

ASSESSMENT OF EXCRETA DISPOSAL IN PHASE III SLUMS OF THE FEDERAL CAPITAL CITY ABUJA, NIGERIA

BY

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ABSTRACT

Excreta that are not disposed of or stored safely represents a health risk to man. It has been implicated in the transmission of many infectious diseases including diarrhoea, cholera, typhoid, hepatitis, polio, cryptosporidiosis, ascariasis and schistosomiasis. This paper examined excreta disposal in Phase III slums of in the Federal Capital City Abuja, namely. Five slum areas were identified out of which two were randomly selected. The selected slums have a total of 1734 housing units, where 400 units were obtained as our sample size. The units were numbered and a systematic sampling technique was employed in selecting the 400 housing units. In each housing unit, the first and eldest woman was sampled and been served with the questionnaire. A checklist was also used to record the observations. Results show that the commonest type of latrine used in the two slums is the pit latrine, this accounts for over 60%. Open defecation is still practiced in the two slums. Over 30% of the respondents in the two slums still wrap and throw children's faeces in the nearby bush. It also revealed that 65% of the households in the two slums hardly wash their latrines. The level of their personal hygiene is also poor, about 11% to 13% of the residents in the two slums used leaves for anal cleansing. Observation revealed some evidence of faeces around the household and 65% of the latrines in the slums are soiled, about 36% are infested with flies. The faecal-oral diseases prevalent in the two slums are diarrhoea (43%), typhoid fever (27%) and worm infestation (23%). There is a significant difference in the prevalence of faecal-oral diseases between and within the two slums. The study recommended that the resident in the slums should be sensitized to adopt community-led total sanitation.

Key words: Coronavirus disease, Faecal-oral diseases, Latrine, Open-defecation, Sanitation

INTRODUCTION

Humans generate between 0.7 and 1.7kg of excreta daily. Excreta is composed of 74.6% water, bacterial biomass 25–54% of dry solids, undigested carbohydrate, fiber, protein, and fat. Excreta has a median pH of 6.64 (Rose, Parker, Jefferson and Cartmell, 2015). It is estimated that one gram of human excreta may contain up to 10,000,000 viruses, 1,000.00 bacterial cells, 1000 parasitic cysts and 100 worm eggs (Harvey, 2007). Globally, 4.5 billion people have no access to improved sanitation facilities, of these, 2.3 billion have no access to basic sanitation facilities and 892 million practice open defecation (World Health Organization, 2017). Nigeria is among the countries with the highest rate of open defecation ranking 2nd in Africa and 5th globally in 2010. It has been reported that 34 million Nigerians practiced open defecation in 2010 (World Health Organization/United Nation International Children's Emergency Fund [WHO/UNICEF], 2012). In October 2019, Nigeria became the number one open defecation nation globally, passing India. It is estimated that 50 million Nigerians (or 10 million households) defecate in the open (UNICEF, 2019). The practice of open defecation results in water pollution, the transmission of infectious diseases such as diarrhoea, typhoid, cholera,

polio, hepatitis, ascariasis, etc., through person to- person interaction, water, and food. It is also a risk factor for violence against women and girls who, for example, may need to leave home in the dark to find somewhere to defecate (Adepoju, 2019).

The diseases transmitted through human excreta accounts for 4% of deaths in the world, and children are the most affected (Sugihara, 2020). Diarrhoea is the leading killer of children worldwide. It kills 2,195 children every day—more than AIDS, malaria, and measles combined (Centre for Disease Control and Prevention, 2015). In Africa, excreta-related diseases are a major contributor to 115 deaths per hour, it also contributes to huge economic losses. It leads to losses of approximately 1 to 2.5 percent of a country's GDP (UNEP, 2020) In Nigeria, diarrhoea accounts for 16 percent of deaths estimated at 150,000 annually (UNICEF, 2013).

