



ANALYSIS OF OPEN DEFECATION SITES AND PUBLIC-PRIVATE CONVENIENCES IN KANO METROPOLIS, NIGERIA

¹Farouk, M.U., ² Tukur Y.M., and ³Sarki, U.S.

¹Department of Environmental Management, Bayero University, Kano ²Department of Geography, Faculty of Social and Management Sciences, Yusuf Maitama Sule University, Kano ³Department of Environmental Resources Management, Faculty of Earth and Environmental Sciences, Federal University Dutsin-Ma

Corresponding author's email: <u>ymtukur81@gmail.com</u> +234 9115119414

https://doi.org/10/33003/jees.2024.0102/07

ABSTRACT

Open defecation menace (ODM) has remained one of the challenging urban environmental problems and public health issues in many cities in Nigeria, including Kano Metropolis. This study aimed to analyze the spatial location of open defecation sites and public-private conveniences in Kano Metropolis, with a view to map and locate areas with high cases and identify the drivers of ODM in the area. Primary data methods were employed to facilitate the study. The coordinates of ODSs and PPCs were obtained using Global Positioning System (GPS). Availability sampling was used to sample 399 respondents, and a structured questionnaire was administered. The ArcMap environment of ArcGIS 10.7 was employed to map the spatial location of ODSs and PPCs; Nearest Neighbour Analysis was conducted to determine the pattern of the spatial distributions. Descriptive statistics was used to analyze drivers of ODM. The finding revealed that the majority (60%) and (57%) of ODSs and PPCs are located in Kumbotso, while Dala accounted for (12%) and (7%) the least. It was also revealed that the majority (43%) of the respondents indicated that the monetary aspect is a major driver of ODM, and the least (5%) indicated the availability of conveniences. The study concluded that socioeconomic factors, inadequate sanitation facilities, urban planning, and cultural norms shape the patterns of ODM. In addition, people residing within OPSs are exposed to vulnerable health conditions. It was recommended that public-private partnerships should be established in the area of mobile toilet facilities around marketplaces, roads, streets, and motor parks.

Keywords: Urban environmental problem, public health, Open defecation

INTRODUCTION

Open defecation menace (ODM) is one of the global urban environmental problems due to associated health risks, economic costs, and environmental degradation. ODM contributes to the spread of diseases such as cholera, diarrhea, and intestinal worm infections. The economic burden includes healthcare costs and loss of productivity due to illness. Contamination of freshwater sources and offensive odour release from the ODM points are the commonest environmental degradation connected to the menace. It is pertinent to note that ODM dramatically undermines the efforts of the global community to achieve an ODM-free society by 2030, despite several efforts to eradicate the menace at the global, regional, national, and local levels. Issaka et al. (2019) noted that even with increasing levels of advocacy and awareness campaigns by international communities, NGOs, and various governments across nations to end ODM and achieve sustainable cities and communities, ODM remained one of the topical issues of concern due to the fact that people are still defecating in





open spaces globally. This shows that public health and the environment are at risk due to increasing vulnerability conditions.

However, ODM has been posing a threat to the teaming urban population of Kano Metropolis. The city, with over 5 million inhabitants and a population density of 15,000 person/km2 (Mohammed et al., 2022), is currently facing challenges of high ODM as a result of a lack of water, sanitation, and hygiene facilities and other attributable factors such as poverty, high population growth, rapid urbanization. The ODM in the city could be attributed to recurrent outbreaks of cholera and other related diseases, which significantly affect the overwhelming local healthcare systems and reduce access to clean water. Poor environmental sanitation and air quality degradation are some of the notable environmental sustainability challenges attributed to ODM. In addition, the menace has some social implications on the part of women and children, as they were affected by the lack of privacy and safety issues associated with ODM.

