

Emerging Forms of Open Defecation in Kaduna Metropolis, Kaduna State Nigeria

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ABSTRACT

This paper ascertained the emerging forms of Open Defecation (OD) in Kaduna Metropolis, Kaduna State, Nigeria. Data were acquired from Primary and Secondary sources. Five (5) residential neighbourhoods with homogenous urban form, were selected out of the twenty-five urban districts of Kaduna metropolis, which represented the city core, North, South, East and Western parts of Kaduna metropolis. Global mapper 18.0 was used to capture a geo-referenced high resolution satellite imagery of Kaduna for year 2018 and further processed with ArcGIS 10.5 to generate 88, 621 houses/ households attribute structures, within the aforesaid neighbourhoods. 1,716 houses/ households sample size were drawn using Krejcie and Morgan (1970) table. Systematic sampling technique was further adopted in selection of houses at the 8th interval. Questionnaire interview was used to collect the socio-economic and OD emerging forms from households. The data collected were coded in numeric character and measured in ordinal, nominal and scale suitable for Statistical Package for Social Sciences version (SPSS) 23 for computing cross tabulations, frequency and tabulations. The study revealed the predominance of Water Closet 52.9% (908) as sanitation option/ toilet type. Hot spots for Open Defecation (OD) are largely at Open Spaces/ dump sites (35%), Use of open drains (31.7%), abandoned or uncompleted buildings (23.1%) and others within a compound with an open pit (5.2%). Recommendations such as establishment of Neighbourhoods OD abatement committee and Environmental marshals, all uncompleted buildings and or undeveloped or vacant lands should be secured with a perimeter fence by property owners to reduce being soft targets for other forms of open defecation (OD), Campaigns and awareness against OD should be done to educate the residents and the general public of the risks associated with OD were suggested.

Keywords: Behaviour, Open Defecation, Sanitation, Sewage and Unsanitary.

1. INTRODUCTION

Open Defecation (OD) refers to the practice where human beings empty their bowels in the open such as in the fields, forests, water bodies and open spaces, other than a proper user interface or sanitation option that should promote proper disposal of human excreta (Boschi-Pinto, Lanata and Black, 2009; Jones Fisher and Reed, 2012; World Health Organisation (WHO), United Nations International Child Emergency Fund

(UNICEF)/ Joint Monitoring Programme (JMP), 2017). The WHO, UNICEF/ JMP (2020) further views OD as involving in defecating in the open that affronts human dignity and encourages the risk of propagating faecal oral transmission of sewage borne diseases. Bartram and Caincross (2010) and UN, Water (2015) added that OD is squatting and emptying of bowels outside a house and or disposing the faeces openly. It is also a human practice of defecating outside rather than in a

sanitary toilet, that is sometimes done because there is no provision of toilets or that the toilets are not readily accessible and perhaps, traditional or cultural practices influence the OD practice (Clasen, 2014). From the aforesaid views, OD can be said to be an unsanitary option where humans use any open space to pass out excreta, other than a built structure or facility that should promote human dignity and protect public/ environmental health. Open Defecation being an unsanitary faecal sludge/ sewage management and disposal option has grave potentials on transmitting viral, helminths, protozoa and bacterial infections such as Hepatitis (A & E), *Clonorchis Sinensis*, *amoebic dysentery* and cholera, respectively (Henze and Ledin, 2001; WHO, 2006; Oluwadamisi, 2013). By implication, Settlements that are not Open Defecation free are vulnerable to the endemic effects of the aforesaid diseases transmission which would influence, negatively, the healthiness and productivity of its populace, due to high risks to aforesaid infections without intentional efforts to curb the unwholesome practice (Feachem *et al.*, 1983; Prus-Ustun *et al.*, 2008; Caincross *et al.*, 2010)

