

SOCIO-ECONOMIC BURDEN IN THE SUSTENANCE OF SANITATION RELATED DISEASES IN EBONYI STATE, SOUTHEAST, NIGERIA

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Abstract

Background: Sanitation related-diseases have affected millions of people, mostly in developing countries. This study aimed to determine the socio-economic burden in the sustenance of sanitation related-diseases in Ebonyi State, Nigeria.

Materials and Methods: The study was conducted in Ebonyi State, Southeast, Nigeria and adopted a descriptive cross-sectional design; sample size was 461 obtained from primary source. The descriptive statistics of frequency, percentage, mean and standard deviation were used to present the obtained data.

Results: Majority (180 or 39%) of the participants reported the size of their household to consist of 3-4 people followed by 150 (33%) who reported having

5-6 people. Out of the 461 participants, 258 (56%) reported that some children within their household had visited health centre due to sanitation-related diseases (such as stomach pains, fever, headache, blood in stool, watery stool), while 219 (48%) paid ₦1,000-₦3,000 for medical services (drugs, nursing services, doctor's services, laboratory services). Also, 294 (64%) reportedly paid less than ₦1,000 for transportation to and from a health facility due to sanitation-related diseases. Also 253 (55%) reported they spent total estimate of ₦1,000-₦5,000 as cost of treatment of sanitation-related diseases. Majority (291 or 55%) spent less than 5 days in a health facility due to sanitation-related-diseases, 177 (38%) recorded 5-10 days absence from work, and 306 (66.4%) claimed they lost less than ₦1,000 per day because of a child's admission in the health facility. On weekly basis, 300 (65.1%)

reported they lost <₦10,000.

Conclusion: The participant were shown to incur some he financial burden due to sanitation-related diseases. Also, sanitation-related diseases has impacted on the life of people in the Ebonyi State with respect to their average level of income. Consequently, it is recommended that sanitation be accorded necessary attention.

Key words: burden, community, sanitation, socio-economic burden, sanitation related-diseases.

Introduction

Sanitation can be referred to the activities that ensure safe disposal of excreta, solid waste and other liquid waste, pest and vector control and personal hygiene and the prevention of disease vectors to ensure a hygienic environment^{1,2}. It can also be regarded as a process whereby people demand for hygienic and healthy environment for themselves and sustain it by erecting barriers to prevent the transmission of disease agents^{1,2}.

This usually includes hygienic management of human and animal excreta, refuse and wastewater, the control of disease vectors and the provision of washing facilities for personal and domestic hygiene. According to World Health Organization (WHO)³, sanitation involves both behaviors and facilities base which work together to form a hygienic environment. Mainly looking at rapid rate of infectious diseases globally, sanitation remains a major problem in developing countries like Nigeria, because wherever humans gather, their waste also accumulates and Government and other stakeholders are unable to provide good sanitation through proper drainage

systems, excreta and wastewater disposal. Improved good health condition could be attributed to progress in good sanitation but many people still have inadequate means of appropriately disposing of their waste. Improper waste disposal contributes to the risk of infectious disease among children, young and elderly people, mostly in heavy populated areas in low income countries. Consequently, poorly controlled waste is a source of daily exposure to an unpleasant environment for the people.

Sanitation related diseases have affected more than a billion of people in the whole world's population, mostly in low income countries where one or more people are infected with the sanitation-related diseases (SDs). Several national and international programs such as the World Health Organization's Global NTD Programs, the Centers for Disease Control and Prevention's Global NTD Program, the United States Global Health Initiative, the United States Agency for International Development's NTD Program, and others) are focusing on sanitation related diseases, NTDs, and fighting to control or eliminate them⁴.

Despite the efforts made by the different non-governmental organization, sanitation has not received the priority it deserves. It has not been widely recognized by local, national and international on how good sanitation policies and practices can support socio-economic development and environmental protection. According to Water and Sanitation Program (WSP) [5], each year equivalent to US\$3 billion was spent on water, sanitation and hygiene. This sum is the equivalent of US\$20 per person in Nigeria per year or 1.3% of the national GDP

because 70 million Nigerians use unsanitary or shared latrines, while 32 million have no latrine at all and defecate in the open place and the poorest quintile is 10 times more likely to practice open defecation than the richest. Health-related productivity costs which measures an average length of time spent incapacitated was 2 days (diarrhea), 5 days (respiratory infection) and 4 days (malaria). While infants are not productive, their sickness leads to diversion of caregivers from other activities⁵.