Therefore, it is pertinent to note that to address the ODM in Kano Metropolis, a holistic effort and drastic measures are needed. This relies on commitment by the concerned authority. Thus, several opportunities exist to follow suit and end ODP and achieve sustainable cities and communities, which is the Sustainable Development Goal (SDGS No. 11). Opportunities to address the problem include firstly, international partnerships and collaborations with organizations like the United States Agency for Internal Development (USAID) for possible execution projects such as the Water, Sanitation, and Hygiene (WASH) initiative, which focuses on providing clean drinking water and sanitation facilities in schools and community health centers. Secondly, there should be active community involvement in environmental sanitation and the construction of sanitation facilities. iii. Environmental education at all levels should be introduced via programs emphasizing hygiene education. However most of these opportunities are there in place, but achieving them remained a topical issue of discussion due to some significant threats, such as poverty, lack of sound environmental education and consciousness from the general public, as well as limited allocation of resources to WASH, lack of political will and poor enforcement of environmental laws and principles.

Many studies have been conducted in the area of ODM globally, such as the work of Abdulkadir, Usman, and Abdullahi (2023); Ayodele and Samuel (2022); Abalaka and Tokula (2022); Ismail et al. (2020); Issaka et al. (2019); Francis (2017); and Muhammad (2015). However, these authors were silent on the spatial location and distribution of ODSs and PPCs, despite the fact that identification and mapping of these sites will provide avenues for law and regulation enforcement. Most importantly, it will assist the regulatory agencies in making informed decisions since Kano State has already declared its intention to end ODM by 2025.

THE GLOBAL OVERVIEW OF OPEN DEFECATION MENACE (ODM)

ODM is one of the contemporary urban environmental problems that the international community is aiming to eradicate to achieve a decent and sustainable environment. Efforts to address the menace prove abortive in many parts of the world. Substantiating this assertion, Bello et al. (2024) posited that the act of ODM has become the norm of global society with a higher magnitude in developing than developed countries due to high levels of poverty, illiteracy, and lack of improved water, sanitation, and hygiene conditions. Ngwu (2017) pointed out that the practice of ODM in developing countries is a concern for both development and health communication scholars worldwide. However, it is pertinent to note that the act of defecating in an open field, drainage, and near or in water bodies is more common in developing countries of Sub-Saharan Africa, where poverty remains a critical issue of concern, and most communities lack essential water and sanitation facilities.





Similarly, Bello et al. (2024) noted that ODM is a serious sanitation issue as most developing countries are currently battling with the phenomenon. It is pertinent to acknowledge the fact that defecation is a natural urge, and everyone will respond to it when the need arises. There are, however, apparent differences in attitudes toward why people defecate openly. Even when poverty is reduced, and toilet facilities become available and accessible, there are many factors influencing people's decision to utilize infrastructure they consider unhealthy and safe. Some of the factors include cultural traits, social habits, and economic status. Therefore, understanding the sociocultural and economic factors underlying ODM is crucial for any policy aimed at eradicating the menace.

The World Health Organization (2015) reported that about 2.4 billion people all over the world do not have access to basic sanitation facilities such as toilets or latrines. About 946 million of them still defecate openly in street gutters, behind bushes, or into surface water bodies such as rivers, streams, and ponds. This unsanitary practice has led to an upsurge in the transmission of communicable diseases such as cholera, diarrhea, dysentery, hepatitis A, typhoid, and polio. It also provides a fertile ground for several neglected tropical diseases like intestinal worms, schistosomiasis, and trachoma. In view of this critical issue, many international organizations intensify efforts at mobilizing financial resources to help in capacity-building, technology transfer, and support to help developing countries improve and provide safe, clean, accessible, and affordable drinking water and sanitation for all (United Nations, 2019).

