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Original Research Article

Access to Sanitation in Some Rural Communities of Enugu State, Southeast Nigeria: A Survey Study

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ABSTRACT

Background: Sanitation is defined as any system that promotes proper disposal of human and animal wastes, proper use of toilet and avoidance of open space defecation. Globally, in 2012, 2.5 billion people lacked access to an improved sanitation facility, compared to 2.7 billion in 1990. In Nigeria, access to improved sanitation has been on the decline since 1990, but in Enugu State it has been increasing since 2008.
Aim: The aim of this study was to determine if access to improved sanitation in Enugu state is actually increasing as has been reported, and the sustainability of this improvement beyond 2013, as this will help to reduce the incidence of sanitation-related diseases.
Materials and methods: This was a cross-sectional survey conducted in five rural communities of Ezeagu Local Government Area of Enugu State, using structured questionnaire administered to 297 respondents. The data were analysed as frequency distributions and t-test, using MaxStat (version3.60) statistical software.
Results: Access to improved sanitation in the five communities of Enugu State was 45% in 2014, representing some improvement from the 22.5% reported for the State in 2013. The incidence of open defecation was 55%.
Conclusion: The study has demonstrated some improvement in access to improved sanitation in some parts of Enugu state, although the incidence of open defecation is still high at 55%. In order to curb open space defecation, Enugu State and Nigeria need to intensify efforts in the provision of improved sanitation for the people.

Key words: Access, Sanitation, Improved, Defecation, Rural, Communities

INTRODUCTION

Sanitation is defined as any system that promotes proper disposal of human and animal wastes, proper use of toilet and avoidance of open space defecation. [1] By convention, sanitation facilities have been categorized into improved (hygienically separates human excreta from human contact) and unimproved (do not separate human excreta from human contact) ones. [2] The improved sanitation facilities include flush or pour flush to piped sewer system, septic tank, pit latrine, ventilated improved pit latrine, pit latrine with slab and composting toilet, while examples of unimproved types are flush or pour flush to elsewhere (i.e. not piped to sewer system, septic tank or pit latrine), pit latrine without slab and open pit. An ideal sanitation facility is that which promotes safe treatment of human waste for health and for the environment; limits human exposure to faecal matter; avoids contamination of water and food sources; provides secure spaces for men, women and children to defecate, each with their unique needs; and encourages

hygienic practices including hand washing. [3] Before 2015, progress towards the sanitation target of the MDGs, was monitored using the so-called sanitation ladder as suggested by. [4] The concept of the sanitation ladder offers a practical step-wise approach to sanitation provisioning. [3] On this four-rung ladder, each rung represents an improvement from open defecation to a more sophisticated toilet, with the critical and most cost-effective step on the ladder, for both health and social reasons, being the first step from open defecation to fixed-location defecation. [5] The subsequent steps up the ladder may yield smaller incremental benefits.

The major health benefit of improved sanitation is the eradication, or marked reduction in the incidence of the diseases attributable to poor sanitation. The sanitation-related diseases are particularly correlated with poverty and infancy and alone account for about 10% of global burden of diseases. [6] Consequently, improvement in sanitation can lead to a reduction in the incidence of these diseases. The disease burden attributable to inadequate provision of sanitation is indeed difficult to determine in isolation, without considering water and hygiene, as studies have shown that worldwide, 66% of the diseases are attributable to unsafe water, inadequate sanitation or insufficient hygiene. [7] Some of the diseases contributing to the water-, sanitation- and hygiene (WASH)-related disease burden, which can be considerably reduced through the provision of safe domestic water supplies, improved sanitation and adequate hygiene include diarrhoeal diseases (39%), consequences of malnutrition (21%), malaria (14%), malnutrition (only protein-energy malnutrition [5%]), lymphatic filariasis (3%), trachoma (2%), intestinal nematode infections (2%), schistosomiasis (1%) and others (7%). [6]

Evidence from past studies strongly suggests that improved sanitation can reduce rates of diarrhoeal diseases by 32%-37%. [8-10] Improved sanitation could also contribute significantly to a sustained reduction in the prevalence of many neglected tropical diseases (NTDs), including trachoma, soil-transmitted helminthiasis (e.g. large human roundworm, the human whipworm and human hookworms), and schistosomiasis. Furthermore, provision of adequate sanitation could be a powerful intervention against acute respiratory infections through the link of malnutrition, which predisposes children to acute respiratory infection, because exposure to one increases vulnerability to the other. [11-13]