The President of Nigeria, signed Executive Order 009 to stop open defecation by the year 2025. With this executive order, the National Open Defecation Free Roadmap was developed by the Federal Ministry of Water Resources. In collaboration with the Minister of Environment, Health and Education, the Ministry of Water Resources will provide two million toilets annually on or before 2025. That is about 2,635 toilets will be provided annually for 759 out of 774 Local Government Areas that are yet to be open defecation-free (Kalu, Etim, Okon and Eja, 2020).

Coronavirus disease-2019 (COVID-19) is a pandemic impacting countries all over the world. It is a severe acute respiratory illness caused by a novel coronavirus (SARS COV-2). Presently the disease has infected 195 million people globally and claimed 4.18 million lives. Studies by Xiao et al. (2020) and Chen, Chen, Deng, Zhang, and Wu (2020) have reported that infectious SARS-CoV- 2 viruses have been found in the faeces of patients with severe COVID-19. Elsamadony, Fujii, Miura, and Watanabe (2020), noted that there is a possibility of spread of COVID-19 disease through faecal-oral transmission or faecal-respiratory transmission through aerosolized faeces.

In Nigeria, about 80 million, representing 79 percent of the population are living in slums (UN-HABITAT 2016). The United Nations operationally defines a slum as "one or group of individuals living under the same roof in an urban area, lacking in one or more of the following five amenities: 1) Durable housing (a permanent structure providing protection from extreme climatic conditions); 2) Sufficient living area (no more than three people sharing a room); 3) Access to improved water (water that is sufficient, affordable and can be obtained without extreme effort); 4) Access to improved sanitation facilities (a private toilet, or a public one shared with a reasonable number of people); 5) Secure tenure (*de facto or de jure* secure tenure status and protection against forced eviction) (UN-HABITAT 2006/7).

The proliferation of slums in Abuja is a result of inadequate and non-affordable housing for all classes of the citizenry, rural-urban migration, urbanization, poverty, poor urban planning, poor infrastructure, social exclusion and economic stagnation (Eneh 2021). These slums are occupied by low-income people, it is densely populated and suffers from limited access to water, sufficient hygiene, sanitation, health care facilities, etc.

Several studies such as Kilakime, Amadi, Azuamah, Agwu, and Zacchaeus (2015), Abubakar (2018), Kalu et al., (2020) and Sridhar, Okareh and Mustapha (2020), have documented reports on poor excreta disposal and sanitation in Nigeria. With the recent increase in the spread of COVID-19 disease and the possibility of its spread through faecal-oral transmission or fecal-respiratory transmission through aerosolized faeces (Elsamadony et al., 2020), there is a need to raise awareness that appropriate precautions must be taken by the public and the government

to avoid potential transmission of numerous diseases including COVID-19 disease from poor excreta disposal. This paper aimed at assessing excreta disposal in two slums in Phase III of the Federal Capital City Abuja. While clinicians seek vaccines to reduce epidemic outbreaks, environmental scientists need to seek precautionary measures to stop the transmission of faecal-oral disease through improved sanitation.

THE STUDY AREA

The Federal Capital Territory (FCT) was created in 1976, it is 1,100km away from Lagos. It is located in the heartland of the country, it lies between Latitudes $8^{\circ} 25'$ and $9^{\circ} 21'$ north of the equator and Longitudes $6^{\circ} 45'$ and $7^{\circ} 39'$ east of the Greenwich meridian. Its area of land coverage is 8,000 km². The Federal Capital Territory is divided into six area councils namely: Abaji, Kwali, Kuje, Bwari, Gwagwalada and Abuja Municipal Area Council (AMAC). The Federal Capital City (FCC) is located within the Abuja Municipal Area Council. The FCC development programme was divided into five Phases namely: Phase I, II, III, IV and V (Figure. 1).