However, in Africa and most emerging countries of the continent, ODM continues to pose a serious threat to public health and the environment as a result of an increasing number of people engaging in the act. It is no wonder that World Bank Blogs 2019 ranked India as the world capital of ODM and Nigeria as the second (Abalaka and Tokula, 2022). In this view, it's obvious to assert that the ODM is one of the environmental challenges in major cities of Nigeria. The report by the Federal Ministry of Water Resources et al. (2020) reveals that nearly 46 million Nigerians, accounting for about 23%, practice open defecation, either in open fields, forests, bushes, or bodies of water. However, disparities exist in the prevalence of ODM across different regions and groups. People living in the North Central recorded the highest ODM, which accounted for approximately 51%, while people in the North West recorded the lowest at 9%. People living in rural areas (10%) are three times more likely to practice the menace than those living in urban areas (29%). Also, the poorest households (36%) are 9 times more likely to practice ODM than the wealthiest households (4%). It has been added that the practice of this unwanted act has had a negative effect on the populace, especially children, in the areas of health and education and has contributed to the country's failure to meet the defunct MDG target. This sanitation situation inspired the National Council on Water Resources in 2014 to prioritize the development of a roadmap towards eliminating open defecation in the country, in line with the UN global campaign for ending ODM by 2030 (FMWR et al., 2020).

MATERIAL AND METHODS

Kano Metropolis is located between Latitudes 11°52`22``N to 12°07`19``N and Longitudes 8°34`56``E to 8°47`11``E and is about 472 meters above sea level. It is the second-largest urban center in Nigeria and the administrative capital of Kano State (Mohammed et al., 2022). Kano, as the commercial nerve of Northern Nigeria, has witnessed unprecedented rapid socio-economic transformation, high population growth, and expansion of informal settlements over centuries ago, making the city stand out as the second largest after Lagos in Nigeria. It has been noted by Liman and Adamu (2003) that Kano Metropolis assumed the status of a city dating back to the 12th century. However, the influx of many migrants from other states within the country, coupled with





poor land administration, resulted in the high development of informal land markets and settlements. Corroborating this accretion, Barau (2017) noted that the informal development in the city has not only constituted nearly half of its landmass, but even within what is considered formal, much informal development exists. This eventually led to the emergence of informal marketplaces that attract large numbers of participants on a daily basis; in most of these business entities, hardly you could observe conveniences, and hence, open defecation became the order of the day in most parts of the marketplaces and beyond.

Data Collection

A reconnaissance survey was conducted through field observation on the ODSs and PPCs to familiarize the study with the state and location of the phenomenon of study. Primary data sources were employed to collect quantitative data with the aid of Global Positioning System (GPS) etrex10 and a structured questionnaire. The GPS was used to record the coordinates of ODSs and PPCs. A structured questionnaire was administered to 399 respondents, based on availability and willingness to participate, considering the commitment and nature of the participants because most of them are businessmen, petty traders, motor park station workers, passengers on scheduled buses, etc.

Data Analysis

The ArcMap environment of ArcGIS 10.7 Software was used to input the geographic coordinates of ODSs and PPCs, which facilitate the mapping of their spatial location. Furthermore, to ensure precision in the interpretation of the pattern of their distribution, the inferential technique was employed to conduct the Nearest Neighbour Analysis (NNA). Responses obtained through questionnaire administration were corded and imported into Microsoft Excel software in rows and columns for straightforward interpretation and analysis. Descriptive statistics (percentages and charts) were used to analyze responses. The result was presented with the aid of a map and pie chart, which permitted us to draw inferences and conclusions based on the findings of the study.

RESULTS AND DISCUSSION

Spatial Location and Distribution of Open Defecation Sites (ODSs)

Figure 1 shows the spatial location and distribution of ODS based on the recorded coordinates; there are about 33 ODSs, out of which Kumbotso has the highest number, constituting 20 (60%), while Dala has 4 (12%) approximately, the least in the area. However, the practice of ODM is common in high-density areas, which low-income individuals predominantly occupy, and the settlements in these areas are primarily informal, where residents lack access to basic sanitation facilities like toilets and waste disposal systems. ODSs exist in significant markets and public spaces with poor municipal waste management services and inadequate conveniences. In addition, these locations appear to have a high prevalence of ODM because they witness a high number of people on a daily basis, which significantly contributes to the unwanted phenomenon. This finding corroborates that of Bello et al. (2024) as they reported that people in urban Kano defecate openly in nearby public places like markets, motor parks, and other commercial outlets due to the fact that public toilets are not adequately available in some places within the study area.

