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Diarrhea Disease Among Children Under Five Years: Critical Assessment of Causes and Effects

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ABSTRACT

The aim of this study was to assess the causes and effects of diarrhea disease on the health of children under 5 years old. A sample of 160 respondents was selected in Orlu Local Government of Imo State, Nigeria, and data were collected from the respondents, mainly mothers and caregivers through structured questionnaire and analyzed using descriptive statistics of chi-square (χ^2) test at 0.05 level of significance at 1 degree of freedom. Results of the findings showed that poor nutritional status of children, unhygienic feeding practices, and poor defecations behaviours among mothers causes diarrhea in children under 5 years old. Recommendations were made at the end of the study, among which was that Health Education should be organized for members of the community, especially caregivers on food and environmental hygiene.

Keywords: Diarrhea, hygiene, nutrition, malnutrition, children

1. INTRODUCTION

Diarrhea diseases are one of the major health risks facing children in Orlu Local Government Area. The frequency and persistent incidence of this disease in the area is a matter of urgent public health concern, especially as it affects children under 5 years of age, which is the most vulnerable segment of the community. It is, however, rare to see a child attaining the age of 5 years without having a recorded episode of frequent and persistent diarrhea in the area.

The frequency and persistence of diarrhea among children has caused many community members to see childhood diarrhea as a normal happening in child growth and development. The effects of diarrheal diseases in the life of a child are enormous and range from malnutrition stunted growth, low resistance to infections and make children more vulnerable to diseases with high mortality in children.

Diarrheal diseases are among the most frequent childhood illnesses and leading cause of preventable growth, especially among children under five in developing countries. According to data from 2019, diarrhea claimed the lives of 480,000 young children worldwide, accounting for 9% of all fatalities among children under the age of five (UNICEF, 2022). It does not only result in a high death rate in children, but also in malnutrition, stunted growth, and weakened immune systems in those who are affected. Dehydration brought on by diarrhea can be caused by fluid and electrolyte loss. Untreated dehydration due to diarrhea in children causes death (UNICEF 2021). Diarrhea can also cause electrolyte imbalance, renal impairment, defective immune system responses, dehydration and also death of children.

The risk of having diarrhoea is high in developing countries (UNICEF, 2018). In Nigeria, diarrheal diseases still pose a severe threat to children's health, particularly in rural areas where standard of sanitation and the general level of hygiene is poor. According to WHO (2019), diarrhea is defined as passing three or more loose or liquid stools per day (or more frequently than is typical for an individual). Many factors predispose children to diarrheal diseases and these ranges from, poor nutrition, an unhygienic environment, tainted food and water, poor hygiene habits by the child's caregiver or parents, and inability to exclusively breastfeed infants for the first 4-6 months of life. An infection in the gastrointestinal tract is the primary cause of diarrhea. The microbes responsible for this infection include Bacteria, viruses, and parasitic organisms most of which are spread by fecal waste, contaminated water, and food (WHO, 2014).

Most of the bacteria, viruses, and parasite organisms that cause this disease are spread via feces, polluted water, and contaminated food (WHO, 2014). It is impossible to overstate the role of viruses in outbreaks of diarrhea in children. One of the most common causes of diarrhea in babies and young children globally is rotavirus (Dhalaria, 2023). The virus is transmitted by the fecal oral route. It infects and damages the cells that line the small intestine and causes gastroenteritis. Diarrhea can also be caused by other viruses such as caliciviruses, astroviruses, and enteric adenoviruses. pathogens include *Campylobacter*, *Salmonella*, *Shigella*, and certain forms of *Escherichia coli*. *Giardia*, *Cryptosporidium*, and *Entamoeba histolytica* are two common parasite infections linked to diarrhea.

Poor nutrition and diarrheal mortality have a bidirectional association (Ed Nel, 2010), While poor nutrition causes immune-deficiency and increased susceptibility to infections, diarrhea causes poor nutrition through reduced food appetite, nutrient loss and malabsorption. According to a recent study conducted in Bangladesh, children who are malnourished and from poorer families with a low monthly income of less than one hundred dollars (\$100 US) (Faruque, 2008) are more likely to develop severe diarrhea disease, as most families cannot afford to buy enough and nutritious food for the family. Proper nutrition is essential for young children's overall health and development, including the prevention of infectious diarrhea, as their immune systems are still growing.

