1977).Regional sources of pollution aerosol at Barrow, Alaska during winter 1979–1980 as deduced from elemental tracers, Atmospheric Environment (19)12: 2011-2024,

Water Aid India (2008). Feeling the Pulse: A study of the Total Sanitation Campaign in five states, Water Aid India New Delhi.