The phenomenon had been a buzzing word within the sphere and themes of sanitation and sustainable municipal sewage management, because of its significance in determining the sanitation status of cities (WHO, UNICEF/ JMP, 2020; Habila and Oladimeji, 2020a; Habila, 2021b). OD practice has grave consequences on the socio-economic, public health well-being and environmental performance (physical-aesthetics and air quality) of humans and their habitations (Saleem *et al.*, 2019; Habila and Oladimeji, 2020; Habila, 2021a). In addition, loss of human dignity and privacy, especially when women and girls are involved in the practice (Saleem *et al.*, 2019; JMP, 2020). Records of the WHO, UNICEF/ JMP (2020) revealed that globally, over 1,229 million people practice OD in year 2000, but declined to 494 million in 2020, this is an average decrease of 37 million people per year. Today, 0.9 million worldwide are currently engaged in the practice with 16-220 million persons are practicing OD in sub-Saharan Africa (WHO, UNICEF/ JMP 2020). This really sounds good and progress, as it is outcomes of the United Nations efforts through its Millennium Development Goal (MDG) 7.6 “ensuring environmental sustainability...access

to improved sanitation and end open defecation”. The outcomes of the aforementioned target achieved tremendous improvement of basic sanitation status in most alliance countries, but not attaining OD free status. This necessitated rolling over the target to year 2015 as Sustainable Development Goal (SDG) 6.2 “access to Water Sanitation and Hygiene by halving the disposal of untreated waste water and end up open defecation” in order to fight the ugly practice by all SDG regions. In 2020, more than 5% of the global population are practicing Open Defecation, with 233 million in Central and Southern Asia and 197 million in Sub-Saharan Africa (WHO, UNICEF/ JMP, 2020). In spite of the improvement on ending OD, most of the cities in developing nations are not OD free, which makes their cities vulnerable to diseases of public health concerns from OD practice. In Nigeria, there is an estimation of 25% of Nigeria’s population practicing OD (The Nation, 2018). Therefore, the need to explore the nature of OD practices in such countries for necessary interventions.

In Kaduna Metropolis, in spite of its colonial advantage of local blue prints and more recently the SDG guidelines of the WHO, UNICEF/ JMP (2017) that guides proper sewage management and ending OD. There is expression of symptoms on OD around the urban districts/ residential neighbourhoods of the metropolitan area, that requires investigation (Habila, 2021a). Habila *et al.* (2021b) further revealed the predominant use of Water closet as sanitation option in Kaduna metropolis, yet, not OD free, in spite of the attainment of basic sanitation status with improved user interface. It is expedient to investigate the underlying reasons behind the emerging forms of OD in Kaduna metropolis. Therefore, the need to answer the question; what are the factors responsible for the emerging forms of OD practice and its nature?

However, riding on Social Cognitive and Planned Behaviour theories of people in relation to their actions and use of environment. The former theory postulates that people’s behaviour is driven by a tripod interaction of behaviour, personal attributes (an individual’s intrinsic traits, instincts and drives and motives) and environmental factors (environmental conditions where a behaviour is executed) which is also known as “reciprocal

determinism". In other words, a person can be an agent of change and a recipient of change as well (Bandura, 1986). Its major assumption is that people learn and act from the observed actions of other people or the outcome of actions not necessarily their experiences, even in open defecation practice. Secondly, the theory of Planned Behaviour asserts that behaviour as a function of a person's intention (self-efficacy feelings and capabilities) to perform a particular behaviour and the intention is a drive of the individual's attitude (beliefs and values) and subjective norms derived from other people's opinion, say peer pressure (Ajzen, 1991; Armitage and Conner, 1991; Godin and Kok, 1995). By extension, a given community's intention driven by acceptable or unacceptable culture and values on OD will influence the behaviour of their wards in practicing or non-practice of OD option on faecal disposal. Therefore, when an unsafe practice is ignorantly embraced, it would obviously be disseminated and the consequential outcomes suffices as well. However, when a campaign or imbibe of a safe information on OD occurs, a positive behaviour against practice would change help influence change towards curbing the ugly involvement in OD by a given people. Past studies on Open Defecation (OD) by Sara & Graham (2014), Coffey *et al.*, (2014); Gertler *et al.* (2015); O'Reilly *et al.* (2017); Ngwu (2017); Abubakar (2018a), Abubakar (2018b), Saleem *et al.* (2019) and Ntaro *et al.* (2022) focused on the determinants of OD at the National or regional levels in Tanzania, India, Mali, and Nigeria. Despite the exposé made by the aforesaid scholars, there remains a lacuna on the nature and forms of Open defecation that may occur at local areas of human habitations or residential neighbourhoods and may also be emerging against the conventional forms. More so that, Kaduna State Water and Sanitation Sector (2016) and Kaduna State Planning and Budget Commission (2017) revealed the absence of reliable and baseline data that could help Kaduna sewage governance to monitor and or strategize ways in achieving an OD free metropolitan area. The aim of this paper therefore, is to explore the emerging forms of OD and their explanatory factors so as to add to existing knowledge and provide first hand data baseline that could help policy formulation and practicable ways of curbing the OD

