

Assessment of Excreta Disposal and its Health Implications in Tambiri Ii Community – Biseni, Bayelsa State, Nigeria

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ABSTRACT

An assessment of excreta disposal and its health implications was carried out from March to September 2014 in Tambiri Ii Community of Biseni Clan, in Yenagoa Local Government Area, Bayelsa State, Nigeria. The objectives of this study were to determine the knowledge of the people about proper excreta disposal; methods of excreta disposal; sanitary conditions of toilets; and common diseases associated with excreta disposal. A total of 280 heads of households were randomly selected for the study. Data analysis was done with computer aided designs, using IBM-SPSS Statistics Version 20.0 (IBM-SPSS Corp, Chicago, III, USA) and Microsoft Excel 2010. The study revealed that 265 (95%) out of 280 respondents practiced open defecation while 15 (5%) used flush/pour flush toilet. Assessment of sanitation condition of toilets revealed that 275 (98%) out of 280 households studied had dirty toilets compared to 5(2%) with clean toilets. The results showed that out of 280 respondents studied, 104(37%) reported that diarrhea was common in the community; 62(22%) identified typhoid fever; 61(21%) identified cholera; 44(16%) identified dysentery; 6(2%) identified Gastro Enteritis; while 3(1%) did not know the common diseases in the area. It was recommended that the

community should be sensitized and effectively mobilized to adopt Community-Led Total Sanitation (CLTS).

Keywords:

Excreta; sanitation; latrine; disease; hygiene

INTRODUCTION

Access to excreta disposal facility (sanitary toilet) is a fundamental human right of everyone and the key indicator of sustainable development. Evidence based studies also indicate that sanitary excreta disposal facility combined with hygiene (hand washing) serve as the most effective intervention for reducing disease mortality/morbidity rates, especially diarrhoeal diseases e.g. cholera, typhoid fever etc. It acts as a primary barrier in breaking the transmission cycle of these diseases. For example, provision of toilets alone can reduce the incidence of diarrhoea and deaths of children below 5 years by more than 30%, including malnutrition.

Human excreta is made up of solid matter and a liquid component, i.e. faeces mixed with urine, plus anal cleaning water that may contain common pathogens. 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^{3, 30}. In developing countries where sanitary excreta disposal facilities are lacking in the communities and open defaecation is the practice the risk of diarrhoeal disease transmission from constitutes major public health problems. Currently, an estimated 2.2 billion people across the world have no access to improved sanitation facilities, while 1.1 billion practice open defaecation. Nigeria with about 170 million population ranked 4th in the world and 1st in Africa among countries practicing open defaecation, as a result of poor access to sanitation. The practice is more popular in the rural and semi-urban areas where children and adults defecate indiscriminately at refuse dump sites, gutters or any available open space in the late hours of the night and early hours of the morning. This unhygienic practice poses serious adverse effects on public health, due to the high disease burden and heavy death toll caused by faeco-orally transmitted diseases such as cholera, typhoid, gastro-enteritis and parasitic diseases. For instance, hookworm, ascariasis and whipworm also contribute significantly to malnutrition and anaemia, especially in vulnerable groups such as those under 5 years and pregnant women²⁴. From the ongoing, it is clear that excreta disposal, especially in the rural communities remains a problem that should be given adequate attention. This could be attributed to various challenges which include lack of political will and commitment by government towards the promotion of sanitation services and programs, illiteracy and poor public enlightenment on sanitation programs, weak and poorly enforced Public Health Laws and ignorance of the public on the importance of proper excreta disposal⁴⁻⁷.