Furthermore, places such as Kumbotso and Ungogo have more significant landmasses than the other six LGAs. By virtue of their proximity to the Metropolitan outskirts, residents often have limited access to public utilities and WASH facilities. This situation motivates ODM, especially in areas with a high number of undeveloped plots of land, bushes, and abandoned buildings, or in some cases, ODSs are often found near rivers, canals, and drainage systems. In a similar vein, from the core and outside the city, ODSs are found near open gutters and drainages, where there are





limited drainage facilities; people sometimes defecate near occupied buildings, walls or fences, construction sites, and or abandoned buildings.



Figure 1: Spatial Location and Distribution of ODSs in Kano Metropolis

Spatial Location and Distribution of Public/Private Conveniences (PPCs)

Figure 2. shows the spatial location and distribution of PPCs in Kano Metropolis. The inventory of geographical coordinates captured about 104 conveniences, out of which Kumbotso has 57 (54%), representing the highest, while Dala has 07 (7%), which accounted for the least. Furthermore, the spatial location and distribution of the conveniences reveal that the majority of the public conveniences are located along major roads and motor park stations and areas with high concentration of commercial activities and high foot or pedestrian traffic, such as Yankura, Sabon Gari, Kantin Kwari, Sabuwar Kasuwa, Kurmi and Kofar Ruwa markets, Gidan Makama National Museum, and Kano Zoological Garden. In a similar vein, in almost all Masjids and petroleum filling stations, one could observe two or more toilets for utilization by worshippers, the general public, workers, motorists, and travelers at no cost.

On the other hand, private conveniences are primarily located in strategic areas, and the majority are attached to plazas or what people popularly call Dubai shops, Farm centers, and other GSM markets. This type of convenience provides services to traders within their premises, shoppers, and commuters; charges are strictly applied depending on the location and hygienic condition of the facility. Modern shopping malls like Ado Bayero Mall and eateries such as Franchise and KFC provide conveniences within their facilities for visitors and shoppers at zero cost.



FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 1, No. 2, 2024 Print ISSN: 1595-9686 EISSN: 1595-9708





Figure 2: Spatial Location and Distribution of PPCs in Kano Metropolis

Furthermore, to ensure precision in the pattern of the distribution of the ODSs and PPCs, a Nearest Neighbour Analysis was conducted. The spatial pattern of the distribution of PPCs is clustered, given the fact that the nearest neighbor index (Rn) value is less than 1 (0.4), suggesting that they are closer to one another. There is < 1% likelihood that the clustered pattern could be the result of random chance, given the z-score of -9.32 and P-value of < 0.000, indicating that there is a significant difference in the distribution of PPCs in the study area. The finding of this study disagrees with that of Ismail et al. (2020), who, in their research, found the distribution pattern of PPCs in Kano Metropolis to be nucleated as they depend categorically on commercial activities as most of them are located in motor parks and markets areas (Appendix I). While the pattern of distribution of ODPs is clustered, given the fact that the nearest neighbour index (Rn) value is 0.70. There is < 1% likelihood that the clustered pattern could be the result of random chance, given the clustered pattern is significantly different from a random pattern, leaning towards the clustering effect (Appendix I).

Derivers of Open Defecation Menace (ODM)

Figure 3. shows the drivers or reasons why the respondents practice open defecation despite the availability of public in the study area. About 43% of the respondents revealed that the monetary aspect is the primary reason they defecate in an open space, as they are more comfortable since they pay nothing. 32% indicated that distance to the conveniences is the reason why they avoid patronizing the PPCs. About 20% indicated that they are not comfortable with the PPCs. For this reason, they prefer to make use of any available space within their business premises, as they feel comfortable. Only 5% of the respondents indicated distance as a barrier to patronizing the available conveniences and, hence, resort to defecating in open drainages or gutters.



