



## ENVIRONMENTAL HEALTH COMMUNICATION AND ATTITUDE CHANGE ON OPEN DEFECACTION AMONG THE UKELLE RESIDENTS IN YALA LGA, CROSS RIVER STATE

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### Abstract

The issue of environmental health has become a major concern in Cross River State generally and Ukelle, Yala LGA, in particular, due to increasing recurrent cases of open defecation practice which has contributed to widespread incidences of waterborne diseases such as cholera and diarrhoea. Though some households have access to proper toilet facilities, including water closets and pit toilets, many still prefer open defecation. This study, therefore, examined the level of awareness of the danger of open defecation among Ukelle residents, and the key communication strategies capable of reducing open defecation. The study adopted the mixed methods research approach using both quantitative and qualitative data, with questionnaire distributed to 286 respondents determined from a population of 1000 persons through Slovin formula, while five health workers and three community members were interviewed. The study used convenience sampling method to administer 286 copies of questionnaire to the respondents. The Health Belief Model and Diffusion of Innovation Theory anchored the study. Findings of the study revealed that majority of the Ukelle residents are not aware of the dangers of open defecation due to poor environmental health communication messages. The study recommended that the Primary Healthcare Agency, State Ministry of Health, the media, and other stakeholders should engage in an aggressive sensitisation on the dangers of open defecation.

**Keywords:** Environmental health communication, attitude change, open defecation, Ukelle residents

### Introduction

Open defecation, the practice of defecating in open spaces, has been a persistent issue, particularly in rural areas (Chawla, 2024); and has continued to be one of the serious public health challenges globally, especially in areas with inadequate toilet facilities. This means it is a significant public health issue that impacts both developed and developing countries (Inah et al., 2025). It has assumed the status of a pandemic in view of its menacing public health threat (Bappa et al., 2025), which calls for immediate attention (Astuti et al., 2021). Open defecation practices in most rural communities, pose critical risks to public health, environmental sustainability, and human dignity.

According to the World Health Organisation, WHO (2020), the discovery of infectious diseases and a growing understanding of public health and human dignity have led to global efforts to mitigate open defecation, with sanitation becoming a critical focus. Ufomba et al. (2021) observe that the discoveries made in 2018 proved that many parts of Nigeria struggled with high levels of waterborne diseases resulting from poor sanitation practices, especially open defecation. In rural communities where a large population faces poverty, ignorance and constrained governmental resources, eliminating open defecation presents a significant challenge. The persistence of open defecation in Ukelle is not only a matter of infrastructure deficit, it is also that of behavioural and cultural dynamics. Vulnerable groups, particularly women, the

elderly and children, bear the brunt of the adverse effects of open defecation (Chawla, 2024). This has been linked to increased risks of waterborne diseases and safety concerns for women (Coffey et al., 2017).

According to Ufomba et al. (2021), Nigeria is among the highest ranked nations in the world with a significant proportion of the population engaging in the practice of open defecation. According to UNICEF (2023), sanitation requires more than mere provision of toilets. This therefore, suggests that behaviours, facilities, and services jointly provide the hygienic environment people need to fight infectious diseases and live healthy. Addressing the issue of open defecation requires not just technological solutions like water closet toilets, but also the behavioural change of the residents. This study, therefore, aims to examine the level of awareness of the dangers of open defecation among Ukelle residents, and the key communication strategies capable of reducing open defecation.

### **Statement of the Problem**

Open defecation in rural communities across Nigeria is still on an alarming rate. The practice, among some Ukelle residents, is one of the habits that most individuals exhibit as a result of imitating the behaviour of other people around them. Though most residents look at open defecation as a normal lifestyle, they forget the resultant health implications. To some, the practice is preferable due to its open nature and open-air comfort it affords them.

The problem which this study seeks to unravel is that despite consistent efforts by government and other international agencies to end open defecation in rural communities, the practice still persists, leading to such concerns as to how this health problem can be completely eradicated among the Ukelle residents to gain their pride and human dignity, maintain the environmental sustainability in the area, and eliminate all health risks associated with it.

