Childhood Sanitation Practices and Incidence of Diarrhea in Slum Communities With Implications for Community-Based Education in Less Developed Countries

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Abstract:	<p>Background</p> <p>Diarrhoea is a major cause of mortality among under-five children, especially in less developed countries. Previous studies on childhood diarrhoea have largely focused on biomedical methods with little attention given to community-based approach to reduce the prevalence of the disease in the slums, classified in literature among areas of high diarrhoea incidence. The key question is does childhood sanitation practices influence the incidence of diarrhea? This study, was therefore, designed to examine the association between childhood sanitation practices and incidence of diarrhea using community-based approach.</p> <p>Methods</p> <p>The value beliefs and planned behavior theories were adopted as framework, while cross-sectional survey was use to elicit data from 900 mothers of under-five children who had lived in the study locations for at least 12 months preceding the research and 10 In-depth interviews was conducted.</p> <p>Results</p> <p>There was a positive significant association between defecating with unimproved toilet facilities ($\chi^2 = 42.167$, $p < 0.05$), cleaning buttocks with inappropriate materials ($\chi^2 = 4.274$, $p < 0.05$), disposing faeces around household environments ($\chi^2 = 10.542$, $p < 0.05$), and childhood diarrhea. The odds was higher among children whose mothers had no education (OR=1.560), widow (OR=5.542), poor (OR=1.556), and children that defecates with unhygienic toilet facilities (OR=7.806).</p> <p>Conclusion</p> <p>Community perceptions interact with poverty to influence unhygienic toilet practices in the slums. This has negative health implications on the lives of low-income and vulnerable slum dwellers. Thus, community- based education on improved sanitary practices is necessary to reduce diarrhoea prevalence.</p>
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Childhood sanitation practices and incidence of diarrhea in slum communities with implications for community-based education in less developed countries

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Abstract

Background

Diarrhoea is a major cause of mortality among under-five children, especially in less developed countries. Previous studies on childhood diarrhoea have largely focused on biomedical methods with little attention given to community-based approach to reduce the prevalence of the disease in the slums, classified in literature among areas of high diarrhoea incidence. The key question is does childhood sanitation practices influence the incidence of diarrhea? This study, was therefore, designed to examine the association between childhood sanitation practices and incidence of diarrhea using community-based approach.

Methods

The value beliefs and planned behavior theories were adopted as framework, while cross-sectional survey was use to elicit data from 900 mothers of under-five children who had lived in the study locations for at least 12 months preceding the research and 10 In-depth interviews was conducted.

Results

There was a positive significant association between defecating with unimproved toilet facilities ($\chi^2=42.167$, $p<0.05$), cleaning buttocks with inappropriate materials ($\chi^2=4.274$, $p<0.05$), disposing faeces around household environments ($\chi^2=10.542$, $p<0.05$), and childhood diarrhea. The odds was higher among children whose mothers had no education (OR=1.560), widow (OR=5.542), poor (OR=1.556), and children that defecates with unhygienic toilet facilities (OR=7.806).

Conclusion

Community perceptions interact with poverty to

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influence unhygienic toilet practices in the slums. This has negative health implications on the lives of low-income and vulnerable slum dwellers. Thus, community-based education on improved sanitary practices is necessary to reduce diarrhoea prevalence.

Keywords: Childhood diarrhea, Sanitation practices, Slums, Under-five.

Introduction

Research has indicated that under-five children that live in over-crowded slum settlements characterized by absence of clean toilet facilities, running water and dirty household environments are at risk of morbidity and mortality [1, 6]. Efforts by Governments and Non-Governmental Organizations (NGOs) to improve sanitation practices and reduce the incidence of open defecation globally has been on-going for years, especially since the 80s (Sanitation decade 1980-1990).

However, the challenges associated with poor sanitation still lingers as reports indicate that 2.5 billion people still do not have access to improved toilet facilities, resulting in widespread open defecation [12, 22, 30]. This has health implications as research

shows that for every 20 seconds, a child dies due to poor sanitation [30]. The situation is precarious in less developed countries with a high prevalence of open defecation due to chronic poverty and a long history of living in unhygienic environment [17].