The technical objective of sanitary excreta disposal is to isolate faeces so that the infectious agents in them cannot reach a new host. This prevents or minimizes the transmission of disease due to environmental contamination by faecal matter or the proliferation of vectors³. Provision of improved sanitation technology options can help to achieve these objectives. Some of the technical options recommended for rural and semi urban communities include:

Pit Latrine with slab: This is the most common sanitation system in the world. It is based on containment and indefinite storage of human excreta. The system is also called 'drop-and-store'. It requires a reasonable amount of open space, soil that can be dug, low ground water level and a site that is not liable to flooding⁹. This method of excreta disposal is common in the rural areas and communities where water is scarce. Generally it consists of a pit and floor, including the superstructure. Simplicity, use of local materials in construction and low cost makes it affordable by majority of the people in developing countries^{1,6,10-12}. However, in places where the soil is weak, the sides of the pit may cave in and create large openings that constitute odor nuisance causing people to avoid using the pit. Apart from fly and odor nuisances, the warm hydrogen gas that comes out of the pit makes most people uncomfortable, especially women who believe that they can get infections by using the pit latrine, hence they avoid it¹².

Ventilated Improve Pit Latrine (VIP): The Ventilated Improved Pit (VIP) latrine is an improved pit latrine designed to minimize odor and flies. Unlike the ordinary pit latrine, a vent pipe covered with a gauze mesh or fly-proof netting is incorporated into the design to remove odorous gases from the pit, prevent flies entering the pit and trap any flies trying to leave. The vent pipe can be situated inside or outside the

latrine. The interior of the superstructure is usually dark to deter flies, but there is a gap, usually above the door to allow air to enter. This gap is at least three times the cross-sectional area of the vent pipe^{13,14}.

Aqua privy: An aqua privy is a tank filled with water into which excreta falls via a drop pipe. It uses a water seal to prevent odors getting out of the tank and a soak-away pit to dispose of sullage and effluent. The drop pipe in the tank extends below the surface of the water to prevent the escape of odors. The tank is usually watertight to ensure prevention of groundwater pollution. Hence it requires emptying about every three years^{10,15}.

Septic Tank: The septic tank also known as "on-site sanitation" is the most useful and satisfactory system of excreta disposal based on water-carriage in individual dwellings, small groups of houses or institutions located in areas out of reach of sewer system. It consists of a covered settling tank into which the raw sewage is flushed in from the building sewer. The processes which take place inside the septic tank are known as "Primary Treatment" of raw sewage; while those which occur in the disposal field form the "Secondary Treatment". It is the most convenient and environment friendly sanitation technology used in both rural and urban areas, provided a suitable site for the soak-away is available^{15,16}.

Pour-Flush Latrine: The pour-flush latrine, also known as water-seal latrine, is a type of pit latrine in which small volumes of water (usually 1 – 3 liters) is used to flush feces into the pit. It has a small collection pan placed on a slab in which excreta is deposited through a section of pipe bent into a U shape (a U-bend) to maintain a water seal for reducing fly and odor problems. The pit is usually connected to a soak-away to allow liquids to infiltrate the soil, leaving solid waste to decompose. Like the VIP latrine, twin pits are

provided, while one is used, the other is reserved until the first is filled before use¹⁹.

Ecological Toilet (Eco-San): According to the World Bank Groups²⁰, ecological sanitation is based on three fundamental principles which comprise preventing pollution rather than attempting to control pollution; rendering the urine and feces to make it safe for reuse; and using the safe products for agricultural purpose. This approach can be described as "sanitize and recycle", which is aimed at closing the nutrient loop²¹. Ecological toilet uses a minimum amount of water or no water at all which it is economical and environment friendly.

The Community – Led Total Sanitation (CLTS). This is a modern sanitation system whereby people in rural communities are assisted to do their own appraisal and analysis of hygiene/sanitation situation, come to their own conclusions, and take their own action. It is an approach or process that inspires and empowers local communities to stop open defecation and to make improvements in hygiene and sanitation. CLTS has a single objective which is to get people to see that open defecation is a problem and to see the need to do something about it. It focuses on changing sanitation and hygiene behaviors as the primary objective, rather than constructing toilets. In other words, the idea is to get people committed to changing their behavior first, before talking about the construction of toilets. Open defecation and hand washing with soap are the first behaviors to be changed, as these are the most effective behaviors for reducing diarrheal disease^{22,23}.