menace. In turn, realising the SDG 6.2 by year 2030 in Kaduna Metropolis.

MATERIAL AND METHODS

The Study Area

Kaduna Metropolitan area is located between Latitudes 10°25'15"N and 10°36'08"N and Longitudes 7°23'31"E and 7°29'33"E. The metropolis is situated at the North-west geopolitical zone of Nigeria as shown at the top right side of Figure 1.2. It is the capital of Kaduna state and made up of two (2) Local Government Areas-Kaduna North, Kaduna South, and parts of Chikun and Igabi LGA's with the existence of distinct local administrators as shown at the left side of Figure 1. It is made up of twenty-five (25) urban districts that are largely residential neighbourhoods as shown in Figure 2. The metropolis has a projected population of 1,123,581 persons with a growth rate of 2.55%. Kaduna City (Metropolis) is the fifth largest city after Lagos (10, 578,000), Kano (3,395, 000), Ibadan (2, 837, 000) and Abuja (1, 995,000) (Max Lock *et.al*, 2010). Historical records have shown that, metropolitan Kaduna owns its prominence from its status of being an administrative capital and military garrison of Northern Nigeria Protectorate from 1912 to 1917 and headquarters of North Central State (made up of Zaria and Katsina provinces) between 1967 and 1975. In 1975 the name changed Kaduna state carved out from North Central State to Kaduna metropolis remaining as the capital in 1996. It is populated by about 59 to 63 different ethnic groups if not more with the exactitude of the number requiring further verification through a genuine field work (Max Lock *et al.*, 2010)

2. METHOD OF DATA COLLECTION

Data were generated from quantitative data collection methods. data on insitu disposal, presence of Open Defecation and hot spots of OD around neighbourhoods were obtained via the use of checklist from physical observations and administration of structured multichoice questions using questionnaire instruments to Heads of Households. Systematic sampling (selection of 8th house/ property on every street) was used for household survey on 1,814 Household Heads/ Landlords as 1,716 real participants (respondents) at ten (10) medium/ low densities and high residential neighbourhoods of the metropolis. The aforesaid sample size of households was drawn

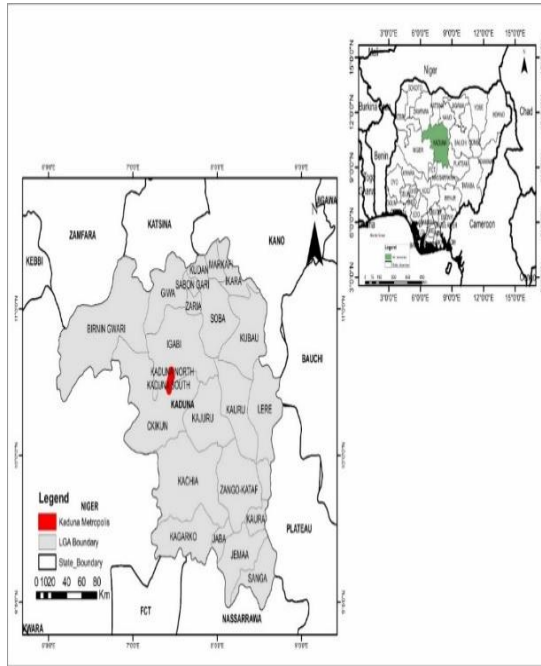


Figure 1: Left Side- Kaduna Metropolis
Top Right side-Kaduna State in Nigeria
Source: Centre for Spatial and Information Science, Department of URP, ABU, Zaria (2021)