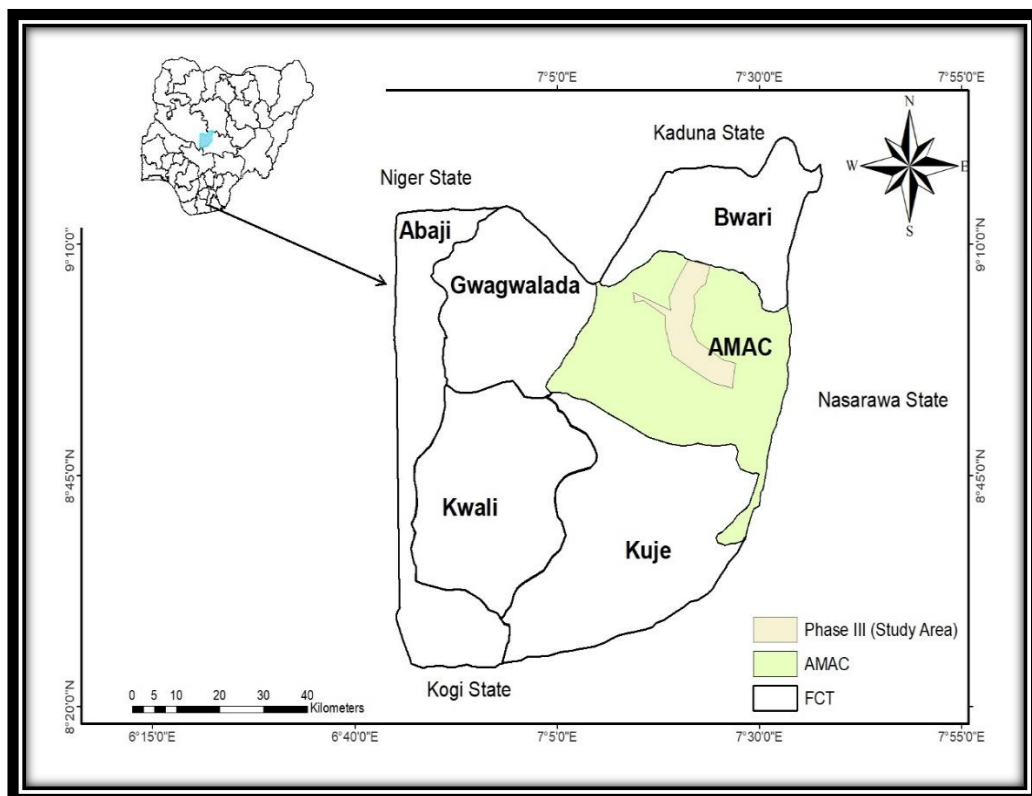


Figure 1: FCT showing Six Area Councils and FCC

Source: Adapted and Modified from the Administrative Map of Abuja

The city consists of about 93 districts in the 5 phases, 22 sector centers, and 3 Industrial areas, an Institution Research District as well as two Central area districts and a National park. The population of the FCC is estimated to be 3.2 million (World Bank, 2017). The study area is Phase III and it has 11 districts namely; Gwarinpa, Galadimawa, Dakwo, Lokogoma, Wumba, Saraji, Kabusa, Okanji, Pyakasa, Nbora and Karma. There are about 5 slum settlements in the study area.

MATERIALS AND METHODS

A descriptive cross-sectional survey was used for this study. The research utilized both primary and secondary data. The primary data were acquired through the use of a structured questionnaire, while the secondary data were sourced from government publications, textbooks, journals, newspapers and internet facilities. Five slum areas were identified in the study area, out of which two were randomly selected. The two slums selected were namely: Dakwo slum (in Dakwo district) and Dongo-Gada slum (in Lokogoma district). The housing units in each district were enumerated during the reconnaissance survey that is Dakwo slum with 980 housing units while Dongo-Gada had 754 housing units. The Sample Size was determined by adopting Yamane (1967) formula stated as follows:

$$n = N/1 + N(e)^2$$

where:

n = Sample Size

N = Study Population

1 = Constant

e = Error Margin of 5%

A sample size of 400 from a total of 1734 housing units was obtained for this study. The units were numbered and a random sampling technique using the Table of random numbers was employed in selecting the 400 housing units. In each housing unit, the first and eldest woman was sampled and served with a questionnaire. This is because culturally in Nigeria, women are saddle with the responsibility of caring for the family and cleaning the house. The latrine condition and its uses were collected by checklist through observation by the researchers. Data collection lasted for a period of three months (March 2021 to May 2021). The data were analyzed using a Statistical Package for Social Sciences (SPSS) and the results were presented in frequency tables. The chi-square statistics was used in testing the hypothesis stating that “there is no significant difference in the prevalence of faecal-oral disease in the two slums”.

