MAAUN INTERNATIONAL MULTIDISCIPLINARY JOURNAL OF RESEARCH AND INNOVATIONS (MIMJRI)
A Publication of the Institute of Africa Higher Education Research and Innovations (IAHERI)
in Collaboration with
Maryam Abacha American University of Niger (MAAUN) Maradi, Niger Republic
Maiden Edition/Volume 1, October, 2023
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v1i001.40

Pattern and Distribution of Open Defecation Practices in Kano State, Nigeria.

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Abstract
Nearly one (1) billion people still practice open defecation globally, and a further 1.4 billion use unimproved toilet facilities. Up to one hundreds and five (105) million Nigerians still do not have access to safe and improve toilets facilities; and out of this figure, nearly forty (40) million practices open defecation in Nigeria. The overall aim of the study was to determine the pattern of distribution Open Defecation (OD) practice in Kano State, Nigeria. The study was conducted using a mixed design by combining both quantitative and qualitative techniques. A total of 423 head of households participated in the quantitative study within six (6) LGAs in Kano State and Twelve (12) communities were observed for evidences of OD practices. Findings from the study revealed that 30% of the respondents were within 26-35 years and are mostly (79.9%) males with 37.2% of them having a family size of 6-10 persons. The findings showed that 95.7% had toilet facility at home but 47.0% currently reported practice of open defecation. The results of observation showed that more than half of the 12 communities observed lacked public toilets and 8 out of 12 communities observed were categorized to be of moderate and high level of open defecation practice. The study concluded that there was high level of open defecation in the State with close to 50% of the respondents practicing open defecation. It was therefore, recommended that public health nurses, Kano State Government, community leaders and community members have an important role such as mass campaign, review of all outdated policies on OD.
Keywords: Pattern, Distribution, Open Defecation, Practices

Introduction

Nearly 1 billion people still practice Open Defecation (OD) globally, and a further 1.4 billion use unimproved toilet facilities (United Nation Children Fund/Water Sanitation and

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Hygiene, 2017). The problem is principally severe in India, where 44% of the population still practice OD and only 40% use improved sanitation, (WHO and UNICEF, 2015). United Nations reported that, about 82% of the 1 billion people practicing OD in the world lived in just 10 countries: India, Indonesia, Pakistan, Nigeria, Ethiopia, Sudan, Niger, Nepal, China and Mozambique (UN, 2014). OD is defined as discharge/dumping of faecal substances in the fields, street gutters, bushes, bodies of water, and other open spaces (Babalobi, 2014). In 2015, the United Nations launched the Sustainable Development Goals (SDG) and Goal number 6 aims at ensuring availability and sustainable management of water and sanitation for all with a key target for this goal being to eradicate OD by the year 2030.

In sub-Saharan Africa, estimated 215 million people practice OD, (John, 2017). Majority of OD practices, referred to in national health surveys as defecating in fields, forests, bushes, bodies of water or other open spaces occur in rural areas of low-income countries. Despite the fact that the proportion of people practicing OD in sub-Saharan Africa has declined by 23.5 million from 1990 to 2010, the total number of people practicing OD has actually increased by 33 million over the same time period due to population growth (WHO/UNICEF, 2014). In 2010, OD was practiced by 8% of the urban population and 35% of the rural population in sub-Saharan Africa (WHO/UNICEF, 2014).

It is estimated that 1.7 billion cases of diarrhoea occur every year, causing approximately 800,000 deaths among children under 5 years of age worldwide (WHO, make every mother and child count, 2015). While the diarrhoeal diseases responsible for a high number of deaths among young children and vulnerable persons receive the most attention, OD is also a virtually sure route for the spread of helminthic infections which interfere with growth and cognitive development and impede educational and vocational aspirations (Clasen, Schmidt, Fung, & Jenkins, 2014).

While the provision of toilets to all is an important strategy in the fight to address OD, the assumption that opens defecation ends where toilets begin is faulty. This flawed assumption can be found in many of the campaigns and reports produced by organisations promoting improved sanitation and eradicating OD which often declare areas which have been provided with toilets as “open defecation free” (Mollins, 2018). As a result of this error, the data on OD is often skewed, presenting the picture that it has been eliminated while in reality it may well be continuing concurrent with the availability of basic sanitation. This means that sanitation interventions are not as effective as they may be considered to be, and this gap represents a serious health problem that is not being properly mapped or understood (Mollins, 2018).