In assessment of community sanitation status, food hygiene, excreta, refuse and water supply should be consider as the basic amenities people must practice because good sanitation and hygiene practice mitigate contamination of water and soil, and thereby prevent diseases mostly communicable/infectious diseases such as cholera, typhoid, dysentery and others. These disease conditions could contribute to stunting and impaired cognitive function and impacts on well-being through school attendance, anxiety and safety with lifelong consequences, especially for women and girls. Improving sanitation in households, health facilities and schools underpins progress on a wide range of health and economic development issues including universal health coverage and combating antimicrobial resistance through personal hygiene practice, institutional sanitation (like school, health care, homes, etc) practice, safe water, refuse disposal, excreta disposal and waste water disposal⁶. Therefore, this study was aimed to determine the socio-economic burden in sustenance of sanitation related diseases in Ebonyi State, Nigeria.

Materials and Methods

This study adopted a descriptive cross-sectional design to determine the socio-economic burden in sustenance of sanitation-related diseases in Ebonyi State, Nigeria. Ebonyi state is one the state in the southeast of Nigeria. Abakaliki is the state capital and largest town in the state. The second largest town is Afikpo. Other towns are Ikwo, Izzi, Onicha, Edda, Onueke, Ezzamgbo, Nkalagu, Uburu, Ishiagu, Amasiri and Okposi. This research design employed assisted to gather information across the state. The study objective was achieved from participants attended primary health facilities at community levels of every selected LGA with the aid of harmonized questionnaire and checklist.

The sample size was determined based on the information from participants otherwise known as caregivers that attended primary health facilities with their child due to sanitation-related diseases [may due to stomach pains, fever, headache, blood in stool, watery stool etc] were studied. The criteria used for selection of participants must be that the child was taken by a caregiver to the health facilities at the selected areas. The variables associated with community sanitation were determined using sample size formula by Kish and Leslie for cross-sectional descriptive studies needed to be representative of the given population. The same formula used by Fisher et al., (1998) for a population > 1,000 was adopted for this study.

$$n = \frac{z^2 pq (1-P)}{d^2}$$

n - Minimum sample size

Z - Standard normal deviation usually set at 1.96 which corresponds to the 95% confidence level.

p - Assumed population prevalence in %, Population of the study is estimated to be 50% to represent the target population in this study

q = 1-p

d - Maximum acceptable random sampling error in %

In this case,

P= 50%= 0.5

q = 1- 0.5 =0.5

d = 5%= 0.05

Therefore,

Sample size (n) = $(1.96)^2 (0.50) (0.50)$

$$(0.05)^2$$

n = 384

Adding an iteration of 20% to cover for non response (20% X 384) = 76.8 sample size to the nearest hundred= 384+76.8=460.8. For more clarity and coverage, the figure was rounded up to 461 for easy computation.

A multistage sampling was used to select the samples included in the study area. At first, stage Ebonyi state was divided into three senatorial zones (Ebonyi North, Central and South) with 13 Local Government Areas and a total of 6 Local Government Areas (LGAs) were randomly

selected through balloting which covered at least 46% of the LGAs. Ebonyi North and Central has 4 LGAs each while Ebonyi south contained 5 LGAs each, hence two LGAs namely Abakaliki LGA and Ebonyi LGA were selected from Ebonyi North; Ezza South LGA and Ikwo LGA were randomly selected from Ebonyi Central senatorial zones and Afikpo North LGA and Ohaozara LGA were randomly selected from Ebonyi South senatorial zones. The selected LGAs include Abakaliki LGA, Ebonyi LGA, Ezza South LGA, Ikwo LGA, Afikpo north LGA and Ohaozara LGA were randomly selected from all the senatorial zones in Ebonyi State.