RESULTS AND DISCUSSION

The results and discussion of this study are presented in five sections. The first section deals with the socio-demographic characteristics of respondents. The second section deals with, excreta disposal and practices. The third section deals with personal hygiene practice among respondents, while the fourth and fifth sections deal with findings from observation of latrines and surrounding and prevalent faecal-oral diseases in households within the 3 months respectively.

Table 1 shows the Socio-demographic characteristics of respondents in the two slums. It was observed that 50% are between the ages of 30 to 50 years. About 42% of them have had secondary school leaving certificates. Over 70% of respondents are tenants in the two slums. This concurs with Gulyani et al. (2010) study on slums in Dakar, Johannesburg and Nairobi.

Table 1: Socio-Demographic Characteristics of Respondents

Variables		Dakwo slum		Dogon-Gada slum	
		Frequency	Percentage	Frequency	Percentage
Age (in years)	Below 30	48	21.2	30	17.2
	30-50	115	50.8	99	56.8
	Above 50	63	27.8	45	25.8
Total		226	100	174	100
Educational Status	Quranic school	24	10.6	19	10.9
	Primary	50	22.1	34	19.5
	Secondary	95	42	73	41.9
	Tertiary	57	25.2	48	27.5
Total		226	100	174	100
Occupation	Civil service	77	34	51	29.3
	Trading	94	41.5	88	50.5
	Unemployed	55	24.3	34	19.5
Total		226	100	174	100
Household Ownership	Tenant	161	71.2	122	70.1
	Owner	65	28.7	52	29.8
Total		226	100	174	100

Source: Field Survey, 2021

In Table 2, the pit latrine with slab (44.6%) is the commonest type of latrine in Dakwo, while in Dogon-Gada it is the pit latrine without slab (39.9%). Open defecation is still practiced in the two slums (19% and 22.9% in Dakwo and Dogon-Gada respectively). Forty percent of respondents who practice open defecation attributed the reason to poor toilet conditions in their households. Over 30% of respondents in the two slums still wrap and throw children's faeces in the nearby bush. The findings of this study concur with many studies that have shown that poor sanitation, open defecation, and lack of awareness about hygiene have a greater impact on the health of people living in slums (Mudey, Kesharwani, Mudey and Goyal, 2010; Raj, Galhotra and Roja, 2019; Sridhar, Okareh and Mustapha, 2020). The use of pit latrines with a slab and pit latrines without a slab among the two slums, concur with the studies of Abubakar (2018) on the dominant types of sanitation facilities used in Nigeria that are cheaper to construct and maintain as compared to modern flush/pour toilets. Abubakar (2018) also noted that these types of sanitation facilities are more preferred by the poor, who constituted more than two-thirds of Nigerians.

Open defecation is still practiced in the study area, and this corresponds to various findings in developing countries (Reddy, Kusuma, Pandav, Goswani, and Krishnan, 2017; Sridhar et al., 2020). The main reasons for open defecation include unhygienic conditions of existing facilities, high cost of building a toilet and shortage of space at home (Ordinioha and Owmondah 2008; Okurut et al., 2015). Open defecation has dangerous effects on human health. Recent studies by Elsamadony et al. (2020) have shown that there is a possibility of spread of COVID-19 disease through faecal-oral transmission or faecal-respiratory transmission through aerosolized faeces. This is because coronavirus has been confirmed to be excreted in human waste (Chen et al., 2020). Lodder and de Roda Husman (2020), noted that the faecal-oral contamination route may be one of the concerns in developing countries because of insufficient sanitation systems.