Therefore, the provision of sanitary toilet facilities, including CLTS is a basic step towards ensuring a safe environment and health of the people which should be advocated for, promoted and supported. It

is in view of this fact that the present study was carried out in Tambiri II Community in Biseni–Clan, in Yenagoa Local Government Area of Bayelsa State, Nigeria.

MATERIALS AND METHODS

The study adopted the descriptive design, using questionnaire survey, personal interview, including sanitary inspection of excreta disposal facilities, for data collection. Simple random sampling technique was used in the identification and selection of 280 respondents. In all, 35 respondents (heads of households) were selected from each of the 8 compounds to make up 280 respondents (heads of households) for the study. Excreta disposal facilities were assessed with the aid of a well-structured questionnaire distributed to the respondents to obtain relevant information. Descriptive statistics was used to summarize the data characteristics. Chi-square test for independent samples was performed on the association between the selected areas and the data factors at 5% significant level of probability values (p-values). All P-values less than 0.05 were considered to be significant, while P-values above 0.05 were taken to mean absence of lack of evidence of association. The data analysis was performed, using IBM-SPSS Statistics version 20.0 and Microsoft Excel, 2010, respectively.

The study area was Tambiri II community in Biseni Clan, Yenagoa Local Government Area of Bayelsa State, Nigeria comprising eight(8) compounds namely: Obosawari, Agbidewari, Ediwari, Itekiwari, Awuwari, Oweiwari, Amafeniwari, and Adehwari. Each of these compounds was headed by the oldest man. The major occupation of the people are fishing and farming, but fishing remains the main source of livelihood and income generation for the supply of basic needs.

The people of Tambiri II are both Christians and non-Christians alike, with few idol worshipers.

RESULTS

Table 1 showed that 265 (95%) out of 280 respondents practiced bush defecation; while only 15 (5%) used pour flush toilet. None of the respondents used pit latrine, communal latrine or rivers/stream. There was no significant association (p-value = 0.794) between the type of toilet facilities used and the compounds (households) sampled. From table 2, 98% of the 280 households studied had dirty toilets; while 2% had clean toilets. The test of probability value showed that there was no significant difference (p-value = 0.214) among the compounds in the community, which indicated poor hygienic conditions of toilets in the area studied. Table 3 showed that out of 280 respondents, 104 (37%) reported that diarrhea occurred in the community; 62 (22%) identified typhoid fever; 61 (21%) identified cholera; 44 (16%) identified dysentery; 6 (2%) identified Gastro Enteritis; while 3 (1%) did not know common diseases in the area. Half (50%) of the compounds do not have any knowledge of Gastro Enteritis as a disease associated with excreta disposal, and among these groups were Agbidewari, Amafeniwari, Ediwari and the Obusawari compounds. Statistically the common diseases associated with excreta was not found to be associated on particular compounds (p value = 0.140). The result implies that no significant difference exist among the locations on the most common diseases identified. Thus there are generally common excreta related diseases for all the compounds in the community. Table 4 represents the distribution for common diseases suffered among the people in Tambiri II Community, obtained from Tambiri II Health Centre records between 2009 and 2013. The table showed

that a total of 826 cases of excreta related diseases occurred in the community between 2009 and 2013, and of this number, gastro enteritis was the disease with most cases among the people, with 382 (46.2%) cases suffered within 4 years (2009 – 2013). Cases of Typhoid and Diarrhea were also high. Cholera had 26 (3%) cases and happens to be the least suffered excreta related disease in the area for the recent years. Table 5 indicated that 104 (37%) out 280 respondents earned ₦11,000 - ₦30,000 per month; followed 93 (33.2%) who earned less than ₦10,000; 43 (15.4%) earned ₦31,000 - ₦50,000 monthly; while 26 (9.3%) earned ₦51,000 - ₦80,000 monthly; and 14 (5%) earned above ₦80,000 per month. The income status among the compounds were found to have differed statistically (p-value = 0.001).