Even though there was a marginal improvement in the number of households with improved toilet facilities in Africa [8, 18, 27], sub-Saharan Africa experienced an increase of open defecation from 204 million to 220 million people between the year 2000 and 2015 [27]. In addition, most of the households with improved

sanitation do not have toilet facility that is safely managed to separate faeces from human contact. For instance, the Nigeria Demographic and Health Survey shows that only 23% of households in the country makes use of latrine with a slab and 16% in urban areas use pour-flush toilet to septic tank [14]. This report

from the Nigeria Demographic and Health Survey highlights that open defecation and indiscriminate disposal of faeces is still widely practised in Nigeria. These practices increase the risk of water-borne diseases such as diarrhea, dysentery and cholera. The situation portends great

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4 risk to under-five children who could contact faeces with hands during play and thus expose to
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6 diseases.

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10 In Nigeria, death among under-five children is high at 132 per 1000 live births. This translates to
11 1 in 8 children death before age five [14]. Some of these deaths among children were caused by
12 diarrhea. Yet, some
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14 communities in Nigeria do not perceive young children's faeces as a risk that causes diarrhea
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16 [16]. This is worrisome because faeces around residential homes
17
18 make other children that play around the neighborhood susceptible to disease. This faecal oral
19 transmission route is a major risk for childhood diarrhea. This prompt sanitation to be highlighted
20 as a key issue in the Sustainable Development Goal 6, which emphasized "availability and
21 sustainable management of water and sanitation for all". Target 6.2 focused on ending open
22 defecation while gaining access to improve toilet facilities [23].
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29 Studies on sanitation practices in Nigeria have largely focused on adult and household facilities
30 [16, 24]. There is a paucity of information on the
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32 relationship between childhood toilet practices and diarrhea, especially in the slums. In addition,
33 little is known on the contributions of community based education to reduction of diarrhea
34 incidence. This has implications on the success of achieving the Sustainable Development Goals.
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36 This gap in the literature has effects on the human development index, typified by under-five
37 mortality in Nigeria. Therefore, this study was designed to examine the relationship between
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39 childhood sanitation practices and incidence of diarrhea in the slums of Nigeria in order to make
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41 context-specific recommendations.
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46 47 **Research Questions**

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49 This study was guided by the following research questions:
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- 51 1. What are the associations between childhood sanitation practices and incidence of diarrhoea?
 - 52 2. What are the community perceptions of childhood sanitation practices?
 - 53 3. What is the effects of household environments on childhood diarrhoea?
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Theoretical framework

The study is anchored on two theoretical perspectives, namely; the value belief norms and planned behaviour theories. The theory of value belief norms by Stern [20] focused on how individual's personal interest and societal values shape human behaviour within a community. The thrust of the theory is that pro-social attitudes and personal norms are significant predictors of human actions and behavior. In the view of Stern [20], socially accepted behavior and norms within a community were influenced by the values associated with it. This implies that the values attached to actions or inactions are strong determinants of acceptable and non-acceptable behaviors.

However, acceptable behavior varies within space and time.

In this study, societal norms, community perception and parental financial capability influence children toilet behaviour and practices. Wealth is a significant factor that shape household sanitation practices and children with poor parents are more likely to utilize unimproved toilet facilities. The situation is precarious in the slums due to limited finance to care for children. Therefore, the risk of child morbidity is higher in the slums than non-slums. Further, [21] had earlier explained how the belief and perception of a society shape behavior and attitude. Behavioral response to hygiene practices are associated with perception and beliefs that community has towards such actions. People in the community are more likely to be obliged to a particular hygiene practices if they perceive or believe that such practices will yield positive outcome. This theory, however, did not highlight the intra-personal connections between human attitude, behavior and actions. Thus, the need for the theory of planned behavior.

The theory of planned behaviour by Ajzen [2] shows the correlation between attitudes and human action. The thrust of the theory is that human actions are influenced by subjective norms within a community. Attitude is borne out of rational perception that such action will yield positive outcome. If an individual perceives that the outcome of his action will be negative, he/she is more likely to refrain from such act. Thus, human attitude relies on rational choices. Subjective norms explain that human action is generated from interaction with friends, family members, neighbors, and significant others. This means that, the people within the immediate environment of an individual influence his/her action. Within this context, therefore, the rational attitude of

mothers/care-givers, family members and neighbours largely determines sanitation and behavioral practices of mothers of under-five children.