Open defecation is strongly associated with incidence of diarrhoeal disease, prevalence of helminthic infection and stunting, especially in children less than five years of age. Globally, almost 1 billion people always practice OD, having no toilet at home; the majority are rural dwellers in less-developed countries (WHO/UNICEF, 2014). Nigeria is home to a significant number of open defecators and has experienced the largest increase in the number of open defecators of any country during the past 15 years, increasing from 23 million in 1990 to 39 million in 2012 (WHO/UNICEF, 2014). Out of the one billion people that practice OD worldwide, about 49 million are Nigerians. It was however estimated that around 68 million

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Nigerians are likely to be added between now and 2025, if concerted efforts were not made to arrest the problem (Olajuyigbe, 2016; Musbau, 2014).

Nigeria was ranked 4th among countries with higher percentages of OD as of 2014, but earlier in the year 2019, a Water Sanitation and Hygiene (WASH) survey conducted by the United Nations Children's Fund (UNICEF) showed the prevalence of OD in Nigeria. This survey ranked Nigeria as the African country with the highest number of populations still practicing OD and the second ranked country after India, globally (Adedigba, 2019). Anecdotal reports by WASH stated that Kano State contributes significant proportion of open defecators in Nigeria (Adedigba, 2019). According to World Health Organization (2015), 88 percent of diarrhoea cases are attributable to poor excreta management. Diarrhoea is the second largest killer of children below five years, only next to pneumonia yet OD practice is commonplaces in Nigeria and Kano State specifically (WHO and UNICEF, 2015; Musbau, 2014). The persistent practice of OD in residential areas, commercial areas, industrial areas, worship areas such as Mosques peripheral areas and Riverine areas within Kano metropolis and rural areas often poses serious health risks to many residents and is becoming alarming (Musbau, 2014)

Materials and Methods:

Research Design and Instrument:

Mixed design was used by combining both quantitative and qualitative techniques. Descriptive cross-sectional design was used to establish the pattern of distribution of OD in the three senatorial districts of Kano State, Nigeria, while exploratory design was used to confirm the practice of OD. Two (2) instruments were used for the study: Interviewer Administered Questionnaire and Environmental Observation Checklist.

Interviewer Administered Questionnaire was developed by the researcher in line with the study objectives after reviewing various relevant literatures. The questionnaire was divided into two (2) main sections: Section A focused on socio-demographic characteristics of the study participants with eleven items (11); section B comprises of questions on the practice and pattern of distribution of OD by community members with ten (10) items.

Environmental Observation Checklist was used to support findings obtained from the section B part of the questionnaire for the first objective of the study. The environmental observation checklist was adapted by the researcher using from (Joint Monitoring Programme, 2019; WHO/UNICEF, 2014; UNICEF/WASH, 2017). It assesses the level of OD practice and pattern of distribution in each selected community/political ward. The checklist also observes the number of faeces within Normal Eye Sight Radius. Normal Eye Sight Radius technique indicates counting the total number of faeces defecated within the sight of an observer radius (Joint Monitoring Programme, 2019; WHO/UNICEF, 2018).

Setting:

The study was conducted in the three senatorial zones of Kano State, North western Nigeria. The State lies between latitude 13^0 North in the North and 11^0 North in the South and longitude 80^0 West in the West and 10^0 in the East. The total land area of Kano State is 20,760sq kilometres with 2021 projected population of 15,076,892 based on the official 2006 National population census figures. Kano State borders Katsina State to the north-west, Jigawa State to

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the north-east, Bauchi State to the south-east and Kaduna State to the south-west. Kano State is located in the Northern Nigeria, in the Sahelian geographic region south of the Sahara (Iliffe, 2017). Kano State was created under this name on May 27th 1967, when Nigeria assumed 12 States structure. Kano is the capital of the State and administratively, it is divided into 44 Local Government Areas (LGAs) which form twenty-four federal constituencies and three (3) senatorial zones. The 3 senatorial zones are Kano central with 15 LGAs, Kano north with 14 LGAs and Kano south with 15 LGAs (Citypopulation, Nigeria: Federal, States and major cities-statistics and maps on city population, 2021).