In Sub-Saharan Africa, Several factors exposes children to risk of poor nutrition, such as unemployment, household food insecurity, inadequate dietary intake, large family size, poor caregiver's knowledge, age, poor weaning methods, poverty, sickness, poor environmental

sanitation and water supply (Mkhize, 2020), (kalu, Etim 2018). Large families always have less food for each person to eat. Moreso children who are sick usually do not feed well which leads to poor protein and energy supply to meet the demands of the growing body which gives way for diarrhea and other infections.

However, Oninla et al (2007) observed that children in rural areas of developing countries are generally of risk of under nutrition than their urban counterpart. This observation implies that malnourished children more often come from poor living conditions with unhygienic practices. Recent study from Mihret 2023, discovered that undernourished children are more likely to have diarrhea disease as compared to children who had normal nutritional status. It is now clear that good child feeding depends not just on the food consumed but also on the amount of time spent interacting with the caregiver. The nutritional status of children who are fed by their mothers receives positive encouragement and undistracted aid to eat than children who are fed by caregivers and this has an impact on the nutritional health of the child (Aboud et al. 2009).

Literature from Ethiopia shows that child feeding practice is directly related to diarrhea (Feleke et al., 2022). Unhygienic feeding practices include poor breastfeeding, serving of improper foods, and use of unsterilized feeding utensils for infants. According to a study done in Zanzibar, inadequate preservation of infant food and drinking water is substantially correlated with the frequency of diarrheal disease (Ali, Kigadye 2020)

Mothers and children in low socioeconomic urban areas with limited hygiene and sanitation facilities tend to have poor hygiene practices such as using dirty cooking and eating utensils for their children. While poor hygiene practices, especially in food preparation and feeding practices may increase the risk of having diarrhea. Inadequate breastfeeding, poor sanitation and hygiene practices of mothers are associated with diarrheal disease incidence in young children (park, 2015).

Furthermore, studies from Nigeria demonstrated that the frequency of diarrhea varied depending on the mothers' level of education, with a significantly greater prevalence among children whose mothers had no formal education (Yilgwan and Okolo, 2012). This could be because of the health education provided on cleanliness feeding and weaning techniques, the management of childhood illnesses at school, and the function of various school groups in maintaining personal hygiene and environmental sanitation.

According to Mosisa et al. (2021), families with mothers who wash their hands less frequently before giving their children food had considerably higher rates of childhood diarrhea.

This includes using unclean tools to make and serve food, feeding children with unclean cups and bowls, and using feeding bottles that are difficult to keep clean. It also includes drinking unclean water. Incidences of flies, regular eating of street food, and sociodemographic factors including child age, sex, area, and access to sanitary facilities all play a role in the recurrence of diarrheal disease.

Globally, 892 million people have no access to proper sanitation facilities and experience open defecation. Basic sanitation refers to unshared housing facilities that hygienically remove human excreta from human touch (UNICEF/WHO, 2017).

The pathways for faecal-oral illness transmission are significantly impacted by inadequate access to safe water, proper sanitation and hygiene. When there is no water for personal hygiene, it gives way for diarrheal infections. In Africa's sub Saharan countries, where hygiene and sanitation are poor, the incidence of diarrhea is very high (Workie et al., 2019) as

about 80,% and 20% of the rural and urban population respectively lack access to safe drinking water and sanitation (Plan international 2010).

Fecal pathogens can be transmitted through contaminated soil, water, hands, food, surfaces and objets (Gizaw et al.,2022). In many low and middle-income countries (LMICs), young children are often exposed to soil that has been contaminated with animal and human feces while crawling and playing both outdoors and indoors. According to research from Tafere (2020), there is a reduced prevalence of diarrhea among children who lived in open defecation-free zones than among children who didn't as pathogens that cause diarrhea are typically transmitted by the faecal-oral route by ingesting food or liquid contaminated with feces or by direct contact with infected stools (Kirk et al, 2017).

When mother's dispose off their children's excreta in the open during the rainy season, the excreta may be washed away by rainwater, run into Wells, streams, rivers or even sleep into the earth, contaminating both surface and subsurface water supplies that could be used for drinking.

Additionally, it provides a chance for some fly species to lay eggs, brood and feed on the exposed substance (which can be food or water) and when children swallow it, they become the susceptible host and spread the disease to them. Typhoid, dysentery, cholera and other intestinal diseases are transmitted through this pathway. After disposing their children's waste, many mother's/caregivers have the practice of not washing their hands with soap and water.