In addition, the theory predict how individuals will behave based on their pre-existing attitudes and behavioural intentions. The World Health Organisation has suggested that children toilet practices should be safely managed. However, adherence to this practice is subject to parent's beliefs that such action will produce positive health outcome or benefit to their children.

The conceptual framework that follows synthesizes the two theoretical perspectives:

Figure 1: Conceptual Framework

The framework highlights the connection between community perceptions and childhood toilet practices. The attitude and sanitary behaviours of mothers within this context has health implications for under-five children.

Data and Methods

This study was conducted in Nigeria, which is the 32nd largest country in the world in term of land space. The country has six geopolitical zone: South-west, South-south, South-east, North-central, North-east, and North-west. Almost half (40.1%) of Nigeria population are poor and 35% of female do not have any form of education [15]. Poverty breeds slums and slums breed poverty. In addition, about 25% of households practice open defecation in Nigeria. South-west region was purposively chosen for this study because of the prevalence of slums in the region, and Oyo State was purposively selected due to high records of open defecation (51%) than the national average (37%) [14, 15].

A descriptive cross-sectional design was utilize for this study because it gives room for in-depth and intensive analysis of the phenomenon under study. Due to lack of sufficient data, it was difficult to get the actual population size of slum dwellers in Nigeria, thus making it a challenge to apply known sampling size formula. To overcome this challenge, the World Health Organisation, Expanded Programmes of Immunisation (30 by 30) sampling technique was adapted. The World Health Organisation began using this method in 1974 and it has been adapted in epidemiological survey involving children [13, 19].

This entails the systematic selection of 30 clusters for a study. In each cluster, 30 households were selected. Therefore, 30 clusters makes up 900 households were a questionnaire was randomly administer to mothers that met the inclusion criterion. In this case, 30 slum clusters were selected randomly (A cluster is a block of houses within the same community) in Oyo State. From each of the cluster, 30 households were systematically (every 3rd house) selected. A questionnaire was administer to a household with the inclusion criterion. When two members of a household meets the inclusion criterion, balloting was use to select the respondent. This was done to administer 900 copies of a questionnaire to mothers of under-five children. A segment of the World Health Organization WASH instrument that focused on childhood sanitation was adapted for this study [30]. Households

eligible for inclusion in the study were households with mothers or care-givers of under-five children that were 18 years and above, who have been living in the study locations for at least 12 months prior to the study.

Data collection and analyses

The chosen instruments for the study were questionnaire for the quantitative method and In-Depth Interview (IDI) for the qualitative method. The questionnaire was used to collect information on mothers' social characteristics, child's health, toilet practices, and incidence of diarrhea in each of the selected households in the 4 weeks preceding the survey. The questions were close-ended and was adapted from a questionnaire developed by the Joint Monitoring Programme of the World Health Organization and UNICEF on water and sanitation, which had been used in a similar study [1]. A segment of the adapted questionnaire can be found at the World Health Organization website <https://washdata.org/monitoring/methods/core-questions>. A pre-test of the questionnaire was conducted with 15 respondents in the study location to determine its suitability on childhood sanitation practices. After the pre-test, the questionnaire was adjusted to suite childhood sanitation practices within the contexts of the study location. Data was collected within the month of February and July 2018. In addition, ten In-depth Interviews were conducted with caregivers to gain insight into the interpretative understanding of childhood toilet practices in the slums of Nigeria.

The dependent variable was childhood diarrhea. This was measured by asking mothers whether their under-five children had experienced diarrhea in the last four weeks before the survey. A binary response (Yes or No) was elicited from mothers. The independent variables were the location/site where under-five children defecate, materials used for cleaning children's buttocks after defecating, and faeces disposal site. Table 1 illustrates the measurement variables of the study. The classification of variables aligned with the WHO/UNICEF joint monitoring programme for toilet practices [30]. The quantitative data were analyzed using descriptive and inferential statistics, while the qualitative data was content analyzed. Chi-square was used to test the relationship between the independent and dependent variables. A logistic regression model was used to examine the influence of childhood toilet practices on the risk of diarrhea among under-five children that lives in slum communities in Nigeria.