Table 2: Excreta Disposal and Practices

Variables		Dakwo slum		Dogon-Gada slum	
		Frequency	Percentage	Frequency	Percentage
Types of toilet facility	Flush/pour toilet	30	13.6	21	12
	Pit latrine with slab	101	44.6	54	31
	Pit latrine without slab (open pit)	52	23	59	33.9
	Open defecation	43	19	40	22.9
Total		226	100	174	100
Disposal of children faeces	In toilet	25	11	17	9.7
	In-pit latrine	96	42.4	73	41.9
	Wrap and throw in the waste dump site	38	16.8	28	16
	Wrap and throw into the bush	67	29.6	56	32.1
Total		226	100	174	100
Location of toilet	Inside the compound	96	42.4	74	42.5
	Outside the compound	130	57.5	100	57.4
Total		226	100	174	100
No. of households using a toilet	Only 1	49	21.6	38	21.8
	2-4	115	50.8	87	50
	>5	62	27.4	49	28.1
Total		226	100	174	100
Important barriers to building a toilet	Lack of money	73	32.3	50	28.7
	Lack of enough space	56	24.7	41	23.5
	Not my house	97	42.9	83	47.7
Total		226	100	174	100
Reasons for Open defecation among residents		Dawko slum (n=43)		Dogon-Gada slum (n= 40)	
		Frequency	Percentage	Frequency	Percentage
	Many families sharing a toilet	15	34.8	13	32.5
	The poor condition of toilets	17	39.5	19	47.5
	No water	11	25.5	8	20
Total		43	100	40	100

Source: Field Survey, 2021

Table 3: Personal Hygiene Practice among Respondents

Variables	Dakwo slum		Dogon-Gada slum		
	Frequency	Percentage	Frequency	Percentage	
Things used for anal cleansing after defecation	Water	159	70.3	132	75.8
	Leaves	31	13.7	19	10.9
	Toilet roll	36	15.9	23	13.2
Total	226	100	174	100	
The thing used to wash hands after defecation	Water only	80	35.3	66	37.9
	Water and soap	74	32.7	51	29.3
	Ash	45	19.9	28	16
	No handwashing	27	11.9	29	16.6
	Total	226	100	174	100
Persons responsible for cleaning the toilet	Self (women)	98	43.3	105	60.3
	Children	62	27.4	37	21.2
	Paid labourer	11	4.8	10	5.7
	Men	55	24.3	22	12.6
Total	226	100	174	100	
Frequency of toilet cleaning	Daily	23	10.1	18	10.3
	Twice a week	54	23.8	40	22.9
	Once a week	83	36.7	43	24.7
	Rarely	66	29.2	73	41.9
Total	226	100	174	100	
Method of cleaning of toilet	Washing with water only	72	31.8	85	48.8
	Washing with water and soap	67	29.6	31	17.8
	Washing with water, soap and antiseptic	22	9.7	26	14.9
	Sweeping only	65	28.7	34	19.5
	Total	226	100	174	100
Household source of water	Water vendor	101	44.6	45	25.8
	Fetching borehole water by self	68	30	78	44.8
	Shallow wells	57	25.2	51	29.3
Total	226	100	174	100	

Source: Field Survey, 2021

In Table 3, the frequency of latrine cleaning in the two slums is poor, about 65% in the two slums hardly wash the latrine or only wash once a week. Even when washed, about 31% only wash with water. Personal hygiene among residents is also poor, about 11 to 13% of residents

in the two slums use leaves for anal cleansing. About 35% of respondents in the two slums use only water for hand washing after defecation. A small fraction of respondents (12% in Dakwo and 17% in Dogon-Gada) do not even practice handwashing after defecation. Only a small proportion of household wash hand with soap and water after defecation. The findings of this study are similar to those of the sanitation and hygiene survey carried out in the slum community of Kampala which found that many households did not have hand-washing facilities (Ssemugabo et al., 2021).