Target Population:

The target population for this study are adult residents, heads of household, women leaders, youth leaders, Community health officers, heads of Local Government Area (LGA), health departments, trained PHC CORPS, Kano State Orientation Agency, political leaders, traditional rulers, Malaman Tsangaya (Traditional Islamic School Teachers), Chairmen of market associations and Heads of households of Kano State Nigeria from the six LGA. The 2021 projected population in the six LGAs were as follows:

Table 1.1: Showing the population of LGA selected for the study

S/No	LGA	Population
1.	Kano Municipal	516,400
2.	Garun Malam	165,000
3.	Gwarzo	255,400
4.	Tofa	137,200
5.	Rano	206, 200
6.	Bebeji	266,900

(Citypopulation, Nigeria: Federal, States and major cities-statistics and maps on city population, 2021)

Sample Size and Sampling Technique

The sample size for the Descriptive study (Quantitative) was determined by using a single population proportion formula used in household surveys (Tessema, 2017):

$$n = Z^2(1 - \alpha/2) \text{ x } (P(1 - P))/d^2$$

Where: n= minimum sample size

Z= Normal Standard Deviation = 1.96 at 95% C.I

α= (1-p) = 1- 0.50= 0.50

p= prevalence rate = 0.50 (Tessema, 2017)

d= degree of error = 0.05

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$$n = \frac{0.50 \times 0.50 \times (1.96)^2}{(0.05)^2}$$

n= 385

By considering the desired precision of (d^2) 5%, a 95% (Z1-∞/2) with normal distribution of 1.96 and P of 0.5, the final sample size was **423** including 10% non-response rate.
A multi stage sampling technique was used in the study for the quantitative aspect where:

Stage One: Selection of LGAs from the senatorial zones

Two LGAs in each senatorial zone; one rural and one urban/semi-urban were selected for the study using simple random sampling (Paper-Basket method) from groups of rural and Urban/Semi-urban LGAs in each senatorial district. All rural LGAs and Urban LGAs were grouped together before random selection is made.

Stage Two: Selection of Wards from the selected LGAs

At this stage, each LGA selected above was divided into its political wards. One political ward was randomly selected using paper-basket method from each participating LGA to conduct the study. The 423 copies of questionnaires were proportionately distributed based on the population size of the LGA

Stage Three: Selection of Settlements or Villages from the selected Wards

Two settlements or villages were randomly selected using paper-basket method from each selected ward to participate in the study, making a total of twelve (12) settlements or villages. The table below shows the selected settlements or villages:

Stage Four: Selection of Households from the selected Settlements or villages

Households were selected using systematic sampling technique with list of house numbering serving as sampling frame. From each household, adult members were recruited to answer the quantitative research aspect using the Interviewer Administered Questionnaire (IAQ). Where there is no adult member in a household at the time of data collection, the next household was selected to replace the missing one.

Ethical Considerations

Ethical clearance was obtained from operational research and ethical committee of Kano State Ministry of Health with number MOH/off/797/T.I/1132 and permission from the LGAs selected for the study was sought. An informed consent was obtained from each study participants after they had been given an explanation of the research, and what they were expected to do and informed that their participation is voluntary.

Data Analysis

The interviewer administered questionnaires were reviewed for completeness prior to coding. It was considered complete when it was at least 85% responded, else it was rejected. However, because it was interviewer administered, all the 423 questionnaires were retrieved, the data was then coded, sorted and cleaned for analysis using SPSS version 23. All statistical data were

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entered in the Statistical Package for Social Sciences (SPSS) version 23. Data were organized, tabulated and analysed using both descriptive and inferential statistics.

Table 1.2: Showing the Environmental Observation Checklist Analysis Plan

Observation criteria	Level of OD Practice
No faeces sighted	ODF
1 – 3 faeces sighted	Low level of OD practice
4 – 7 faeces sighted	Moderate level of OD practice
> 7 faeces sighted without fresh faeces	High level of OD practice
> 7 faeces sighted including fresh faeces	Very High level of OD practice

(Joint Monitoring Programme, (2019); WHO/UNICEF, (2018); UNICEF/WASH, 2017)

Result

Participants of the study were drawn from six local government areas of the State using the existing geo-political zones. A total of 423 respondents participated in the descriptive cross-sectional design and 12 communities were randomly selected for observations of OD practice.