The second stage of the sampling involved random selection of communities from the sampled LGAs. Two communities were selected from six (6) sampled LGAs which gave a total of 12 communities. At stage three, purposive sampling method was used to select two primary healthcare centres (PHCs) in each community given a total of 24 primary health centers (PHCs). In order to get the sample size of the study, 20 persons attended primary healthcare facility for treatment were interviewed in each PHC with the aid of harmonized questionnaire and checklist and it gave a total of 480 but 461 was valid.

Ethical Approval and Consent to participate:

The study received ethical approval from the Department of Environmental Health Sciences, College of Medicine and Health Sciences, Abia State University Uturu. Also, ethical approval was sought (for procedural reasons) and obtained from the Primary Healthcare Directors in Ebonyi State, Nigeria. Verbal consent was collected from all the people within the selected communities in the selected LGAs and those who gave verbal consent were ticked and interviewed and those

who refused were skipped. Participation was voluntary.

Data Analysis

The data collected with the research instrument were summarized using descriptive statistics of frequency distribution, percentage and charts.

Results

Table 1 presents the socioeconomic burden of sanitation-related diseases on direct cost. The number of participants in household recorded as follows: 115 (25%) recorded 1-3 people in the household; 180 (39%) were 4-6 people; 150 (33%) reported 7-9 people and 16 (3%) reported above 10 people in the household. Concerning the child visitation to primary healthcare centre in general, 258 (56%) responded YES while 203 (44%) said NO. The issue of child admission in primary healthcare centre, 194 (42%) said YES and 267 (58%) said NO. As for payment for medical services (drugs, nursing services, doctor's services, laboratory services; in all the LGAs), 36 (8%) paid less than ₦1,000; 219 (48%) paid between ₦1,000 and ₦3,000; 162 (35%) paid between ₦4,000 and ₦6,000; 24 (5%) paid between ₦7,000 and ₦10,000; 17 (4%) paid ₦11,000 and ₦13,000; and only 3 (06%) paid above ₦14,000. As for paying for transportation to and from primary healthcare centre due to sanitation-related diseases, 294 (64%) paid less than ₦1,000; 126 (27%) paid ₦1,000; 36 (8%) paid ₦2,000; 5 (1.1%) paid ₦3,000 and above. On total amount spent as cost of treatment, 48 (11%) paid less than ₦1,000; 253 (55%) paid between ₦1,000 and ₦5,000; 155 (34%) paid between ₦6,000 and ₦10,000; 5 (1.1%) paid ₦11,000 and above.