Table 1: **Variable measurement**

Variable	Coding and definition	Measurement
Dependent variable	When in the last 4 weeks did your child have diarrhea?	Childhood Diarrhoea 0= Yes 1= No
Independent variable 1. Location where child defecate	Improved source: Toilet facility that flush faeces and water into a septic tank, pit latrine, piped sewer system, ventilated improved pit (VIP), composting toilet or pit latrine with slab Unimproved facility: open pit or a latrine without a slab, flush/pour or flush into a bucket, hanging toilet, floor, nylon bag, diapers.	Type of toilet facilities re-categorised as: 1= Improved 0= Unimproved
2. Materials used for cleaning buttocks after defecating	Improved source: water (as long as handwashing with soap is practiced immediately, soft tissue paper. Unimproved source: clothes, water without handwashing with soap, hard tissue paper and wipes	Type of toilet facilities re-categorised as: 1= Improved 0= Unimproved
3. Faeces disposal site	Improved source: Toilet facility that flush faeces and water into a septic tank, pit latrine, piped sewer system, ventilated improved pit (VIP), composting toilet or pit latrine with slab Unimproved source: floor, drainage, dust-bin, river, bush, canal	Type of toilet facilities re-categorised as: 1= Improved 0= Unimproved

Ethics

Ethical approval to conduct this research was obtained from the Social Sciences and Humanities Research Ethics Committee at University of Ibadan, Nigeria with assigned number UI/SSHEC/2017/0025, issued on 31st October, 2017. All participants provided written informed consent for the study, assured of their anonymity, informed that data was purely for academic publications, voluntary and were free to leave the study at any time.

Results

Table 2 present the association between childhood sanitation practices and incidence of diarrhea in the slums. Under-five children that defecate using unimproved toilet facilities were more

susceptible to diarrhea. There is a positive significant association between using unhygienic toilet facilities and incidence of diarrhea among under-five children in the slums ($\chi^2 = 42.167$, $P < 0.05$).

Table 2: Association between toilet practices of under-five children and incidence of diarrhoea

Toilet behaviour	Diarrhoea		χ^2	Asymp. Sig. (2-sided)
	No	Yes		
Defecation site				
Unimproved	85%	97%	42.167	0.000
Improve	15%	3%		
Buttocks cleansing				
Unimproved	95%	90%	4.274	0.039
Improve	5%	10%		
Faeces disposal				
Unimproved	85%	74%	10.542	0.001
Improve	15%	26%		

Significant at $p < 0.05$

Almost all respondents (97%) who had experienced diarrhoea within the last four week defecates with unimproved toilet facilities. In addition, children whose faeces were disposed within household environments were more susceptible to diarrhea ($\chi^2=10.542$, $P<0.05$). About 74% of respondents that disposed faeces around household environment had experienced diarrhea in the last 4 weeks before the survey. Further, there is a significant association between using unimproved toilet materials for cleaning buttocks after defecating and incidence of diarrhea among under-five children in the slums ($\chi^2=4.274$, $P<0.05$).

Table 3: Association between mothers' socio-demographics and toilet practices of under-five children in the slums