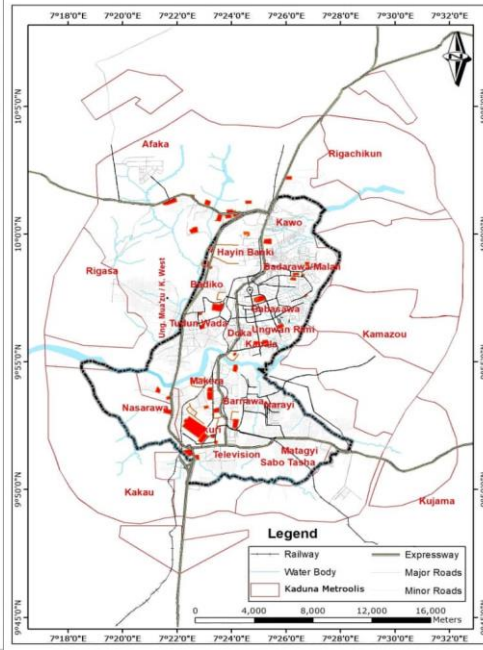


Figure 2: Urban Districts in Kaduna Metropolis
Source: Adapted from Max Lock, et al. (2010)

from the use of Global Mapper 18.0 that captured the attribute data of residential houses being the sample frame. Krejcie and Morgan sampling table (1970) of 95% confidence level (CL) was used to draw samples out of 88, 621 total houses at sample frame locations of Doka medium/low and high density (City Core-

12,320 houses); Kawo-medium/low and high density (Kaduna North-21, 502); Sabon Tasha (Kaduna South- 21, 502); Unguwan Rimi medium/low and high density (East-17, 209 houses) and Unguwan Muazu-Kabala West (West-21,502 houses) as shown on Figure 3. The socio-economic and emerging OD forms

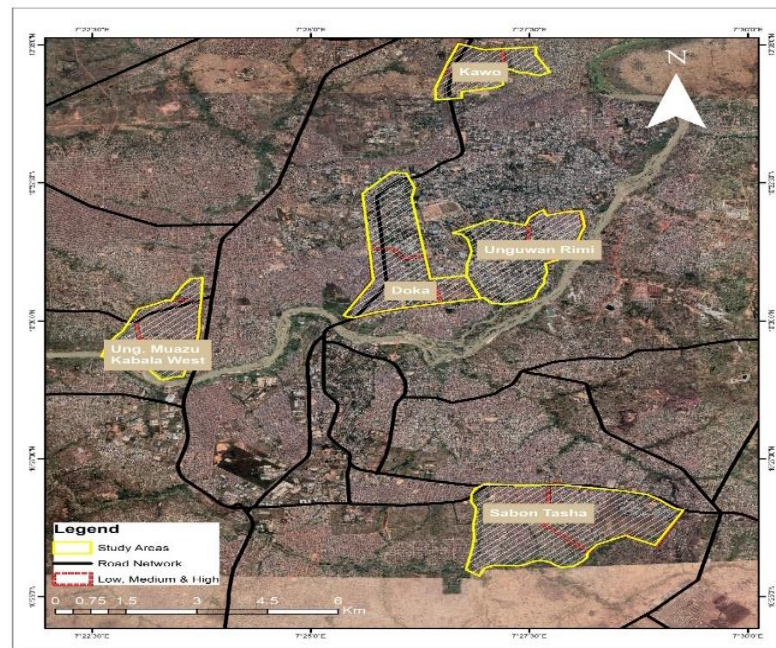


Figure 3: Strata of study areas (Low/ Medium and high densities)
Source: Global mapper 18.0 (2020) and modified by CISS, URP, ABU, Zaria (2021)

data of households or respondents were coded in numeric characters (0,1,2,3,4) of the multichoice options and were measured in ordinal, nominal and scale values of measurement and meets up the pre-requisites for use of Statistical Package for Social Sciences (SPSS) version 23 software for Crosstabulations Frequency/percentages in analysis of the data. Descriptive mode in discussing results on emerging forms of Open Defecation. Pictures were used to illustrate presence of OD in Kaduna metropolis.