Figure 3. Drivers Open Defecation Menace in the Study Area

Discussion of Findings

From the results presented, this study's findings reveal that four ODM drivers influence individual decisions to patronize conveniences or otherwise. It was discovered that the common belief of not getting infected has a strong influence on the attitude of respondents towards utilizing open spaces because they felt secure. About 43% of the respondents revealed that they are more comfortable defecating in an open space rather than any other place. This attitude has a negative impact on the health of the defecators and the environment at large because the field observation shows that those ODSs are risky for human utilization. Besides, someone may end up getting infected with sexually transmitted diseases due to the poor condition of such ODSs.

Apart from people's attitudes and beliefs, distance and the monetary aspect appear to be obstacles, thereby preventing many respondents from high-commercial areas from patronizing the available conveniences around them. Similarly, about 32% of the respondents revealed that they could not afford to leave their shops unprotected, and for that reason, they utilized nearby available space due to distance.

It is pertinent to acknowledge the fact that poverty is one of the key drivers of ODM. There are specific individuals who, when it comes to the issue of monetary charges for a particular service, find it difficult to afford because they lack financial strength. In contrast, others are not willing to patronize at whatever rate due to their conservative nature. In this case, about 20% of the respondents indicated that money is a significant standing block discouraging them from patronizing services offered by the PPCs. In comparison, only about 5% of the respondents attributed poor hygiene and sanitary conditions as a significant barrier preventing them from utilizing either private or public convenience. This finding agrees with that of Bello et al. (2024) as they stated that the major causes of ODM in Kano Metropolis are inadequate toilet facilities in most of the public places. Widespread poverty as many people cannot afford to build toilets or pay for commercial toilet services, and hence, they resort to defecating openly.





CONCLUSION AND RECOMMENDATIONS

The phenomenon of ODM is a worrisome issue in most cities and rural communities of Nigeria. As reported by FMWR, about 134 LGAs are still practicing ODM in the country. However, in Metropolitan Kano, ODM is typically an activity performed by active people who never felt the need to utilize whatever conveniences are available. The menace is more prevalent in Kumbotso LGA, which appears to have a high number of PPCs and ODPs. Therefore, many factors could be used to explain the apparent phenomenon of ODPs in the area. For example, factors such as the availability of open space, undeveloped plots of land, and people's attitudes towards environmental sanitation, poverty, and poor government intervention in sanitation infrastructure could be attributed to the menace. Furthermore, this phenomenon has implications for public health due to contamination of air around the ODPs, particularly during the early onset period of rainfall or at the beginning of the rainy season when the ground is arid. As the wind blows over such surfaces, it carries so many clouds of dust that contain dry human excreted, which pollutes the air and surface water, and at the same time, rain wash usually transports such excretion down to the nearby rivers. Sometimes, such excreter may wash out and infiltrate to contaminate groundwater sources, particularly hand-dug wells that have partial aquifers.

Thus, considering the apparent and concomitant challenges of ODM in the Kano Metropolis, it is practically impossible for the Kano State government to achieve an ODM-free society by 2025, based on the reality on the ground. The field evidence suggests that for the state to actualize the earlier stated assertion based on the executive order in question, there is the need to strive and map out strategies toward achieving the said target.

It was recommended that, to end and achieve a free society, there is needed for the Kano State Government fully implement the executive order (009) Titled "Open Defecation Free Nigeria by the year 2025" which was signed by the Federal Government in 2019. This will help people to desist from the act of open defecation in Kano Metropolis. Furthermore, environmental education and awareness campaigns could be the best options. In addition, modern conveniences and mobile toilets should be provided through public-private partnership (PPP) initiation around the central commercial areas of the city and beyond to ensure environmental sustainability.