	Defecating site			Buttocks cleaning			Faeces disposal		
Characteristics	Unimproved	Improved	P-value	Unimproved	Improved	P-value	Unimproved	Improved	P-value
Mother's age group (in years)									
15-24	87.6%	12.4%	29.882***	92%	8%	0.746	79.3%	20.7%	2.890
25-34	94.1%	5.9%		90.5%	9.5%		73.9%	26.1%	
35>	100%	0%		92.3%	7.7%		78.5%	21.5%	
Mother's education									
No education	100%	0%	47.214***	100%	0%	44.898***	78%	22%	68.854***
Primary	95.7%	4.3%		96.5%	3.5%		89.4%	10.6%	
Secondary	96%	4%		89.2%	10.8%		74.1%	25.9%	
Tertiary	80%	20%		76.7%	23.3%		46.7%	53.3%	
Ethnic group									
Yoruba	92.4%	7.6%	22.279***	95%	5%	35.856***	76.8%	23.2%	0.541
Igbo and others	100%	0.00%		82.8%	17.2%		74.6%	25.4%	
Religion									
Christian	100%	0.00%	38.266***	96.8%	3.2%	205.609***	75.7%	24.3%	0.747
Islam	90.7%	9.3%		96.1%	3.9%		77%	23%	
Others	100%	0.00%		55.4%	44.6%		73.2%	26.8%	
Marital status									
Single	88.8%	11.2%	16.956***	100%	0.00%	36.727***	93.8%	6.2%	77.629***
Married (living with husband)	94%	6%		9.8%	90.2%		73%	27%	
Separated	100%	0.00%		91.4%	8.6%		100%	0.00%	
Divorce	100%	0.00%		68.4%	31.6%		44.7%	55.3%	
Widow	100%	0.00%		100%	0.00%		59.1%	40.9%	
Type of marriage									
Monogamy	96.6%	3.4%	2.629	92.1%	7.9%	0.395	83.5%	16.5%	11.463***
Polygyny	94%	6%		90.8%	9.2%		73%	27%	
Wealth Index									
Poor	95.3%	4.7%	4.017***	93.9%	6.1%	70.173***	77%	23%	3.719

Rich	90.4%	9.6%		68.1%	31.9%		68.1%	31.9%	
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Significant at $P < 0.05^{***}$

Table 3 shows the association between mothers' socio-demographics and toilet practices of children less than five years that live in urban slums of Oyo state, Nigeria. There is a significant positive relationship between mothers age and where under-five children defecate ($\chi^2 = 29.822$, $P < 0.05$). Children whose mothers are within the age of 15 years to 24 years were more likely to defecate with improved toilet facilities. However, these categories of children were more likely to clean their buttocks with unimproved materials (92%) and faeces were disposed around household environment (79.3%). These practices constitute health risk to children and it retard earlier positive efforts made to defecate with improve toilet facilities.

In addition, there is a significant relationship between where children defecate ($\chi^2 = 47.214$, $P < 0.05$), materials used for cleaning buttocks ($\chi^2 = 44.898$, $P < 0.05$), faeces disposal site ($\chi^2 = 68.854$, $P < 0.05$), and mothers education. Children whose mothers had no education were more likely to defecate with unhygienic toilet facilities (100%), clean their buttocks with unimproved toilet materials (100%), and faeces were disposed (78%) around residential homes.

Further, there is a significant positive relationship between mothers' marital status and under-five children's sanitation practices (defecation site $\chi^2 = 16.956$, $P < 0.05$; buttocks cleaning $\chi^2 = 36.727$, $P < 0.05$; dispose faeces $\chi^2 = 77.629$, $P < 0.05$). Children whose mothers were not living with their husbands or partners were more likely to defecate with unimproved toilet facilities, clean waste from buttocks with unhygienic materials and dispose faeces around household environments. In addition, most children from poor households were susceptible to defecating with unimproved toilet facilities (95.3%), clean faeces from buttocks with unimproved toilet materials (93.9%), and their faces were illicitly disposed (77%).

Community perceptions of childhood sanitation practices

The norms and perception of people within the slums influence childhood toilet practices. Open defecation is a bane to children's development and survival, yet many people practice unhygienic toilet behavior due widely held perception and practices. A respondent in an In-depth Interview noted:

My child defecate on the floor behind the building. After she defecate, I clean her buttocks with water and dispose the faeces into the drainage using a nylon bag. At times, I threw it across the road for animals to feed. It is not our tradition for children to defecate in the toilet (IDI/Ibadan slum/28 years)

The community perception and neighbourhood norms influence toilet practices of children less than five years old. Another respondent buttressed this when she said:

It is not our tradition for children to defecate in the toilet, especially in this community. We have our own way of live and people within the neighbourhood would frown at it if seen taking children to defecate in a flush toilet. My kids defecate inside a polythene bag, which I dispose at the roadside at night (IDI/Ibadan slum/41 years)

The responses of respondents shows that community perception interact with poverty to influence people's toilet practices in the slums of Nigeria. There is an association between poverty and poor toilet practices in the slums. This was highlighted in the In-depth Interview below:

My child defecates on the floor and I evacuate the faeces by covering it with sand. At times, he defecates while sitting between my feet. I do not have the financial capacity to purchase all his needs, that is the reason I make use of the available limited resources in my household (IDI/Ibadan slum/33 years/2017)

The findings from the qualitative study shows that community perceptions interact with poverty to influence widespread open defecation and the practice of unhygienic toilet behaviour in the slums.