### **Objectives of the Study**

Generally, the study focuses on environmental health communication and attitude change on open defecation among the Ukelle residents in Yala LGA, Cross River State. Specifically, the objectives are:

1. To examine the level of awareness of the dangers of open defecation among the Ukelle, residents in Yala LGA.
2. To identify key communication strategies capable of reducing open defecation practice among the Ukelle residents in Yala LGA.

### **Literature Review**

#### **Open Defecation and Sanitation Practices**

Open defecation is the human act of passing out faeces in open spaces rather than using designated toilet facilities. Such open areas include fields, garbage bins, waterways, ditches, bushes, forests, culverts, or any other open areas or green spaces, without any appropriate method of disposal (Inah et al., 2025; Bassey, 2025; Obianagwa et al., 2022). This can be harmful to human health and survival chances (Gayawan et al., 2022). Individuals engaging in this practice do so either due to the unavailability of proper sanitation facilities or deeply rooted traditional beliefs, even when toilets are accessible (Bassey, 2025). People involved in open defecation are defined as the percentage of the population who do not use any form of toilet for defecation (Gayawan et al., 2022). This can occur deliberately due to unwholesome cultural practices, superstitions, and personal unhygienic behaviours. It could also be as a result of unavailability or lack of access to modern toilet facilities (Ngwu, 2017).

According to Bealy et al. (2022), approximately 494 million people worldwide still engage in open defecation. Notably, 92% of these individuals reside in rural areas, primarily within developing countries. The health implications of open defecation are severe, contributing to the spread of communicable diseases such as cholera, diarrhoea, dysentery, hepatitis A, typhoid, and polio, thereby fostering conditions for neglected tropical diseases, including intestinal worms, schistosomiasis, and trachoma, which further exacerbate malnutrition, particularly in low-income nations (Bassey, 2025). Besides the substantial health threat which open defecation poses to human well-being and environmental health, it is an affront to human privacy, dignity and safety, especially for children, girls, and women (Gayawan et al., 2022). According to Bassey (2025), Nigeria ranks among the top nations with the highest number of people practising open defecation, with an estimated 47 million individuals still involved in the practice, which has affected our sanitation practices as a country. According to Gayawan et al. (2022), the improper disposal of human waste has exposed not less than 10% of the world's population to feeding on food crops irrigated by contaminated water supply, thereby exposing people to higher occurrence and transmission of human-faecal related diseases like diarrhoea, cholera, typhoid, dysentery, hepatitis A, severe child stunting, and eventual higher death incidence.

### **Environmental Health Communication, Open Defecation and Attitude Change**

Effective environmental health communication requires more than information dissemination. It requires a pragmatic approach and attitudinal change among individuals living within the environment. The effectiveness of health communication depends on the ability to reach diverse populations with accurate, engaging, and actionable messages (Ezeaka & Bartholomew, 2025). Communication can be a game-changer in a number of important areas by utilising communication tools and approaches effectively (Ezeaka & Ochuba, 2024). Effective environmental health communication strategies such as public health campaigns, community outreach programmes, and digital health interventions can significantly influence sanitation practices (Ezeaka & Bartholomew, 2025). This suggests that environmental health communication is essentially about disseminating knowledgeable information on the sustainability of the environment and the wellbeing of the people living within the environment. Therefore, environmental health comprises aspects of human health including quality of life, that are determined by physical, chemical, biological, social and psychological factors in the environment. It also comprises diverse areas including water management, environmental management, infectious disease control and health education (Ihekwoaba & Elijah, 2021). Open defecation is a serious environmental and/or public health threat to human health especially for children under five years (Inah et al., 2023), this is a principal threat to public health in many ways especially in rural settings.

The practice of open defecation is a public health menace capable of resulting in the outbreak of serious environmental health complications and communicable diseases like cholera, typhoid, diarrhoea, intestinal infections, respiratory diseases and tuberculosis in both rural and urban centres (Bwakan, 2021). It is the main factor that spurs much contamination of the environment, water resources, and in turn, increase the risks of waterborne and water related diseases that affect environmental health (Abdullahi et al., 2023). The adverse environment health effect of open defecation is infectious excreta-related intestinal disease, of which diarrhoea diseases are the most common (Mara, 2017). Ending open defecation would be an important environmental/public health intervention and success to healthy living (Inah et al., 2023).