Table 1: Socioeconomic Burden of Sanitation Related-Diseases on Direct Cost

Variables	Abakaliki		Ebonyi		Ezza South		Ikwo		Afikpo		Ohaozara		Total
	LGA		LGA		LGA		LGA		North LGA		LGA		
	F	%	F	%	F	%	F	%	F	%	F	%	
Size of People in household													
1-3	21	18.3	20	17.4	20	17.4	20	17.4	14	12.2	20	17.4	115(25%)
4-6	35	19.4	29	16.1	30	16.7	26	14.4	32	17.8	28	15.6	180(39%)
7-9	24	16.0	10	6.7	28	18.6	30	20.0	32	21.3	26	17.3	150(33%)
Abv 10	0	0.0	2	12.5	2	12.5	4	25.0	2	12.5	6	37.5	16(3%)
Has any child within the household visited primary healthcare centre (may due to stomach pains, fever, headache, blood in stool, watery stool etc)													
Yes	55	21.3	29	11.3	40	15.5	46	17.8	50	19.3	38	14.7	258 (56%)
No	25	12.3	32	15.8	40	19.7	34	16.7	30	14.8	42	20.7	203 (44%)
Have you ever been admitted in any primary healthcare centre within your community													
Yes	34	17.5	19	9.8	39	20.1	37	19.1	35	18.0	30	15.5	194 (42%)
No	46	17.2	42	15.7	41	15.4	43	16.1	45	16.9	50	18.7	267 (58%)
Payment for medical services (drugs, nursing services, doctor's services, laboratory services etc)													
--	2	5.6	5	13.9	10	27.8	6	16.7	3	8.3	10	27.8	36(8%)
₦1-3,000	38	15.1	35	16.0	42	19.2	36	16.4	37	16.8	32	16.4	219(48%)
₦4-6, 000	28	17.8	16	9.9	25	15.4	34	20.9	27	16.7	32	19.8	162(35%)
₦7-10,000	6	25.0	4	16.7	2	8.3	2	8.3	7	29.7	3	12.5	24(5%)
₦11-13,000	4	23.5	2	11.8	1	5.9	2	11.8	5	29.4	3	17.6	17(4%)
Abv ₦14,000	2	66.7	0	0.0	0	0.0	0	0.0	1	33.3	0	0.0	3(06%)
Payment for transportation to and from health facility due to sanitation related diseases													
<₦1,000	49	16.7	39	13.3	53	18.0	49	16.7	51	16.9	53	18.0	294(64%)
₦1,000	20	15.8	15	11.9	23	18.3	26	20.6	21	16.6	21	16.6	126(27%)
₦2,000	8	22.2	6	16.7	4	11.1	5	13.9	7	19.4	6	16.7	36(8%)
Abv ₦3,000	3	60.0	1	20.0	0	0.0	0	0.0	1	20.0	0	0.0	5(1.1%)
Total amount spent in cost of treatment													
<₦1,000	2	4.2	6	12.5	11	22.9	12	25.0	7	14.6	10	20.8	48(11%)
₦1-5,000	39	15.4	21	8.3	49	19.3	51	20.1	38	15.0	55	21.7	253(55%)
₦6-10,000	37	23.9	32	20.6	20	12.9	17	10.9	34	21.9	15	9.7	155(34%)
Abv ₦11,000	2	40.0	2	40.0	0	0.0	0	0.0	1	20.0	0	0.0	5(1.1%)

Table 2: Socioeconomic Burden of Sanitation Related-Diseases on Indirect Cost

Variables	Abakaliki LGA		Ebonyi LGA		Ezza South LGA		Ikwo LGA		Afikpo North LGA		Ohaozara LGA		Total
	F	%	F	%	F	%	F	%	F	%	F	%	
	Duration of stay in the health facility because of the sanitary-related-diseases												
<5 days	57	19.5	33	11.3	53	18.2	48	16.5	52	17.8	48	16.5	291(55%)
5-10 days	16	14.8	19	17.6	17	15.7	18	16.7	17	15.7	21	19.4	108(23%)
11-15days	7	12.3	8	14.0	10	17.5	12	21.1	10	17.5	10	17.5	57(12%)
Abv15 days	0	0.0	1	20.0	0	0.0	2	40.0	1	20.0	1	20.0	5(1.1%)
In last month, number of days record absent in work place by a caregiver													
<5 days	21	17.1	16	13.0	21	17.1	24	19.5	17	13.8	24	19.5	123(27%)
5-10 days	28	15.8	20	11.3	29	16.4	32	18.1	38	21.5	30	16.9	177(38%)
11-15days	20	22.2	15	16.7	18	20.0	11	12.2	15	16.7	11	12.2	90(20%)
16-20 days	6	15.4	6	15.4	7	17.9	7	17.9	5	12.8	8	20.5	39(9%)
21-25 days	5	15.6	4	12.5	5	15.6	6	18.8	5	15.6	7	21.8	32(7%)
Amount of money lost per day because of the child's admission in the health facility													
<₦1,000	48	15.7	34	11.1	51	16.7	67	21.8	46	15.0	60	19.6	306(66.4%)
₦1-2,000	18	18.0	12	12.0	22	22.0	10	10.0	19	19.0	19	19.0	100(21.7%)
₦2-4,000	7	23.3	9	30.0	3	10.0	2	6.7	8	26.7	1	3.3	30(6.5%)
₦5-6,000	4	28.6	3	21.4	2	14.3	1	7.1	4	28.6	0	0.0	14(3.0%)
Abv 7,000	3	27.3	3	27.3	2	18.2	0	0.0	3	27.3	0	0.0	11(2.4%)
Amount of money lost per week because of the child's admission in the health facility													
<₦10,000	45	17.3	27	17.6	54	16.0	64	15.7	43	17.0	67	16.3	300(65.1%)
₦10-19,000	24	18.6	25	19.4	25	19.4	16	12.4	26	20.2	13	10.1	129(28.0%)
₦20-29,000	8	33.3	7	29.2	1	4.2	0	0.0	8	33.3	0	0.0	24(5.2%)
₦30-39,000	3	37.5	2	25.0	0	0.0	0	0.0	3	37.5	0	0.0	8(1.7%)
Abv ₦40,000	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0