REFERENCES

- Abdulkadir, H., Usman, A. K., and Abdullahi, A. H. (2023). Open Defecation as a Challenge to Public Health In Giwa Local Government Area, Kaduna State, Nigeria. FUDMA Journal of Sciences, 7 (6), 342 – 346, ISSN: 2616-1370. DOI: <u>https://doi.org/10.33003/fjs-2023-0706-2141</u>
- Abalaka, L. D. and Tokula, A. E. (2022). Assessment of the Factors Affecting Open Defecation among Slum Dwellers in Lokoja, Kogi State Nigeria. *Journal of Geography, Environment and Earth Science International, 26 (12), 61-72, Article no.JGEESI.94436, ISSN: 2454-7352.*
- Ayodele, I. V. and Samuel, T. A. (2022). Spatial Assessment of Open Defecation in the Core area of Akure Metropolis, Ondo State, Nigeria. *African Journal on Land Policy and Geospatial Sciences*, 5, (4), ISSN: 2657-2664.
- Barau, A.S. (2017). Land Degradation and Environmental Quality Decline in Urban Kano. Kano: *State Soc. Econ. 1967, 141–170.*





- Bello, N.I., Salisu, Y.A., Abubakar, A.S., Adamu, H., Yakubu, M.M., and Ab-dullahi, I.K. (2024). Prevalence of Indiscriminate Open Defecation in Urban Kano, Kano State, Nigeria. *International Journal of Social and Humanities Sciences (IJSHS)*, 8(1), 183-200.
- Francis, G. (2017). Access to and Utilization of Public Convenience in Kano Metropolis. Unpublished MSc. Dissertation Department of Geography, Bayero University Kano, Nigeria.
- Federal Ministry of Water Resources (FMWR), National Bureau of Statistics (NBS), and UNICEF (2020). Water, Sanitation, and Hygiene: National Outcome Routine Mapping (WASHNORM) 2019: A Report of Findings. FCT Abuja. Nigeria.
- Issaka, K.O., Enoch, A.K., and Frank. A. (2019). Determinants of Open Defecation in the Wa Municipality of Ghana: Empirical Findings Highlighting Sociocultural and Economic Dynamics among Households, *Journal of Environmental and Public Health Volume 2019*.
- Ismail, A.I., Abubakar, A.S., Bello, N.I., and Hussain, A. (2020). Spatial Distribution and Locational Implications of Public Conveniences in Kano Metropolis. FUDMA Journal of Sciences (FJS) 4 (3), 382 – 388. ISSN: 2616-1370. DOI: https://doi.org/10.33003/fjs-2020-0403-400
- Liman, M.A. and Adamu, Y.M. (2003). Kano in time and space: From a city to a metropolis. In Perspective on Kano British Relations; Hambolu, M.O., (Ed.); Gidan Makama Museum: Kano, Nigeria, pp. 144–169.
- Mohammed, M.U., Hassan, N.I., and Badamasi, M.M. (2019). In search of missing links: Urbanisation and climate change in Kano Metropolis, Nigeria. *International Journal of Urban Sustainable Development*, 11, 309–318.
- Muhammad, S. A. (2015). Spatial analysis of human excreta in Kano metropolis. Unpublished MSc. Dissertation Department of Geography, Bayero University Kano, Nigeria.
- 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).
- United Nations (2019). The Human Right to Water and Sanitation in Practice. A Collaborative Report of the UN, WHO, and UNECE, Designed and Printed at United Nations, Geneva 1917288 (E), Switzerland, Available from: <u>http://www.unece.org</u>
- World Health Organization (2015). Sanitation Fact Sheet: Water Sanitation and Hygiene. Available from: http://www.who.int/topics/hygiene/en/



FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 1, No. 2, 2024 Print ISSN: 1595-9686 EISSN: 1595-9708



Appendix I



Figure 4: Spatial Pattern and Distribution ODSs in Kano Metropolis



FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 1, No. 2, 2024 Print ISSN: 1595-9686 EISSN: 1595-9708



Appendix II



Figure 5: Spatial Pattern and Distribution of PPCs in Kano Metropolis