The practice of open defecation has various environmental health consequences, especially in rural areas where there is limited access to proper sanitary facilities. This is in line with Inah et al. (2025) who posits that open defecation leads to the contamination of water and food with faecal matter, as it enters drinking water sources through runoff and attracts pests and rodents that spread harmful pathogens into food. Open defecation can be linked to the spread of several diseases and health conditions, impacting the well-being of individuals, particularly children and women, and environmental contamination (Ekhonoragbon, 2024; Inah et al., 2025).

Eradicating open defecation requires serious behavioural and attitudinal change campaign against the ugly trend (Bwakan, 2021). Bwakan (2021) further argues that in the ancient era, there were more open spaces and less population pressure on the environment and as such open defecation then caused little or no harm to human health, but with the increase in population and urbanisation, open defecation is now a serious health challenge globally, thus, causing serious environmental health issues that require attitudinal change among the people.

Behaviour Change Communication (BCC) is an important way of addressing the prevalence of open defecation in rural areas in Nigeria. In some rural areas, open defecation is deeply ingrained in the cultures and beliefs of the people, and there is also a lack of awareness of the health hazards it poses (Ekhogbon, 2024). Social and behaviour change communication (SBCC) is a modern communication initiative used to proffer solutions to the myriads of developments and environmental health issues facing the world, especially issues with behavioural and attitudinal change (Ngwu, 2017). One of the objectives of behavioural change communication is to create awareness about the environmental health hazards that open defecation causes, since it appears that many people are unaware of the dangers of open defecation in their society. The main thrust of social and behavioural change communication on open defecation is to change human behaviours, particularly bad behaviours, with a view to bringing about transformation in the ecological system through human nature (Bwakan, 2021). Therefore, development and health communication experts need to engage communities, individuals and organisations with attitudinal change campaign on the need to embrace the appropriate and acceptable behaviours in the society so that everybody will be happy with the environment they live in.

## **Theoretical Framework**

This study was anchored on the tenets of the Health Belief Model and the Diffusion of Innovation Theory.

### **Health Belief Model**

The Health Belief Model was first developed in the 1950s by social psychologists, Hochbaum, Rosenstock and Kegels, working in the U.S. Public Health Services. It is a psychological model that attempts to explain and predict health behaviours (Ogbuoshi, 2020). This is done by focusing on the attitudes and beliefs of individuals' preventive health actions. The three broad areas identified by Conner and Norman (1996) in Ogbuoshi (2020) are: (1) preventive health behaviours, which include health-promotion and health-risk behaviours as well as vaccination practices; (2) sick role behaviours, which have to be in compliance with recommended medical regimens, usually following professional diagnosis of illness; and (3) clinic use, which includes physician visits for a variety of reasons. It addresses factors that explain why and when messages and self-motivated efforts are more or less likely to lead to attitude formation.

Consequently, drawing inferences from this model as it relates to the study, the Ukelle residents would benefit because a preventive health behaviour, which includes health-promotion and change in health-risk behaviours, would guide them to have a change of attitude towards open defecation that would promote a healthy lifestyle among them.

### **The Diffusion of Innovation Theory**

The study was also anchored on the Diffusion of Innovation Theory. This theory was propounded by Bryce Ryan and Neil Gross of Iowa State University in 1943 and 1960. The theory traces the process by which a new idea or practice is communicated through a certain channel over time among members of a social system (Ogbuoshi, 2020). Diffusion research centres on the conditions which increase or decrease the likelihood that a new idea, product or practice will be adopted by members of a given culture. Diffusion is

the process by which an innovation is assimilated and accepted through certain channels over a period of time among the members of a social system (Ogbuoshi, 2020; Asemah et al., 2022).

According to Ogbuoshi (2020), for a new idea or innovation to be diffused, there must be awareness stage, interest stage, evaluation stage, trial stage and adoption stage. Adoption means that a person does something differently from what they did previously; purchase or use a new product, acquire and perform a new behaviour (Asemah et al., 2022).