3. RESULTS AND DISCUSSION

3.1 Respondents Status and longevity of Stay in Residence

the respondents can be adjudged reliable, because the longevity of stay influences the knowledge of OD occurrences in the study area.

2. Sanitation Option of Households in Kaduna Metropolis

Table 3 results reveal that predominantly (52.9%) of households use Water Closet as sanitation options. Most of the high-density households use Pour flush viz; Sabon Tasha 96(44.4%), Kawo 79(41.8%), Unguwan Rimi 67(33.8%), and Unguwan Mu'azu-Kabala West 83 (41.3%); and Simple Unimproved Pit Latrine in Sabon Tasha high density (26.4%) and Kawo high density (32.3%), Doka high density (23.8%); Ung. Rimi high density

Table 1: Respondents Status as Household Head or Landlord

Respondents Status	Frequency	Percentage
Spouse	45	2.6
Tenant/ lodger	829	48.3
Child or Grandchild	228	13.3
Close relative	93	5.4
Other relative	39	2.3
House staff	21	1.2
Total	1255	73.1
Landlord or Head of Household	461	26.9
Total	1716	100.0

Source: Field Survey, 2020

Table 2: Longevity of Respondent stay in residence

Duration of Stay	Frequency	Percent
1-3 Years	173	10.1
4-6 Years	306	17.8
7-9 Years	432	25.2
10-15 Years	342	19.9
16 Years and above	463	27.0
Total	1716	100.0

Source: Field Survey, 2020

Table 1 revealed the majority (73.1%) of respondents were directly or indirectly related to the Landlords as spouses, tenants, children, grandchildren or house staff, while, only 26.9% of Landlords participated in the housing survey. This shows the predominance of rental tenements in Kaduna metropolis and adult tenants and or head of households (66.1%) were the participants. However, Table 2 further showed that majority (27%) of the Tenants had lived up to 16 years and above, which corroborates the findings of Max Lock *et al.* (2010) that "Kaduna metropolis has adult residents that had lived up to 10-20 years". By implication, all the information collected from

(31.3%) as against the predominant use of WC in the medium/ low density area. The medium/ low density areas use the most appropriate sanitation option of the SDG sanitation ladder. By implication, the entire metropolis may experience minimal problems associated with poor sanitary conditions, but, more problems at the high-density areas with unsanitary options.

3.3 Emerging forms of Open Defecation in Kaduna Metropolis

Table 4 shows that 537 of 1,716, which is about 30% of the sampled population are the only participants that indicated the presence of emerging forms of OD. This corroborates the

Table 3: Type of Sanitation/ user interface/ toilet type* Res_neighbourhoods' Cross tabulation