Table 1.3: Distribution of Respondents According to the Socio-Demographic Characteristic. n=423

Socio-Demographic Characteristics		n	%
Age (in Years):			
16-25		73	17.2
26-35		127	30.0
36-45		101	23.9
46-55		57	13.5
56 and above		65	15.4
Range:	**16 - 90**		
Mean ± SD:	**39.7±15.3**		
Sex:			
Male		338	79.9
Female		85	20.1
Family Size:			
1-5		130	30.7
6-10		157	37.2
11-15		78	18.4
16 and above		58	13.7
Mean ± SD	**9.5±6.9**		
Highest Educational Qualification:			
No formal education		289	68.3
Primary education		18	4.3
Secondary education		59	13.9

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Tertiary education	57	13.5
Occupation:		
Public/Civil Servant	54	12.8
Farming	26	6.1
Business/Petty Trading	119	28.1
Artisans work	45	10.6
Unemployed	179	42.4
Marital status:		
Married	353	83.5
Single	16	3.8
Divorced	8	1.9
Widow	46	10.8
Ethnicity:		
Hausa/Fulani	341	80.6
Fulani	63	14.9
Others	19	4.5
Estimated Family Monthly Income status:		
≤ ₦30,000/Month	290	68.6
> ₦30,000 to ₦60,000/Month	106	25.1
> ₦60,000 to ₦90,000/Month	15	3.5
> ₦90,000/Month	12	2.8
Religion:		
Islam	419	99.1
Christianity	4	0.9
Residential Setting:		
Rural	227	53.7
Urban/Semi Urban	196	46.3
L.G.A of Residence:		
Kano Municipal	141	33.3
Garun Malam	45	10.6
Rano	56	13.2
Gwarzo	70	16.5
Tofa	38	9.0
Bebeji	73	17.3

This section presents the socio-demographic characteristics of respondents. Variables covered include age in years, sex/gender, family size, Highest Educational Qualification, occupation, marital status, ethnicity, Estimated Family Monthly Income status. Other variables such as religion, residential settings and Local Government Area of residence are all presented in this section.

The results in table 1.3 revealed that participant were within the age range of 16-90 years with mean and standard deviation of 39.7±15.3 years. Majority of the respondents (30%) were

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within 26-35 years and are mostly (79.9%) males with 37.2% of them having a family size of 6-10 persons. The table also revealed that 68.3% of the respondents had no formal education, are mostly unemployed (42.4%) and therefore, majority (68.6%) of them earned less than or equal to 30,000 Naira per month using the Nigerian minimum wage for family income status. Overwhelming majority (83.5%) were married from Hausa/Fulani (80.6%) ethnic group with more than half (53.7%) living in the rural setting.

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Table 1.4: Distribution of Respondents According to Access to Toilets and Practice of open defecation (n=423)

Access to toilets/Practice of Open Defecation	n	%
Presence of Toilet Facility at Home:		
Yes	405	95.7
No	18	4.3
Type of Toilet at Home: (n=405)		
Flush to sewage	5	1.2
Flush to Septic tank/pit	66	16.3
Pit with slab	117	28.9
Latrine without slab	217	53.6
Number of toilets at home: (n=405)		
Just one	298	73.6
Two	82	20.2
Three	20	4.9
Four (4) and above	5	1.2
Presently Have a Functioning Toilet at home: (n=405)		
Yes	290	71.6
No	115	28.4
Places for defecation when toilet is full/Not usable: (n=405)		
Public toilet	21	5.0
Share neighbour's toilet	203	48.0
None of the above	199	47.0
Presence of Public Toilet in the community:		
Yes	187	44.2
No	236	55.8
practiced open defecation		
Yes	199	47.0
No	224	53.0
Preferred places for open defecation (n=199)		
Defecates in the bush	155	77.9
Defecates in the river	26	13.0
Defecates in gutters	17	8.5
Any open space	1	0.6
Places to dispose children's faeces:		
Disposed to the toilet	408	96.5
On the street	1	0.2
Disposed to the backyard	1	0.2
Any open space	3	0.7
Other spaces	10	2.4
Places for defecation during ceremonies and large gatherings:		

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Public toilet	396	93.6
Share neighbour's toilet	15	3.5
Defecates in the bush	5	1.3
Defecates in polythene bag	7	1.7

In assessing the pattern of distribution of OD in Kano State, access to toilets/latrines and practice of OD were studied such as presence of toilets at home and communities, including the types and number of toilets presence. This section also described the presence of functional toilets at home and communities and also described the preferred places for OD among those who practice OD.