Accordingly, the theory is considered relevant to this study because it points to whether the Ukelle residents have embraced the new idea and practice of using modern toilet facilities to defecate as against the open defecation practices commonly known by the community members.

## Methodology

This study adopted both quantitative and qualitative research methods. The study adopted mixed-method with questionnaire and in-depth interview as instruments of data collection. The methods as adopted in this study, is to allow access to the population under investigation. The research design explores how environmental health communication, and attitude change among the Ukelle residents can help end open defecation in the community. The population of the study comprised the Ukelle residents, totaling 1000 from which the sample size of 286 was drawn, using Slovin formula because there was no known population figure for the Ukelle people. Also, five health workers and three community members were interviewed. A convenience sampling technique was used to administer copies of questionnaire to the respondents. Consequently, the data used descriptive statistical method of frequency distribution on frequency tables, the statistical information obtained was analysed in a four-point Likert format and scaled as: SA (4); A (3); D (2); and SD (1), and weighted mean for the analysis.

## Data Analysis and Results

The data used in this study to achieve the results were the 8-item closed-ended questionnaire designed to address the basic research questions, and interview with five health workers, and three community members. A total of 286 copies of the questionnaire were administered but 270 copies were filled correctly and returned.

**Table 1: The level of awareness of the dangers of open defecation among the Ukelle Residents**

S/N	Statement	SA	A	D	SD	Total	Weighted Mean	Decision
1	Open defecation cause illnesses such as diarrhoea, typhoid and cholera	41	63	120	46	270	2.3	Rejected
2	Open defecation poses high risk to children's health and can lead to high mortality rates among children	48	59	127	36	270	2.4	Rejected
3	Open defecation can bring flies and bad odour that affects human health	68	120	45	37	270	2.8	Accepted
4	Open defecation can pollute drinking water sources like streams, lake, springs and rivers	51	48	129	42	270	2.4	Rejected

Weighted Mean = 2.4

Decision Rule = Rejected

Source: Field Survey, 2025

**Decision Rule:** *If the calculated mean is equal or greater than the criterion Mean (2.5), then the decision is accepted but if the calculated mean is lower than the criterion mean (2.5), the decision is rejected.*

Research question one sought to know the level of awareness of the dangers of open defecation among the Ukelle residents in Yala LGA. From the analysis, majority of the respondents rejected that open defecation can cause illnesses such as diarrhoea, typhoid and cholera. Further investigation revealed that the residents are not aware that open defecation poses high risk to children’s health and can lead to high mortality rates among children, however, a good number of them accepted that open defecation can breed flies and bring bad odour that affects human health. The respondents also disagreed that open defecation can pollute drinking water sources like streams, lake, springs and rivers. The decision is rejected because the weighted mean of 2.4 is less than the criterion mean of 2.5. This is because majority of the respondents are not aware that open defecation can cause health-related problems, thus, only insignificant numbers are aware. This therefore, calls for serious concern from all stakeholders.

**Table 2: Key communication strategies capable of reducing open defecation practice among the Ukelle Residents**

S/N	Statement	SA	A	D	SD	Total	Weighted Mean	Decision
1	Dissemination of health communication messages through town criers would help reduce open defecation	77	143	37	13	270	3	Accepted
2	Organising community meetings on the dangers of open defecation and proper waste disposal would reduce the practice	64	142	49	15	270	2.9	Accepted
3	Organising open campaigns against open defecation practice would help reduce the menace	71	129	52	18	270	2.9	Accepted
4	Organising dramas in a community town hall on the dangers of open defecation would help reduce the practice	62	131	54	23	270	2.8	Accepted

Weighted Mean = 2.9

Decision Rule = Accepted

**Source:** Field Survey, 2025

**Decision Rule:** *If the calculated mean is equal or greater than the criterion Mean (2.5), then the decision is accepted but if the calculated mean is lower than the criterion mean (2.5), the decision is rejected.*

Research question two sought to know the key communication strategies capable of reducing open defecation practice among the Ukelle residents in Yala LGA. In the table above, residents accepted that dissemination of health communication messages through town criers would help reduce open defecation. Further investigation revealed that organizing community meetings on the dangers of open defecation and proper waste disposal would reduce the practice, organising campaigns against open defecation practice would help reduce the menace, and organising dramas in a community town hall on the dangers of open defecation would help reduce the practice. Therefore, the weighted mean of 2.9 above the average implies that, the decision rule is accepted that the key communication strategies like dissemination of health communication messages through town criers, community meetings, organizing campaign, and dramas on the dangers of open defecation is capable of reducing the practices.