		Sanitation/ Toilet option/ User Interface					Total
Residential Neighbourhoods		A	B	C	D	E	
1.	Sabon Tasha (High Density)	57(26.4%)	3(1.4%)	96(44.4%)	55(25.5%)	5(2.3%)	216(100%)
2.	Sabon Tasha (Medium/Low Density)	0(0%)	0(0%)	25(16.8%)	124(83.2%)	0(0%)	149(100%)
3.	Doka (High density)	51(23.8%)	5(2.3%)	76(35.5%)	82(38.3%)	0(0%)	214(100%)
4.	Doka (Medium/Low Density)	2(1.4%)	2(1.4%)	16(11.3%)	121(85.8%)	0(0%)	141(100%)
5.	Kawo (High density)	61(32.3%)	2(1.1%)	79(41.8%)	47(24.9%)	0(0%)	189(100%)
6.	Kawo (Medium/Low density)	2(1.5%)	2(1.5%)	17(12.4%)	116(84.7%)	0(0%)	137(100%)
7.	Ung. Rimi (High Density)	62(31.3%)	5(2.5%)	67(33.8%)	64(32.3%)	0(0%)	198(100%)
8.	Ung. Rimi (Medium/ Low density)	0(0%)	0(0%)	13(9.8%)	119(90.2%)	0(0%)	132(100%)
9.	Ung. Mu'azu- Kabala West (High Den.)	43(21.4%)	1(0.5%)	83(41.3%)	74(36.8%)	0(0%)	201(100%)
10.	Ung. Mu'azu- Kab. W. (Med./Low Den.)	4(2.9%)	1(0.7%)	28(20.1%)	106(76.3%)	0(0%)	139(100%)
TOTAL		282(16.4%)	21(1.2%)	500(29.1%)	908(52.9%)	5(0.3%)	1716(100%)

KEY: **A**-Simple Unimproved Pit Latrine; **B**-Ventilated improved Pit; **C**-Pour Flush Pit Latrine; **D**- Water Closet; **E**-Others.

Source: Field Survey, 2020

Table 4: Emerging forms of Open Defecation and in situ faecal disposal

		Emerging Forms of Open Defecation and Faecal Disposal					Total
Residential Neighbourhoods		A	B	C	D	E	
1.	Sabon Tasha High Density	34 (22.7)	34(22.7)	62 (41.3)	3(2)	17(11.3)	150(100)
2.	Sabon Tasha Medium/Low Density	29 (80.6)	2 (5.6)	3(8.3)	1(2.8)	1(2.8)	36(100)
3.	Doka High density	3 (5.9)	16(31.4)	27(52.9)	5(9.8)	0(0)	51(100)
4.	Doka Medium/Low Density	3 (8.3)	25(69.4)	3(8.3)	2(5.6)	3(8.3)	36 (100)
5.	Kawo High density	13 (25)	17 (32.7)	15(28.8)	6(11.5)	1(1.9)	52(100)
6.	Kawo Medium/Low density	8 (21.1)	23 (60.5)	4(10.5)	1(2.6)	2(5.3)	38(100)
7.	Ung. Rimi High Density	10 (16.7)	20 (33.3)	28(46.7)	1(1.7)	1(1.7)	60(100)
8.	Ung. Rimi medium/ Low density	8 (29.6)	14 (51.9)	3(11.1)	1(3.7)	1(3.7)	27(100)
9.	Ung. Mu'azu- Kabala West High Density	6 (11.1)	19 (35.2)	21(38.9)	7(13)	1(1.9)	54(100)
10.	Ung. Mu'azu- Kab. W. Med/ Low Dens.	10 (30.0)	18 (54.5)	4(12.1)	0 (0)	1(3)	33(100)
Total		124 (23.1)	188 (35)	170 (31.7)	27(5)	28(5.2)	537(100)

**All figures in bracket are in percentages (%)*

KEY: **A**-Defecation in abandoned/ uncompleted buildings; **B**-Open Spaces; **C**-Use of Polythene bags and disposed into open drains or streets; **D**-others; **E**-None.

Source: Field work, 2020

findings of Abubakar (2018) that OD is least practiced in Urban areas of North-west Nigeria, which metropolitan Kaduna is part of the zone. The predominant form of OD occurs more (35%) at Open spaces, 31.7% in polythene insitu disposal in drains and streets 23.1% in abandoned buildings, 5.2% as others such as railway lines, backyards, dumpsites and undeveloped plots. In addition to the aforesaid, 90% of households in Sabon Tasha medium-low density practice other forms of open defecation in abandoned and uncompleted buildings. Households in high densities of Doka (52.9%), Unguwan Rimi (46.7%), Sabon Tasha (41.3%) and Unguwan Mu'azu/ Kabala West (38.9%) reported OD in polythene bags and

disposed into open drains or streets popularly called 'flying toilets' or 'short put'. Medium-low density households of Doka (69.4%), Unguwan Mu'azu/Kabala (54.5%) and Unguwan Rimi (51.9%) indicated OD in open spaces (such as vacant plots, back yards, railway line, solid waste collection points and unkempt bushy) as shown on Plates 1 and 2. This agrees with the position of Akpabio et al. (2021) that, OD in Nigeria occurs in gutters, roadsides, garbage spots and open water bodies, amongst other places.