Soboksa et al. (2019) noted that good practices of using water and soap for cleaning hands after defecation is essential in preventing diseases. A safe toilet, safe water supply and hygiene provide an effective barrier to the transmission of diseases. The F-diagram (Figure 2), which was laid down by WHO and adapted by Ethiopia's One WASH National Programme (2017) shows the different faecal-oral transmission routes, and possible barriers to prevent excreta-related pathogens from finding a new host. Faeces that are not disposed of or stored safely represent a health risk for humans, since pathogens in faeces can be transmitted through many different routes to human-i.e. flies, contaminated foods, fingers (unwashed hands) through fields (crops) and fluids (water). All the transmission routes can be blocked through improved sanitation, safe water supply and changes in domestic hygiene practice.

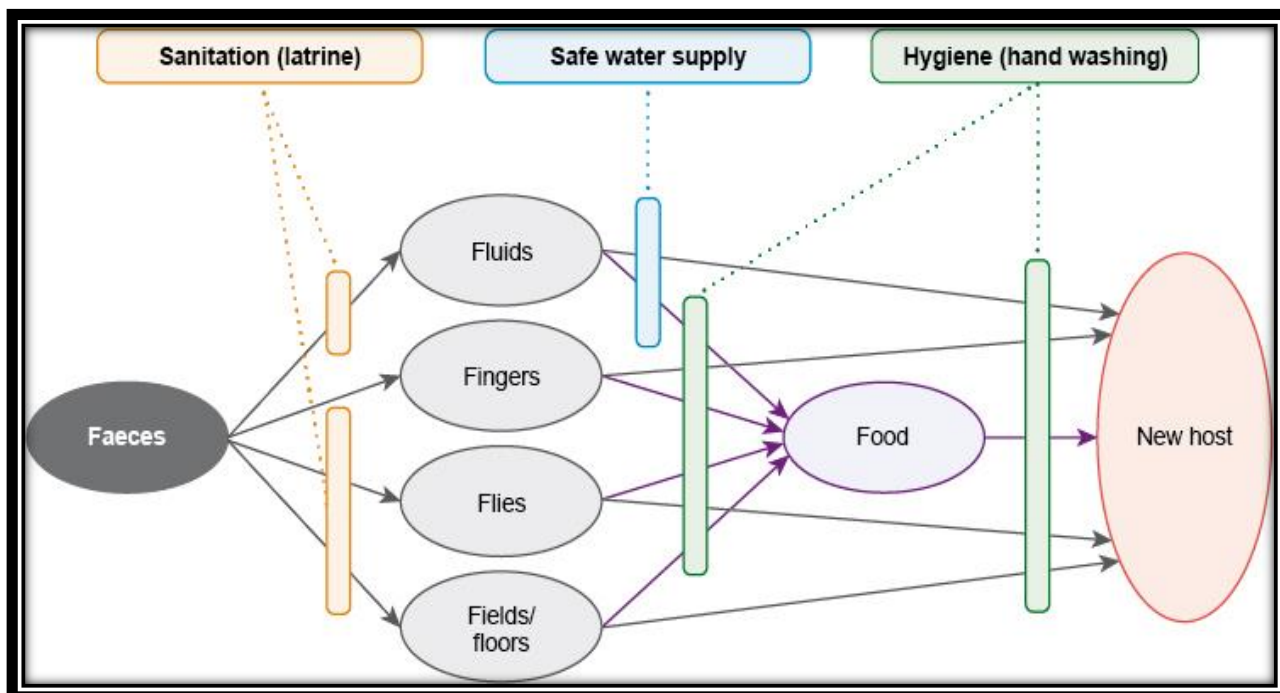


Figure 2: The F- diagram

Source: Ethiopia's One WASH National Programme (2017)

In Table 4, there is evidence of faeces around the household (4% in Dakwo and 10% in Dogon-Gada). The overall condition of latrines in the two slums are poor and very dirty (48% and 54% in Dakwo and Dogon-Gada respectively). Over 65% of the latrines in the two slums are soiled, about 36% are infested with flies and the majority (68%) need proper maintenance. This is similar to Kilakime et al., (2015) study in Tambiri II Community-Biseni, Bayelsa State, where the assessment of sanitation condition of toilets revealed that (98%) out of 280 households studied had dirty toilets compared to 5(2%) with clean toilets.