## Discussion of Findings

Concerning the level of awareness of the dangers of open defecation among the Ukelle residents in Yala LGA, respondents rejected that open defecation cause illnesses such as diarrhoea, typhoid and cholera. The study further revealed that the residents are not aware that open defecation poses high risk to children's health and can lead to child mortality. The analysis also revealed that open defecation can breed flies and bring bad odour that affects human health, but majority of the respondents disagreed that open defecation can pollute drinking water sources like streams, lake, springs and rivers.

Consequently, this high agreement implies that the Ukelle residents in Yala LGA of Cross River State are not aware of the dangers of open defecation on the health of the people, this therefore, calls for attitude change and awareness creation among the Ukelle residents to embrace the system of using their toilets. This implies that there is still lack of knowledge on how open defecation can negatively affect their health and the environment. However, majority of the interviewees who are health workers asserts that the residents might not be aware of the dangers of open defecation due to ignorance, poverty and limited information. Also, one of the interviewees stated that it is as a result of ignorance that most of the residents indulge in open defecation practice because they may have limited knowledge of the negative health implications on their health and environment they lived in. Therefore, this behoves the relevant authorities like Primary Healthcare Agency, State Ministry of Health, the media, and other stakeholders to engage the community members on health education and aggressive sensitisation on the dangers of open defecation to their health and environment. This is in line with the view of Astuti et al. (2021) who agrees that open defecation practices in most rural communities pose critical risks to public health challenges, environmental sustainability, and human dignity within the society. The positions are in line with the diffusion of innovation theory which emphasises that, for a new idea or innovation to diffuse, there must be awareness stage, interest stage, evaluation stage, trial stage and adoption stage.

As regards key communication strategies capable of reducing open defecation practice, residents acknowledged that dissemination of health communication messages through town criers, and organizing community meetings on the dangers of open defecation and proper waste disposal would reduce the practice. Also, respondents admitted that organising campaigns against open defecation practice would help reduce the menace. Further findings revealed that residents accepted that organising dramas in a community town hall on the dangers of open defecation would help reduce the practice.

Consequently, the high agreement reveals that these health communication strategies are capable of reducing open defecation practice when adopted in Ukelle community. This strong acceptability implies that stakeholders should employ these health communication tips to support the reduction of open defecation. Accordingly, interviewees asserted that organizing community programmes, sensitisation campaign on the dangers of open defecation, health tips during clinic visits by nursing mothers would help reduce open defecation. One of the interviewees also asserted that organising dramas in community town hall is capable of reducing open defecation among the residents. This is in conformity with Ezeaka and Ochuba (2024) who asserted that communication can be a game-changer in a number of important areas by utilising communication tools and approaches effectively. This is in line with the health belief model which emphasizes on preventive health behaviours, that include health-promotion and health-risk behaviours practices.

## Conclusion

The study examined the environmental health communication and attitude change on open defecation, with a particular focus on the Ukelle residents in Yala LGA of Cross River State. The study highlighted some key communication strategies capable of reducing open defecation practice among the Ukelle residents to include dissemination of health communication messages through town criers, organizing community

meetings on the dangers of open defecation and proper waste disposal, and organising campaigns against open defecation practices that would reduce open defecation in the area. This, therefore, behoves the residents of Ukelle and Yala stakeholders to key into these communication tips and carry out aggressive campaigns to end the ugly trend. It was also observed that majority of the Ukelle residents are not aware of the dangers of open defecation. This underscores the need for adequate sensitisation of the residents. The study concludes that despite various interventions and efforts by government and international organisations to end open defecation, the practice still persists because of poverty, ignorance, and lack of adequate information.