Relationship between household environments and incidence of diarrhea

The unadjusted model on table 4 shows that the odds of getting diarrhea was high among under-five children whose mothers' were older than 24 years, with no education, poor and without husband (single or widow).

Table 4: Odds of childhood diarrhoea in the slums

Characteristics	Model 1 (Odds ratio)	Model 2 (Odds ratio)	Model 3 (Odds ratio)
Mother's age group (in years)			
15-24 (RC)	1.000		0.340***
25-34	2.288**		0.170***
35> (RC)	8.096***		1.000
Mother's education			
No education	1.375		1.560
Primary	0.315**		0.267***
Secondary and above (RC)	1.000		1.000
Ethnic group			
Yoruba (RC)	1.000		1.000
Igbo and others	0.569***		0.386***
Religion			
Christian	1.156		1.833
Islam	6.526***		8.195***
Others (RC)	1.000		1.000
Marital status			
Single (RC)	1.000		
Married (living with husband)	0.109***		0.053***
Separated	0.000		0.000
Divorce	0.111***		0.084***
Widow (RC)	5.542**		1.000
Type of marriage			
Monogamy (RC)	1.000		1.000
Polygyny	0.237***		8.209
Wealth Index			
Poor (RC)	1.556***		1.000
Rich(RC)	1.000		0.739
Defecation site			
Unimproved		6.964***	7.806***
Improve (RC)		1.000	1.000
Buttocks cleansing			
Unimproved		0.511	0.211***
Improve (RC)		1.000	1.000
Disposal of faeces			
Unimprove		0.398***	0.304***
Improve (RC)		1.000	1.000
Model Chi-square 171.662 Nagelkerke R Square 0.273 -2Log Likelihood 737.317 ^a Significant at P<0.05*, p<0.01**, p<0.001***, RC – reference category			

Model 2 shows that the odds of experiencing diarrhea was high among children that defecate using unimproved toilet facilities (OR = 6.964; P<0.05). The odds increased in model 3 as children that defecates using unimproved toilet facilities were 8 times more likely to experience diarrhea than those using improved toilet facilities. In summary, there is a significant relationship between mother's age, education, marital status, poverty, unimproved toilet practices and the risk of experiencing diarrhea among children less than five years in the slums.

Discussion of findings

Despite concerted efforts to reduce the prevalence of death among under-five children, millions of children still die each year due to diseases from poor toilet practices. The disposal of faeces into the toilet is the international criterion for safe disposal of children faeces. Yet, 85% of the households in Nigeria slums threw their children faeces within household environments. There is a significant relationship between locations where faeces were disposed and risk of diarrhea among children less than five ($\chi^2 = 10.542$, $P < 0.05$). This shows that unsanitary disposal of children faeces is widely practice, which in turn, exposes children to morbidity and mortality. Findings in this study are in tandem with the report by [9] that only 25% of children faeces were safely disposed. The International Monitoring Organisation on Health defines safe disposal of children faeces as the process of depositing children's faeces into the toilet. Yet many parents have paid negligible attention to this risk as reflected in a study conducted by [11] that the practices associated with disposing children faeces increased diseases by 23%.

Majority of the children (97%) who had experienced diarrhea defecate with unimproved toilet facilities where open defecation is still widely practice. According to [12], open defecation was responsible for the spread of diseases, especially among under-five children in slum communities. It is therefore understandable that sanitation (toilet practices) was the central focus of the Sustainable Development Goal 6. In fact, some scholars have regarded open defecation as a security threat to women and children [10], and a violation of human right [4, 5]. Nigeria efforts to eliminate open defecation especially among under-five children has claw back due to poverty and slum practices.