Table 1.4 above revealed that 95.7% had toilet facility at home where most of them (73.6%) had just one toilet but slightly above half (53.6%) of the toilets were latrines without slap cover, however, only 71.6% reported that their latrines were functional. 55.8% of the participants reported that there were no public toilets in their communities and therefore 48% of them shared neighbours' toilets when their toilet is filled or not usable. The table also revealed that 47.0% currently practice OD at the time of data collection and majority (77.9%) of those who practice OD preferred to defecates in bush rather than rivers or gutters. 96.5% of the respondents reported that they disposed off the children's faeces in the toilets and another 93.6% reported that they defecate in public toilets during ceremonies and large gatherings.

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Table 1.5: Availability of Toilet facilities at Community and School Level Using Observational Environmental Checklist (EOC) (n=12)

Toilet facilities	Communities/Settlements												n & % Available out of 12 Communities
	G/ Albasa II	Jakara Ksw	Ruru m S/Gar i	U/K adir i	Damu nawa	Taban ni	U/ Fak o	Lamb u C/Ga ri	Yakuw a	Cikin Gari	B/ Kasu wa	Ciro ma wa	
Availability of public toilets in the Community	√	√	X	X	√	√	X	√	X	X	X	X	**3** (41. 7%)
Number of public toilets in the community	3	1	0	0	1	1	0	1	0	0	0	0	**NA**
Availability of toilets in school[1]	√	√	X	X	√	√	X	√	X	√	√	X	7 (58.3%)
Number of toilets in school[1]	9	7	0	0	3	2	0	5	0	4	3	0	**NA**
Accessibility of the toilets in school[1]	√	√	X	X	√	√	X	√	X	√	X	X	6 (50%)
Availability of water and sanitation facilities in toilets	X	X	X	X	X	X	X	X	X	X	X	X	0 (0.0%)
Toilet connected to closed septic tank	√	√	X	X	√	√	X	√	X	√	√	X	7 (58.3%)
Toilet discharges into the river or open space	X	X	X	X	X	X	X	X	X	X	X	X	0 (0.0%)

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Availability of hand washing facilities in toilets	X	X	X	X	X	X	X	X	X	X	X	X	0 (0.0%)
Functioning and clean toilets[2]	√	X	X	X	X	X	X	√	X	√	X	X	3 (25.0%)
Separate toilets for teachers in school[1]	√	X	X	X	X	X	X	X	X	X	X	X	1 (8.3%)
Toilets covered	√	X	X	X	X	X	X	√	X	√	X	X	3 (25.0%)

√: Available/Accessible **X: Not Available/inaccessible** **NA: Not Applicable**

[1]: P*ublic schools only. One school was selected at random in a community with more than one public school.*

[2]: Clean toilet at the time of observation only

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A total number of 12 settlements or villages were observed for practice of OD to support finding of the descriptive part of the study.

The findings from table 1.5 above indicated that majority of the settlements observed lacks public toilets where only 41.7% observed had public toilets. However, 58.3% of the settlements had toilets in schools but all of them lacked water, hand washing and sanitation facilities and only 25% of the toilets are clean and functional at the time of observation. However, more than half of the settlements (58.3%) had toilets connected to close septic tank with none discharging to the river or open space.

The Table 1.6 below showed that in all the 12 settlements or villages observed, none was found to be free from faeces on sight at the time of data collection. However, 2 out of the 12 (16.7%) had 1–3 faeces sighted but in 10 out of 12 (83.3%) had 4 – 7 faeces sighted. In about half (50.0%) of the settlements or villages the study observed more than 7 with fresh faeces at the time of observation. The table also revealed that only Gandun Albasa II was found to be classified as low level of practice of OD community but all the remaining communities were categorised as either moderate, high or very high level of OD practice and interestingly, settlements or villages were observed for discharge of faeces into rivers, gutters or leaking pipes/chambers but none was confirmed.

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Table 1.6: Number of Faeces Within Normal Eyesight Radius (NER) at Community Level Using OEC (n=12)