## Recommendations

In view of the foregoing, the study recommends that:

1. The Cross River State Ministries of Health and Environment should carry out sensitisation, advocacy, and awareness campaigns on the dangers of open defecation on the health of the populace and proper waste disposal in communities.
2. Adequate sensitisation and campaigns should be carried out by relevant stakeholders like the State Primary Healthcare Agency, State Ministry of Health, and the media through different communication approaches to help reduce open defecation.

## REFERENCES

- Abdullahi, M., Sarkingobir, Y., & Yabo, A. G. (2023). Open defecation practices in rural areas threat public health: An assessment of selected area in Sokoto, Nigeria. *Journal of International Environmental Application and Science*, 18(2), 1-8.
- Asemah, E. S., Nwammuo, A. N., & Nkwam-Uwaoma, A. O. (2022). *Theories and models of communication (2<sup>nd</sup> Ed)*. University of Jos Press.
- Astuti, N. Y., Kasmini, O. W. & Indriyanti, D. R. (2021). The effectiveness of KATAJAGA health education on the changes of knowledge, attitudes, and behaviour of defecation of community in TambakromoBojonegoro. *Public Health Perspectives Journal*, 6 (2), 159-164. <http://journal.unnes.ac.id/sju/index.php/phpj>.
- Bappa, M., Akowe, J. & Omeje, T. E. (2025). The role of interagency collaboration in the control of open defecation in Kogi State. *Journal of Public Administration and Social Welfare Research*, 10 (1), 1-14. [jpaswrwww.iiardjournals.org](http://jpaswrwww.iiardjournals.org).
- Bartholomew, J. C., Bartholomew, D. C., Iwu, H. C., Nwafor, G. O., Oguguo, S. C. (2025). Assessing environmental sanitation knowledge, practices, and challenges in Takalau, Birnin Kebbi: A data-driven approach to community health improvement. *Iconic Research and Engineering Journals*, 8(11), 609-629.
- Bassey, A. U. (2025). Evaluating the Abuja environmental protection board's communication campaign strategies in combating open defecation practice in FCT, Nigeria. *World Journal of Advanced Research and Reviews*, 25(03), 980-993. <https://doi.org/10.30574/wjarr.2025.25.3.0806>.
- Bealy, D. G., Asratie, M. H., Aragaw, F. M., Tsega, N. T., Endalew, M. & Gashaw, M. (2022). Open defecation practice and its determinants among households in sub-Saharan Africa: Pooled prevalence and multilevel analysis of 33 sub-Saharan Africa countries demographic and health survey. *Tropical Medicine and Health*, 50(28), 1-12 <https://doi.org/10.1186/s41182-022-00416-5>
- Bwakan, N. A. (2021). Assessment of SBCC campaign against open defecation practice and Bogoro L.G.A. open defecation free status. *NTAtvc Journal of Communication*, 5(2), 118-126.
- Chawla, A. (2024). Rural India, the problem of open defecation and India's public health programs: Lessons in social learning. *Nusantara Journal of Behavioral and Social Science*, 3(4), 185-190. <https://doi.org/10.47679/njbss.202466>.