In this study, childhood toilet practices ($\chi^2 = 42.167$, $P < 0.05$) was positively associated with diarrhea in Nigeria. This health hazard has negative implications on the health indicators of Nigeria. Such hazard account for over 16% of under-five death due to poor sanitation practices in Nigeria [25, 26]. In addition, the findings of this study shows that the risk associated with poor childcare increase with mothers with no education (OR = 1.560). This is in tandem with [14] reports that 36% of female in the country has no formal education. Therefore, despite progress in reduction of households without toilet facilities from 29% to 25% between the years 2013 to 2018, the number of death among under-five children is still high.

Furthermore, there is a correlation between materials use for cleaning children buttocks ($\chi^2 = 4.274$; $P < 0.05$) and the risk of diarrhea among under-five children. This is especially so where water is mainly used for washing children buttocks. In a similar study conducted in Nigeria, [3] reported that 85% of care-givers use water for anal cleansing after children defecate. The use of water to wash anal were perceived as better than any other materials. In addition, children defecate on their mothers body due to belief that children faeces were not harmful. Contrary to widely held beliefs in that children faeces were not harmful, [7] debunked such beliefs and associated the death of 151,700 children per annum to diarrhea, which is mainly caused by unhygienic water and sanitation. [1] also associated the disposal of faeces on the floor to diarrhea due to the presence of flies around household's environment. Further, these reports support the finding of an earlier study conducted in Ondo State, Nigeria by ([12] who linked unsanitary disposal of faeces around residential homes to diarrhea.

What is already known on the topic

Studies have established that consuming dirty water, use of unhygienic toilet facilities and poor hand washing practices were the major cause of diarrhea among under-five children, globally [12, 30]. The situation is precarious in sub-Saharan Africa where under-five children were ten times more likely to die before age 5 than children in high income countries [28, 29].

However, negligible attention has been paid on the implications of childhood toilet practices on achieving the Sustainable Development Goal 6.

What this study adds

This study shows that despite national progress on the use of improved toilet facilities, there remain no progress in the slums. The continuous utilisation of unimproved toilet facilities in the slums will stall or retard efforts made nationally to reduce morbidity among children less than five. Slum communities' perception of diarrhoea, which is influence by ignorance and poverty, is the major constraint limiting the use of improve toilet facilities. Toilet practices in the slums is precarious and children in the slums suffer from preventable illnesses due to poverty, ignorance and slum practices. Therefore, to achieve the Sustainable Development Goal 6 by year 2030, community education on improved sanitary practices should be integrated to slum inhabitants.

Limitation of the study

The limitation of this study relate mainly to the constraints involved with primary data. The responses were self-reported and accuracy of the data depends on the respondents.

Conclusion

Childhood sanitation practices remains a major health challenge, especially, in the slums with precarious toilet facilities. This situation increases the prevalence of morbidity and mortality among children less than five. Poor perception, poverty and ignorance has been implicated for the persistent use of unhygienic toilet facilities and children from poor household were more predisposed to experience diarrhea. Therefore, to achieve the Sustainable Development Goal 6 by 2030, community education should be use to increase the sanitary consciousness of slum dwellers. Health intervention programmes should be integrated with community education to promote improve health practices in the slums and reduce death among children less than five years.

Ethical approval and consent to participate

Ethical approval was sought from the University of Ibadan Social Science and Humanities Research Ethics Committee, University of Ibadan, Nigeria with assigned number **I/SSHEC/2017/0025**. In addition, the international standard ethical issues bordering on respondent's confidentiality, beneficence to participants, non-maleficence and justice as it affects the study was considered and respected. All

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participants provided written informed consent prior to the interview.

Consent for publication

Not applicable

Availability of data and materials

The datasets generated and analysed during the present study are available from the corresponding author on reasonable request.

Competent interest

We have no conflict to disclose

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Author's contribution

OSC Conceptualized, designed and carried out data collection, data analysis/interpretation and wrote the first draft of the paper. AO edited, improved and revised all version of the manuscript. All authors read and approved the final version of the manuscript.

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Figures

Figure 1

Conceptual Framework