DISCUSSION

Open defecation is a common practice in developing countries where poverty is high, especially, in Sub-Saharan Africa^{8,24}. The practice is often encouraged by lack of access to sanitation facilities. In Nigeria for instance, more than 39 million people practiced open defecation in 2012 (WHO/UNICEF, 2014). Table 1 showed that 265 (95%) out of 280 respondents practiced bush defecation. This confirms that open defecation is a common practice in Bayelsa State, including Tambiri II Community in Biseni Clan according to Bayelsa State Economic Empowerment and Development Strategy (BY-SEEDS) report²⁵. The main reasons for the high levels of open defecation are as a result of low income level/poverty among the people as indicated in Table 5 in which 104 (37.1%) out of 280 respondents (heads of households) studied earned between ₦11,000 and ₦30,000. Other factors include lack of community participation in sanitation programs; ignorance of the

importance of proper excreta disposal; lack of proper information, education and communication on hygiene and sanitation; lack of enforcement of sanitation laws; lack of adequate policies and legislation^{4,5} etc. Table 2 further showed that two hundred and seventy five (98.2%) out of 280 households studied had dirty toilets; compared to 5 (1.8%) having clean toilets. The studies^{10,26} also outlined criteria for maintaining hygienic conditions of toilet facilities which include avoidance of handling of fresh faeces; prevention of faeces from flies, animals and vermin; as well as prevention of water and soil pollution. Excreta disposal is one of the most important determinants of child survival. The change from the use of unimproved to improved sanitation facility reduced child mortality rate by one third²⁷. But where sanitation facilities are absent or inadequate, the situation could lead to disease transmission, such as diarrhea, cholera, typhoid fever, dysentery, hook worm, etc.²⁸ especially through flies, fingers, contaminated food and water. The transmission of these diseases further contributes to poverty, low productivity, school absenteeism among school-age children, and poor quality of life; which are among the Millennium Development Goals²⁹.

In conclusion, this study revealed that most of the community residents did not use sanitary excreta disposal facilities. The hygienic conditions of excreta disposal facilities were not satisfactory, in addition to common complaints of excreta-related diseases such as diarrhea, dysentery, cholera, typhoid, and gastro enteritis in the community. Therefore, households within communities, especially in the rural areas should be sensitized to adopt community-led total sanitation. Government and other stakeholders should provide adequate funding for the planning and

implementation of community sanitation programs and projects.

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TABLES

Table 1: Types of toilet facility in households

Location	Flush/ Pour Toilet (%)	Pit Latrine (%)	Bush Defecation (%)	Communal Latrine	River/ Stream
Adehwari	3 (20.0)	-	32 (12.1)	-	-
Agbidewari	1 (6.7)	-	34 (12.8)	-	-
Amafeniwari	1 (6.7)	-	34 (12.8)	-	-
Awuwari	2 (13.3)	-	33 (12.5)	-	-
Ediwari	1 (6.7)	-	34 (12.8)	-	-
Itekiwari	1 (6.7)	-	34 (12.8)	-	-
Obosawari	3 (20.0)	-	32 (12.1)	-	-
Oweiwari	3 (20.0)	-	32 (12.1)	-	-

Total	15 (100)	-	265 (100)	-	-
Raw %	5%		95%		

Statistics P-value= 0.794, Chi Square = 3.874

Table 2: Hygiene conditions of toilet facilities

Location	Clean (%)	Dirty (%)
Adehwari	1 (20)	34 (12.4)
Agbidewari	-	35 (12.7)
Amafeniwari	-	35 (12.7)
Awuwari	-	35 (12.7)
Ediwari	-	35 (12.7)
Itekiwari	-	35 (12.7)
Obosawari	2 (40)	33 (12.0)
Oweiwari	2 (40)	33 (12.0)
Total	5 (100)	275 (100)
Raw %	1.8%	98.2%