- Coffey, D., Gupta, A., Hathi, P., Spears, D., Srivastav, N., & Vyas, S. (2017). Understanding open defecation in rural India: Untouchability, pollution, and latrine pits. *Economic and Political Weekly*, 52(1), 59-66.
- Ekhoragbon, C. (2024). Public Health Implications of Open Defecation Practices in Rural Nigeria. *Authorea*, 1(1), 1-12. DOI: 10.22541/au.173387225.58335964/v1.
- Ezeaka, N. B. & Bartholomew, C. E. (2025). Navigating environmental sanitation and health communication in Nigeria: Challenges and prospects. *International Journal of Research and Innovation in Social Science (IJRISS)*, 9(1), 3381-3389. DOI: 10.47772/IJRISS.
- Ezeaka, N.B., & Ochuba, C.C. (2024). Harnessing AI in development communication for drug abuse prevention: A Nigerian perspective. *Mass Media Review* 6 (1), 1-19.
- Gayawan, E., Somo-Aina, O. & Kuti, O. (2022). Analysis of the space-time trends in open defecation in Nigeria. *Research Square*. DOI: <https://doi.org/10.21203/rs.3.rs-1570689/v1>.
- Ihekwoaba, I. L. & Elijah, E. O. (2021). X-raying the influence of media programmes in environmental sanitation and waste management scheme on the health behaviour of Enugu residents. *Nasarawa Journal of Multimedia and Communication Studies*, 4 (1), 25-40.
- Inah, S. A., Amadi, A. N., Iwuala, C. C., Okereke, C. C., Eteng, A. E., Ebri, E. O., Kanu, P. A., Ezelote, J. C., Onuoha, N. E., Agwoko, A. E., & Chukwuebuka, H. (2025). Knowledge and perceptions on the public health implications of open defecation practices among residents in Yakurr Local Government Area of Cross River State, Nigeria. *African Journal of Biomedical Research*, 28(2), 495-506. DOI: <https://doi.org/10.53555/AJBR.v28i2S.3589>.
- Inah, S. A., Andenum, S. K., Asor, L. J., Okon, A. J., Egbonyi, D. E. & Osuchukwu, N. C. (2023). Knowledge, perceptions and attitude towards open defecation and its health implications among residents in Ussa Local government Area, Taraba State, Nigeria. *Global Sustainability Research*, 10-21. <https://doi.org/10.56556/gssr.v2i1.436>
- Kouassi, H. A. A., Andrianisa, H., A., Traoré, M. B., Sossou, S. K., Nguematio, R. M., Ymélé, S. S., & Ahoussouhe, M. S. (2023). Review of the slippage factors from open defecation-free (ODF) status towards open defecation (OD) after the community-led total sanitation (CLTS) approach implementation. *Elsevier*. <https://www.sciencedirect.com/science/article/pii/S1438463923000512>
- Mara, D. (2017). The elimination of open defecation and its adverse health effects: A moral imperative for governments and development professionals. *Journal of Water, Sanitation and Hygiene for Development*, 7(1), 1-12. DOI: 10.2166/washdev.2017.027.
- Najnin, T., Hossain, S., Akter, N., Islam, S., Ahmed, A., Sikder, T. & Islam, M. (2023). Knowledge, attitude and practice on water, sanitation and hygiene (WASH) and COVID-19 among households in rural Bangladesh. *Jahangirnagar University Journal of Biological Science*, 12(1 & 2), 11-21. </Research%20on%20Open%20defecation/11-21.pdf>.
- Ngwu, U. I. (2017). The practice of open defecation in rural communities in Nigeria: A call for social and behaviour change communication intervention. *International Journal of Communication Research*, 7 (3), 201-206. [The Practice of Open Defecation in Rural.pdf](#).
- Obianagwa, C. E., Ifem, L. A., Uwaechia, O. G., Borlin, E. M., Ejiofor, C. C., Ereforokuma, O. N., & Anene, J. I. (2022). Open defecation in Nsukka Local Government Area of Enugu State, Nigeria: Shifting the discussion towards health and socio-economic implications. *Global Journal of Arts Humanity and Social Sciences*, 2(12), 918-928.
- Ogbuoshi, L. C. (2020). *Understanding the dynamics of communication theories and models*. Linco Enterprises.
- Ufomba, E., Ubi, A., Njoku, L. A., Oyalabu, S., Emurotu, A., Kwaskebe, J., & Uwaoma, A. N. (2021). Ethico-medical implications of open defecation in a multi religious society: A study of three communities in Ibadan, Oyo State, Nigeria. *Sapientia Foundation Journal of Education, Sciences and Gender Studies (SFJESGS)*, 3(4), 213-223.
- UNICEF (2023). Progress on household drinking water, sanitation and hygiene 2000-2022: Special focus on gender. Retrieved on 16<sup>th</sup> August, 2025 from <https://data.unicef.org/resources/jmp-report-2023/>.
- World Health Organisation, WHO. (2020). Sanitation facts. Retrieved on 12<sup>th</sup> September, 2025 from <https://www.who.int>.