Observation Criteria	Communities/Settlements												n & % out of 12 Communities
	G/ Albasa II	Jakara Ksw	Ruru m S/Gari	U/K adiri	Damunawa	Tabanni	U/ Fako	Lam bu C/Gari	Yakuwa	Cikin Gari	B/ Kasuwa	Cir om awa	
No faeces sighted	X	X	X	X	X	X	X	X	X	X	X	X	0.0 (0.0%)
1 – 3 faeces sighted	√	√	X	X	X	X	X	X	X	X	X	X	2.0 (16.7%)
4 – 7 faeces sighted	X	X	√	√	√	√	√	√	√	√	√	√	10.0 (83.3%)
> 7 faeces sighted without fresh faeces	X	X	X	√	X	X	√	X	√	X	√	X	4.0 (33.3%)
> 7 faeces sighted with fresh faeces	X	√	X	X	√	X	√	X	√	X	√	√	6.0 (50.0%)
Number of people defecating on sight	0	2	0	0	1	0	0	0	3	0	2	0	NA
Number of sites where toilets discharges to open space	0	0	0	0	0	0	0	0	0	0	1	0	NA
Level of OD Practice	**Low level**	**High Level**	**Mod. Level**	**High Level**	**High Level**	**Mod. Level**	**V.High Level**	**Mod. Level**	**V.High Level**	**Mod. Level**	**V.High Level**	**High Level**	

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Maiden Edition/Volume 1, October, 2023
ISSN: 3027 – 0294 DOI: https://doi.org/10.59479/jiaheri.v1i001.40

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Communities were observed for discharge of faeces into rivers, gutters or leaking pipes/chambers but none was confirmed.

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Discussion

Finding from this study revealed that almost all the respondents had toilet facility at home where most of them had just one toilet but of the toilets were latrines without slab cover. This finding could be due to the fact that most people consider building toilet at home as necessary but as stated by Routray, Wolf-Peter, Sophie, & Thomas, (2015) that those who own a latrine often do not use it regularly. A national survey in 2010 found that even in villages designated open defecation free (ODF), up to 50 % of newly constructed latrines were not used. In some high coverage villages in Odisha, 83 % of households had toilets, but only 48 % reported using them World Bank WSP, (2019). However, this finding is in disagreement with the findings of Essuman, (2015) in a similar study conducted in Ghana where he reported that only 51% had toilet facilities in their houses while 49% did not have toilet facilities in their houses, he further stated that the reason behind them not having the toilet facilities in their houses was entirely attributed to the landlord's unwillingness to construct toilet facilities due to financial problems and ignorance (Essuman, 2015).

The table also revealed that slightly less than half of the respondents currently practice OD at the time of data collection and majority of those who practice OD preferred to defecates in bush rather than rivers or gutters, this finding is in contrast to the finding of Marylin, Jojok, & Purnomo, (2016) who conducted a similar study in Indonesia reported that 68.6% of the participants practice OD. 96.5% of the respondents reported that they disposed off the children's faeces in the toilets and another 93.6% reported that they defecate in public toilets during ceremonies and large gatherings. The findings observed the availability of toilet facilities at community and school level using observational environmental checklist. The table indicated that majority of the communities observed lacks public toilets where only two-third of the communities observed had public toilets; this was complementing and supporting the descriptive findings in table 4.2.1 where two-third of the respondents reported that they have public toilets. However, more than half of the communities had toilets in schools but all of them lacked water, hand washing and sanitation facilities and only one-quarter of the toilets are clean and functional at the time of observation. This finding is in agreement with the finding of Yaw, (2010) where he stated that 52.25% of the 110 communities studied had public toilets in their schools but only 38.74% had hand washing facility which was in contrary to the findings of this study where none of the communities observed had such facilities. However, more than half of the communities had toilets connected to close septic tank with none discharging to the river or open space.

Findings in this section also observed that none of the communities were found to be free from faeces on sight at the time of data collection; this finding was complimenting the descriptive finding. However, 2 out the 12 communities had 1–3 faeces sighted but in 10 out of 12 had 4 – 7 faeces sighted. In about half of the communities the study observed more than 7 with fresh faeces at the time of data collection, this could be due the fact that OD was practiced widely in the State as reported by the descriptive data.

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Conclusion and Recommendations

Based on the findings of the study, it can be concluded that nearly half of the respondents within the participating LGAs practice OD and majority preferred defecating in the bush rather than gutters or in the rivers. Although overwhelming majority reported that they have toilet at home, more than half reported lack of public toilet in the communities and observation using checklist confirmed that.

Based on the findings from the contextualized framework of the study, the following recommendations were made:

1. Provision and setting of standards and specifications to guide ODF implementation strategies
2. Government through the sanitation Vanguards in the State should strategies ways of ensuring enforcement of OD policies and punishments to defaulters
3. Kano State should ensure provision of adequate public latrines at all strategies places especially around the markets, central mosque, industrial areas and Tsangaya schools through public private partnerships.

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