Statistics P-value= 0.214, Chi-square = 9.571

Table 3: Common diseases associated with excreta disposal at Tambiri II Community

Location	Diarrhoea (%)	Cholera (%)	Typhoid (%)	Dysentery (%)	Gastro Enteritis (%)	Others (%)
Adehwari	12 (11.5)	8 (13.1)	11 (17.7)	3 (6.8)	1 (16.7)	-
Agbidewari	13 (12.5)	14 (23.0)	5 (8.1)	2 (4.5)	-	1 (33.3)
Amafeniwari	15 (14.4)	4 (6.6)	7 (11.3)	9 (20.5)	-	-
Awuwari	9 (8.7)	8 (13.1)	12 (19.4)	3 (6.8)	2 (33.3)	1 (33.3)
Ediwari	18 (17.3)	7 (11.5)	6 (9.7)	3 (6.8)	-	1 (33.3)
Itekiwari	12 (11.5)	6 (9.8)	5 (8.1)	10 (22.7)	2 (33.3)	-
Obosawari	11 (10.6)	9 (14.8)	7 (11.3)	8 (18.2)	-	-
Oweiwari	14 (13.5)	5 (8.2)	9 (14.5)	6 (13.6)	1 (16.7)	-
Total	104 (100)	61 (100)	62 (100)	44 (100)	6 (100)	3 (100)
Raw (%)	37%	21%	22%	16%	2%	2%

Statistics p-value = 0.140, Chi-Square = 44.087

Table 4: Common diseases associated with excreta from Tambiri II Health Centre Records

Year	Diarrhoea (%)	Cholera (%)	Dysentery (%)	Gastro Enteritis (%)	Typhoid (%)	Total (%)
2009	40 (24.2)	7 (26.9)	6 (11.5)	54 (14.1)	39 (19.4)	146 (17.7)
2010	30 (18.2)	3 (11.5)	10 (19.2)	92 (24.1)	43 (21.4)	178 (21.5)
2011	30 (18.2)	15 (57.7)	19 (36.5)	127 (33.2)	35 (17.4)	226 (27.4)
2012	49 (29.7)	1 (3.8)	10 (19.2)	60 (15.7)	26 (12.9)	146 (17.7)
2013	16 (9.7)	0 (0.0)	7 (13.5)	49 (12.8)	58 (28.9)	130 (15.7)

Statistics P-value < 0.001, Chi Square = 92.205

Table 5: Monthly income of respondents (Head of Households)

Location	Below ₦10,000 (%)	₦11,000 - ₦30,000 (%)	₦31,000- ₦50,000 (%)	₦51,000- ₦80,000 (%)	Above ₦80,000 (%)
Adehwari	8 (8.6)	13 (12.5)	6 (14.0)	4 (15.4)	4 (28.6)
Agbidewari	8 (8.6)	9 (8.7)	6 (14.0)	6 (23.1)	6 (42.9)
Amafeniwari	12 (12.9)	17 (16.3)	6 (14.0)	-	-
Awuwari	10 (10.8)	10 (9.6)	13 (30.2)	-	2 (14.3)
Ediwari	12 (12.9)	15 (14.4)	2 (4.7)	4 (15.4)	2 (14.3)
Itekiwari	16 (17.2)	13 (12.5)	2 (4.7)	4 (15.4)	-
Obosawari	18 (19.4)	11 (10.6)	4 (9.3)	2 (7.7)	-
Oweiwari	9 (9.7)	16 (15.4)	4 (9.3)	6 (23.1)	-
Total	93 (100)	104 (100)	43 (100)	26 (100)	14 (100)
Raw %	33.2%	37.1%	15.4%	9.3%	5%

Statistics P-value = 0.001, Chi Square = 61.125