The OD expressions in the medium-low density residential neighbourhoods can be attributed to the presence of vacant plots and ongoing construction sites without perimeter fence.

Thus, easily accessed by people who could be passers-by. In contrast, the high-density neighbourhoods are densely built-up areas with fewer open or abandoned buildings that would allow Open defecation (OD). This necessitates the use of polythene bags and dispose in open drains and streets. This is to the use of unimproved pit latrines option that some households seldom use. The entire metropolis accounts for 35% of open defecation in open spaces. 31.7% in polythene bags and disposed in open drains and streets, 23.1% in uncompleted/ abandoned buildings and in other places 5%, who perhaps defecate in a pit with a collapsed superstructure (see plate 3).

The influence of the external or environmental factor creating the opportunity for the people to engage in OD at the vacant plots, in situ disposal and open spaces in the environment they find themselves, no wonder the variation across the strata of residential densities, agreeing with the postulations of Bandura (1986) social cognitive theory, “that people’s behaviour is driven by environmental conditions where a behaviour (emerging OD in vacant plots, open spaces, abandoned buildings and in situ disposal) is executed. However, the planned behaviour of not using a pit latrine had made some residents to engage in in situ disposal via “short put” into open drains and streets.



Plate 1: A man seen openly defecating close to a rail line in Doka High density.
Source: Field survey, 2020



Plate 2: Feaces found at an open space along Sokoto road, Doka Medium-low density
Source: Field survey, 2020



Plate 3: Collapsed Simple Unimproved Pit Latrine for in situ disposal at Sabo High
Source: Field survey, 2020

It is worthy of note that the emerging forms of OD as established in Table 4 reveals other forms order than the conventional OD as established by the WHO, UNICEF/ JMP (2017, 2020) that OD occurs in the open such as in the fields, bushes, canals and other open spaces (dumpsites) that affront human dignity.

By the aforesaid results OD occurs at uncompleted/ abandoned buildings, within a resident without a structure insitu disposed at holes and vacant plots within the built-up environment that affront human dignity. By implication, the study area where OD is practiced is highly susceptible to faecal oral route transmission of sewage/ water borne diseases such as Hepatitis A, E, and F, Viral diarrhoea, cholera, salmonellosis, typhoid, paratyphoid, amoebiasis, malaria and *Escherichia coli* as ascertained by Bartram and Caincross (2010), WHO (2006), WHO and UNICEF (2013) and Ogbonna and Erheriene (2017) that, areas that are not open defecation free are highly liable to the aforementioned diseases and would encourage the spread of diseases. Abebe and Tucho (2020) further revealed that, settlements with free OD had experienced less prevalence of diarrhoea and fecal associated diseases, and with improved healthiness of the people.

4. CONCLUSION AND RECOMMENDATION

Open Defecation is practiced in Kaduna metropolis in the conventional forms such as at the open spaces and drainage lines as established by the WHO, UNICEF/ JMP (2020) and also emerging forms such as insitu disposal on collapsed toilets and “short put”, uncompleted/ abandoned buildings, railway tracks found in the high-density areas and some the medium/ low residential built-up areas of metropolitan Kaduna. Consequently, affront to human dignity and public health importance.

The study recommends that, all uncompleted buildings and or undeveloped or vacant lands should be secured with a perimeter fence by property owners to reduce soft targets for other forms of OD. Surveillance and Monitoring of the hot spots of OD should be encouraged by establishing OD Community Abatement Committee. Awareness and campaigns should be done to strengthen public education on the risks associated with OD, to curb the unhealthy practice.

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