Table 4: Findings from Observation of Latrines and Surrounding

Variables		Dakwo slum		Dogon-Gada slum	
		Frequency	Percentage	Frequency	Percentage
Evidence of faeces around the premises	Yes	9	3.9	18	10.3
	No	217	96	156	89.6
Total		226	100	174	100
Physical characteristics of toilets	Soiled	149	65.9	128	73.5
	Infested with flies	82	36.2	76	43.6
	Has good ventilation	63	27.8	41	24
	Has a roof	94	41.5	53	31
	Has a door/ shutter	117	51.7		48
	Total		226	100	174
Overall condition of the toilet	Good	35	15.4	21	12
	Fair	83	36.7	59	33.9
	Poor	108	47.7	94	54
Total		226	100	174	100
The physical structure of the toilet	Need maintenance	152	67.2	130	74.7
	Need no maintenance	74	32.7	44	25.2
Total		226	100	174	100

Source: Field Survey, 2021

Table 5: Prevalent Faecal-oral Diseases in Households within the Last 3 Months

Diseases	Dakwo slum		Dogon-Gada slum	
	Frequency	Percentage	Frequency	Percentage
Diarrhoea	122	53.9	75	43.1
Typhoid	57	25.2	48	27.5
Worm infestation	45	19.9	41	23.5
Hepatitis	2	0.8	10	5.7
Total	226	100	174	100

Source: Field Survey, 2021

From Table 5, the faecal-oral diseases prevalent in the two slums are diarrhoea (43%), typhoid fever (27%) and worm infestation (23%). Dysentery and diarrhoea were more common among children under 5, relating to the findings in Nigeria by Yaya et al., (2018). Pruss-Ustun et al., (2019) also noted in their study, that diarrhoea was the leading cause of death under the age of 5 in developing countries. Excreta disposal is one of the most important determinants of child survival. The change from the use of unimproved to improved sanitation facilities reduced the child mortality rate by one-third (UN, 2013). Where sanitation facilities are absent or inadequate, the situation could lead to disease transmission, such as diarrhoea, cholera, typhoid fever, dysentery, hookworm, etc. especially through flies, fingers, contaminated food and water (Fig. 2).

Table 6: Chi-square Testing Prevalence of Faecal-oral Diseases in Two Slums in Phase III of the Federal Capital City, Abuja

Variable	Chi-square computed	df	Critical value of Chi-square at 0.05 SL	Remarks
Prevalence of faecal-oral diseases in two slums	10.85	3	7.81	Rejected

In Table 6, the calculated Chi-square value is 10.85 and the table value is 7.81, this shows that the calculated value is greater than the table value. This implies that the null hypothesis is not acceptable. Therefore, it is concluded that there is a significant difference in the prevalence of faecal-oral diseases between and within the two slums. The reasons for the differences could be as a result of respondents' educational status, income level and personal hygiene among others.

CONCLUSION

The study revealed that excreta disposal in the two slums is generally poor. The hygienic conditions of excreta disposal facilities were not satisfactory. The common excreta-related diseases in the community are diarrhoea, dysentery, typhoid, worm infestation and hepatitis. The study recommended that slums within the Federal Capital Territory, Abuja should be sensitized to adopt community-led total sanitation (CLTS). Community-led total sanitation is an approach that focuses on igniting a change in sanitation behaviour through community participation rather than constructing toilets alone. It does this through a process of social participation. It concentrates on the whole community rather than on individual behaviours and the collective benefit from stopping open defecation can encourage a more cooperative approach. People decide together how they will create a clean and hygienic environment that benefit everyone.

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