Over the past two decades, several studies have revealed that a large proportion of child deaths are preventable through basic WASH interventions. These studies have further shown that the impact of safe water is multiplied many times over by combining it with improved sanitation in the same location. This is known as the median reduction and when the two are combined, it is about 55%, because access to clean water is a prerequisite to maximize the health impacts of sanitation, just as effective sanitation is a prerequisite to maximize the health impacts of safe water. [14] This effect, known as the Mills-Reincke Multiplier, was named after two researchers who observed this phenomenon when safe water and sanitation were introduced to the city of Hamburg, Germany in 1893. [15]

Lower health system costs, fewer days lost at work or at school through illness or caring for an ill relative and convenience time savings (time spent queuing at shared sanitation facilities or walking for open defecation) all constitute the economic benefits of improved sanitation. [5] In monetary terms, the prevention of sanitation- and water-related diseases could save some $7 billion per year in health system costs; the value of deaths averted, based on discounted future earnings adds another $ 3.6 billion per year. [16]

However, the provision of sanitation is not without its own barriers. Prominent among them are lack of national policies that support the transformation of national

institutions into lead institutions for sanitation; population growth and increasingly high population densities in urban and peri-urban areas of developing countries; poverty which makes high-technology sanitation solutions inappropriate; and unwillingness of people to invest in sanitation, given all the other competing demands on their money. [5] Therefore, the eradication or substantial reduction of these universal barriers would enhance the provision of improved sanitation facilities in any given place.

Currently, the global efforts in the provision of improved sanitation have been less successful, compared to what has been achieved in the area of provision of safe drinking water. The MDG sanitation target aimed to reduce the proportion of the population without access to improved sanitation from 51% in 1990 to 25% in 2015. In 2012, it was reported that 2.5 billion people of the world did not have access to an improved sanitation facility, compared to 2.7 billion in 1990 (a decrease of only 7.4%). [17] Reports have further shown that coverage of improved sanitation increased from 49% in 1990 to 64% in 2012, translating into about 2 billion people gaining access to an improved sanitation facility, while open defecation decreased from 24% to 14%, i.e. from 1.3 billion in 1990 to one billion in 2012. Nine out of ten people who practise open defecation live in rural areas, but it has been noted that the number in urban areas is gradually increasing recently. Of the 69 countries that were not on track to meet the MDG sanitation target as at 2012, 37 are in sub-Saharan Africa. Based on this trend (as at 2012), it was estimated that there could still be about 2.4 billion people without access to an improved sanitation facility in 2015.

However, the reported positive trend in global access to improved sanitation has not been reflected in the Nigeria's situation, where access to improved sanitation has actually decreased from 37% in 1990 to 28% in 2012. [17] On the contrary, in Enugu state, the situation appears slightly different. According to the National Demographic and Health Survey (NDHS), in 2008, 18.8% of households in the State had access to improved sanitation, while in 2013 this increased slightly to 22.5%. [18,19] Although these statistics show that between 2008 and 2013, access to improved sanitation had actually improved slightly in the State, about 77.5% of the population of Enugu State is still left without access to improved sanitation. This situation is unacceptable, considering the 2015 MDG target of 25% for the population without access to improved sanitation.

The aim of this study is therefore to determine if access to improved sanitation in Enugu state is actually increasing as has been reported, and the sustainability of this improvement beyond 2013, as this will help to reduce the incidence of sanitation-related diseases.

MATERIALS AND METHODS

This was a cross-sectional survey study of access to sanitation in five rural communities of Ezeagu Local Government Area of Enugu State. According to the last census, Ezeagu Local Government Area (LGA) has a population of 170, 603. [20] Applying the Taro-Yamane formula, a sample size of 395 households was obtained from this population. However, only representatives of 297 households who were available and resident permanently in these communities were included in the study. Indigenes of the communities not resident in the communities, but were present at the time of the study were excluded.

Multistage sampling technique was used for the sampling. Through balloting, Enugu West Senatorial District (out of 3), Ezeagu LGA (out of17) and the five communities of the LGA (out of 23), namely Umusuru, Afor-Ugwu, Iwollo, Obinofia-Ndiagu and Mkpagu, were randomly selected. Copies of structured questionnaire were administered to 297 representatives of the various households in the five communities. Mode of administration of the questionnaire was

through oral interview in vernacular, as most of the rural dwellers were illiterate and semi-literate who could not communicate properly in English language. The few literate ones amongst them filled out the questionnaire themselves. In order to avoid duplication, no two adult members of the same household were allowed to complete the questionnaire.