Abv = Above; Frequency (F) and Percentage (%)

Table 3: Monthly income of a Caregiver by LGAs

Variables	Ebonyi North		Ebonyi Central				Ebonyi South				Total		
	Abakaliki	Ebonyi	Ezza		Ikwo		Afikpo		Ohaozara				
	LGA	LGA	South		LGA		North		LGA				
			LGA		LGA		LGA		LGA				
	F	%	F	%	N	%	N	%	N	%	N	%	F
---	24	14.5	12	7.2	34	20.6	36	21.8	21	12.7	38	23.0	165(36%)
₦31-40,000	23	18.6	28	22.7	16	13.0	14	11.4	25	20.3	17	13.8	123(27%)
₦41-50,000	9	8.8	6	5.8	23	22.5	23	22.5	21	20.6	20	19.6	102(22%)
₦51-60,000	13	28.9	9	20.0	5	11.1	5	11.1	9	20.0	4	8.8	45(10%)
₦61-70,000	7	38.9	4	22.2	2	11.1	2	11.1	2	11.1	1	5.6	18(4%)
₦71-80,000	4	50.0	2	25.0	0	0.0	0	0.0	2	25.0	0	0.0	8(2%)
₦81&above	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0
Total	80	17.3	61	13.2	80	17.3	80	17.3	80	17.3	80	17.3	461(100%)

Frequency (F) and Percentage (%)

Table 4: Monthly income of a Caregiver in the household by Zones

Monthly income of a Caregiver in the household	Ebonyi North Zone	Ebonyi Central Zone	Ebonyi South Zone	Total
---	36(26%)	70(44%)	59(37%)	165(36%)
₦31-40,000	51(36%)	30(19%)	42(26%)	123(26%)
₦41-50,000	16(11%)	46(29%)	40(25%)	102(22%)
₦51-60,000	22(16%)	10(6%)	13(9%)	45(10%)
₦61-70,000	11(8%)	4(2%)	3(2%)	18(4%)
₦71-80,000	5(3%)	0	3(1%)	8(2%)
₦81&above	0.0	0.0	0.0	0.0
Total	141(30.5%)	160(34.7%)	160(34.7%)	461(100%)