A pilot study was conducted in two communities (Ihuezi and Adu-Achi) in May 2014 to test the questionnaire. Data were collected over a period of 20 weeks (from July to November 2014). The data so generated were analyzed as frequency distributions and t-test of means difference using MaxStat (version3.60) statistical software. Respondents' demographics and types of sanitation facilities were analysed as frequency distributions, while the difference between the means of the improved and unimproved sanitation types as t-test.

RESULTS

297 copies of the questionnaire were administered to representatives of the various households in the five communities. The distribution of the respondents by sex is shown in Table 1. The table shows that 131 (44.2%) of the 297 respondents were males, while the remaining 166 (55.8%) were females.

Table 1: Distribution of respondents by sex

Total	Male	Female
297	131 (44.2%)	166 (55.8%)

Table 2 shows the distribution of respondents by communities. As shown in the table, the distribution of respondents in the five communities was not uniform. Obinofia-ndiagu had the largest number of respondents, 126 (42.4%), followed by Mkpagu with 66 (22.2%), Iwollo with 54 (18.2%), Afor-ugwu with 27 (9.1%) and Umusuru with 24 (8.1%). Mean distribution of respondents in the five communities was 59.4(20%).

Table 2: Distribution of respondents by communities

Community	Number of respondents
UMUSURU	24 (8.1%)
AFOR-UGWU	27 (9.1%)
IWOLLO	54 (18.2%)
OBINOFIA-NDIAGU	126 (42.4%)
MKPAGU	66 (22.2%)
Mean	59.4(20%)

Table 3 shows the types of sanitation facilities available in the five communities. Access to improved sanitation facilities of the flush water to septic tank type was greatest at Iwollo (38.9%), followed by Afor-ugwu (33.3%), Mkpagu (12.1%), Obinofia-ndiagu (11.9%) and Umusuru (4.2%). On the other hand, access to improved sanitation of the pit latrine type was greatest at Mkpagu (42.4%), followed by Iwollo (31.5%), Afor-ugwu (29.6%) and Umusuru (12.5%). Obinofia-ndiagu had the least access (8.7%). For open defecation, the incidence was highest at Umusuru (83.3%), followed by Obinofia-ndiagu (79.4%), Mkpagu (45.5%) and Afor-ugwu (37.1%). The least incidence was observed at Iwollo (29.6%).

Mean access to improved sanitation in the five communities was 45%, while the mean incidence of open defecation was 55%.

The relationship between improved and unimproved types of sanitation facilities in the five communities is shown in Table 4. As shown in the table, access to improved sanitation was greatest at Iwollo (70%), followed by Afor-ugwu (63%), Mkpagu (55%) and Obinofia-ndiagu (21%). Umusuru (17%) had the least access to improved sanitation. The table also shows that the incidence of open defecation was highest at Umusuru (83%), followed by Obinofia-ndiagu (79%), Mkpagu (45%) and Afor-ugwu (37%). The lowest incidence of open defecation was seen at Iwollo (30%).
Between access to improved and unimproved sanitation (incidence of open defecation) types in the five communities, the difference in means was not significant ($p=0.55$).

Table 3: Types of sanitation facilities and number of persons that use them in Enugu state

Community	Flush water to septic tank	Pit latrine	Open defecation	Total
	No. of persons	No. of persons	No. of persons that use	
UMUSURU	1(4.2%)	3(12.5%)	20(83.3%)	24
AFOR-UGWU	9(33.3%)	8(29.6%)	10(37.1%)	27
IWOLLO	21(38.9%)	17(31.5%)	16(29.6%)	54
OBINOFIA-NDIAGU	15(11.9%)	11(8.7%)	100(79.4%)	126
MKPAGU	8(12.1%)	28(42.4%)	30(45.5%)	66
Total	54 (18.2%)	67 (22.6%)	176 (59.2%)	297
Mean	20.1%	24.9%	55.0%	100%

Table 4: Relationship between improved and unimproved sanitation facilities in Enugu state

Community	Improved sanitation facilities (Flush water to septic tank & Pit latrine)	Unimproved sanitation facilities (Open defecation)	Total
UMUSURU	4 (17%)	20(83%)	24
AFOR-UGWU	17 (63%)	10(37%)	27
IWOLLO	38 (70%)	16(30%)	54
OBINOFIA-NDIAGU	26 (21%)	100(79%)	126
MKPAGU	36 (55%)	30(45%)	66
Total	121 (41%)	176 (59%)	297
Mean	45%	55.0%	100%
t			0.619
p			0.55

DISCUSSION

Sanitation is all about proper disposal of human and animal wastes, proper use of toilets and avoidance of open space defecation, all aimed at protecting the environments from contamination with potential pathogens. Improvements in sanitation that reduce the transmission of pathogens that cause diarrhoea by preventing human faecal matter from contaminating environments have been associated with an estimated median reduction in diarrhoea incidence of 36% across reviewed studies. [21] Available statistics show that access to improved sanitation facilities in Enugu state had actually shown some improvement between 2008 and 2013, increasing from 18.8% in 2008 to 22.5% in 2013, as reported by the 2013 NDHS. [18,19] This is a positive trend, although this increase, of about 4%, could be considered very marginal.

The present study has revealed that about 45% of the households in the five rural communities had access to improved sanitation (flush to septic tank and pit latrine), even though there was a very wide margin of variation among the communities (from 17% in Umusuru which was the lowest, to 70% in Iwollo, the highest). In these communities, there was no significant difference between the availability of improved sanitation facilities and unimproved ones (p=0.55). 45% access to improved sanitation found by this study in 2014 is even better than that which had been reported in 2013 (for the state) by the 2013 NHDS, further supporting the report, which claims that access to sanitation in Enugu State has actually been on the increase since 2008. In addition, this finding has demonstrated that the reported increase in access to improved sanitation in the state has indeed, been sustained beyond 2013. However, this positive trend might convey a false sense of security that access to improved sanitation is also on the increase elsewhere in the country. This is far from being the situation. On the contrary, at the National level, there has been a downward trend in access to improved sanitation facilities as revealed by the 2014 MDG Report, which shows that access to improved sanitation facilities in Nigeria actually decreased from 37% in 1990 to 28% in 2012. [17] This apparent disparity between access to improved sanitation in the State and reported National access could be attributed to the fact that the mean is not a very good measure of central tendency. Whereas, the situation might be improving in some parts of the country like Enugu State, in others, reverse might be the case, hence the overall negative trend (representing the National mean) that has been reported. In spite of the apparently

improving access to improved sanitation facilities in Enugu State, demonstrated by this study, the incidence of open space defecation still remains high. The mean incidence of open space defecation found by the study was 55%, with a wide margin of variation among the communities (from 30% in Iwollo to 83% in Umusuru). Although a mean access to improved sanitation of 45% found in these communities of Enugu State as at 2014 is indeed encouraging, the implication is that these communities could not have achieved the 2015 MDG target of reducing lack of access to improved sanitation from 51% in 1990 to 25% in 2015, as about 55% of the population would still lack access to sanitation by 2015. At the national level, decrease in access to improved sanitation in Nigeria from 37% in 1990 to 28% in 2012, also implies that Nigeria could not have achieved the 2015 MDG target, for about 72% of the population could still lack access to improved sanitation by 2015, going by the trend in 2012. Nigeria was actually one of the 69 countries that were not on track to meet the 2015 MDG sanitation target as of 2014. As a matter of fact, 37 of these countries are in sub-Saharan Africa.

Limitations of the study

The uneven distribution of respondents in the five selected rural communities could have affected some of the data, because only the available and consenting representatives of the households that make up these communities were recruited into the study.

CONCLUSION

Compared to 22.5% reported for Enugu State in 2013, improved sanitation access of 45% found by this study in 2014 in the five rural communities actually demonstrated that the reported increase for the State has been sustained beyond 2013. However, a mean incidence of open space defecation of 55% across all the communities studied is indeed worrisome. In these communities and in the State therefore, there is a need for the people and the Government to sustain this current positive trend in access to improved sanitation in order to reduce the incidence of open space defection and the rates of diarrhoeal diseases, some neglected tropical diseases and acute respiratory infections which could result from unimproved sanitation. Incorporating sanitation marketing is one of the approaches that may help to improve access to improved sanitation in these rural communities in particular and the state in general.

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