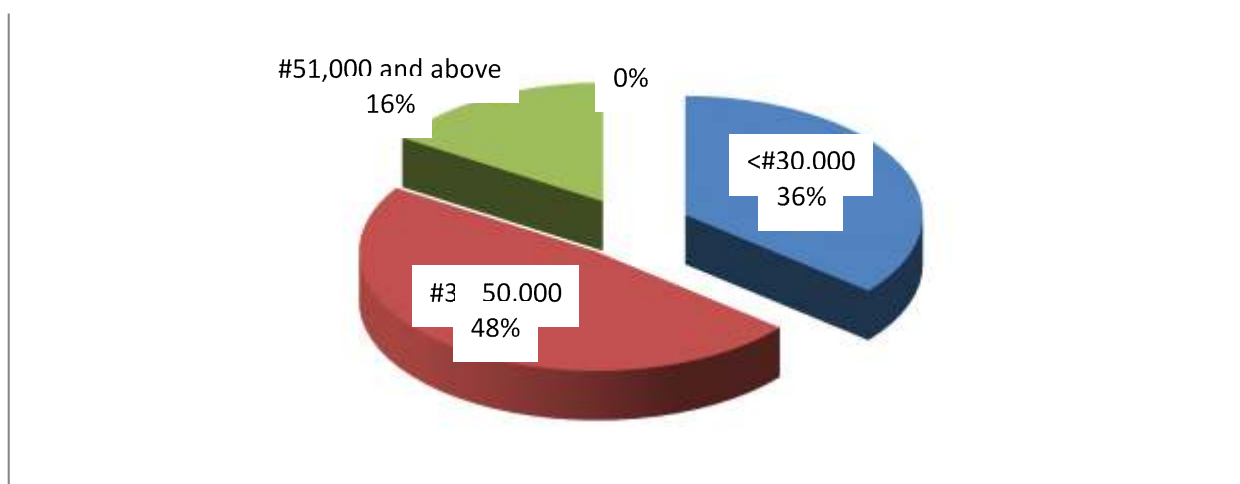


Figure 1: Monthly income of a Caregiver in Ebonyi State

Discussion

In relation to the socioeconomic burden of sanitation-related diseases, looking at the cost associated with illness and disease, public health workers such as health economists try to allocate scarce resources in treatment and prevention because the individual household with fixed resource endowment is made to share the limited resources on the consumption of two commodities in health and commodity markets⁷. Majority of the children within the household visited health facility may due to symptoms like stomach pains, fever, headache, blood in stool, watery stool, e.t.c. while some of them were even admitted because of the disease conditions. The amount paid for medical services (drugs, nursing services, doctor's services, laboratory services, e.t.c.) was high, between ₦1,000 and ₦6,000 for 83% of the participants and less than ₦1,000 for 64% of the participants was paid for transportation. Considering the financial status of the people in Ebonyi State in which 48% earned between ₦31,000 and ₦50,000 per month, this has contributed to the higher incidence of sanitation-related disease (e.g. cholera, diarrhoea, dysentery, malaria, typhoid, infectious hepatitis).

They spent directly or indirectly on sanitation related-diseases because, there is practically no national health insurance scheme readily available to the people in the rural area compared to hospitals operated on a cash and carry basis, therefore, the insufficient amount of money may deprive mothers and care-givers access to good and standard health facilities or intervene appropriately⁸.

In the opinion of Igberaese and Iseghohi⁷, disease infection does not come without its outcome(s) and this/these could be in different forms that may limit the individual from productivity which may result in both the individual and the society suffering losses. From the findings of the study, indirect cost was measured by days, weeks and months spent in the health facility due to sanitation-related disease occurrence. Majority spent less than five days in the health facilities. Based on the number of days, weeks or months spent in the health facility may lead to long term or permanent disability, which can be measured by Activities of Daily Living (ADL), with the worst case being mortality and at times a premature death causing a burden of disease (BoD). Havelaar et al⁹ and other researchers like Murray-Lopez¹⁰ have used the Disability Adjusted Life Years

(DALYs) as a single composite measure of the different disease outcomes, and it is the summation of the number of years of life lost due to mortality (YLL) and the number of years lived in disability (YLD). It is a health gap measure extending potential years of life lost due to premature death to include equivalent years of healthy life lost in a state of less than full health⁹. Therefore, it is important to consider lost days under indirect cost as the negative effect of sanitation-related diseases when reducing or preventing the burden of disease (BoD). Oostenbrink et al¹¹, further stated the other measure is cause of illness (CoI), which is the summation of direct health care costs, direct non-health care costs, and indirect non-health care costs and excluding indirect health care costs.

Carabin et al¹² also stated that to estimate the socioeconomic burden of a disease, some methods are needed to combine the adverse effects on society of disease and reduced productivity in livestock with those of disease and lower levels of well-being and productivity in people. Then, the direct costs to human health include the costs of death, sickness and injury and the costs of treating the disease as observed in this study. Indirect costs include the loss of wages to workers/caregivers who are overseeing the health condition of the sick person and the reduced productivity of workers who may have sub-clinical effects of disease.

Conclusion

The findings in this study have showed how sanitation-related diseases caused socio-economic burden on the life of people in the State compared to their average level of income as average income level of families may not really take care of household needs such as feeding, children school fees, electricity bill, sanitation and hygiene

materials in addition to the cost of care.

Thus, it is important to give sanitation necessary attention, in order to reduce the prevalence of sanitation-related diseases and the financial cost of the treatment of the diseases on families.

Consent for publication: All contributing authors have gave consent for this publication

Availability of data and materials: The collected data and materials were made available before the contributing authors and they were approved before statistical analysis.

Competing interests: All authors of this article report no conflicts of interest throughout the work.

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