These mother's/caregivers will still use their hands to prepare food and feed the children. In most cases, the tools used like shovels and potties are still not washed with soap and water after usage which increases the prevalence of diarrhea among under five children

2. EXPERIMENTAL

This chapter clearly explains the design, procedure, and methods for the research under the following subheadings: Study design, study setting. sample size, sampling techniques, instrument design, method of validating instruments, methods of data collection, method of data analysis and limitations of the study.

2. 1. Study Design

The design used for this research is descriptive survey which seeks to find to research problems whose variables are descriptive rather than experimental in nature, through questionnaire in line with study objectives and hypothesis on the causes and effect of diarrhea among children under 5 years of age.

2. 2. Study Setting

The area of study is Orlu Local Government Area of Imo State, Nigeria. It is one of twenty-seven local government areas in Imo state. It falls within the western territorial districts of Imo state, and its headquarters is in Orlu town. It is bounded in east, Orsu, Njaba, Ideato-north, Ideato south and Nkwere Local ment Areas There are sixteen towns (16 towns) in Orlu Local Government Area which includes, Amaifeke. Amike Eziachi. Ihitte Owerre, Ihioma, Mgbee, obibiochasi, Ogberuru, Okporo, Orly town. Owerre Ebeiri, Umuna, Umuzike, Umudioka and Umuowa.

Oru Local Government Area covers an area of 132km² and a population of 142,792 at the 2006 National population census. Orlu is a home for enterprise and industry which gives it the unofficial tag of the commercial capital of Imo state.

The permanent site for various industries, state and federal agencies like the Imo State University Teaching Hospital, the state-owned cardboard industry in Owerre ebeiri, the newly built Imo State School of Nursing and Health Technology at Okporo, the multipurpose Imo international market and a host of small and medium size chemical and pharmaceutical companies.

In terms of culture, the people of Oru Local Government Area are blessed with rich culture, and they celebrate festivals like Ebuebu, Okorosha (Masquerade) and iri ji (New yam) festival. Also, in terms of language, igbo language is commonly spoken in the local government area, while they are mainly Christians.

2. 3. Sample Size and Sampling Techniques

The sample size for this study is mainly mothers and care givers of children under five years old, drawn from four communities of Umuna, Amaifeke, Owerre-ebeiri and Okporo. This segment of the population is preferred because they are in a close relationship with this category of children and as such are in a good position to provide relevant information for their studies.

The researcher using simple random sampling technique chooses communities and states them into zones (North, South, East, West). From the zones four communities were randomly selected. This was done by assigning a number to each community, cutting uniform pieces of papers to correspond to the number of communities, writing number to each piece of paper to correspond to number of communities, carefully folding these papers into a bag from where four (4) draws were made without replacement.

From the sampled communities, 160 women, forty (40) respondents from each community were selected by first ascertaining women/caregivers nursing children within the ages under study.

2. 4. Instrument Design

The study instrument used by the researcher for the study to gather data was a structured questionnaire divided into two sections; section 1 contains information on biodata of respondents while section 2 contains information on the variables in line with the objectives of the study. The questionnaire was structured on a two point-like scale format of "Yes" and "No".

2. 5. Method of Validating Instrument

The questionnaire was developed by the researcher and validated by the researcher's supervisor. The supervisor made some contributions on the questionnaire by removing irrelevant items and including relevant ones to the instrument and this enhances its validity.

2. 6. Method of Data Collection

The researcher visited resources centres (library) and internet to gather relevant literatures that greatly aided this study while primary data were collected through the questionnaire. One hundred and sixty (160) copies of the questionnaire were administered by the researcher to the sampled population with the assistance of a friend and were successfully retrieved and analysed.

2. 7. Method of Data Analysis

Data obtained were analysed using chi-square x contingency test analysis. Chi-square x was deemed the most appropriate statistical method for the study because it tests a relationship between two variables that are not continuous in nature.

3. RESULTS

The results of this study confirmed that children with inadequate nutritional status have diarrhea. This result backed up Foolch et al. (2022) claim that poor nutrition in childhood alters the immune system in a variety of ways by suppressing immune responses and increasing virus sensitivity. Children who die from diarrhea frequently have underlying malnutrition, making them more susceptible to diarrhea. This is also confirmed by a study conducted in sub-Saharan Africa, which found that malnourished children from lower-income families had a higher risk of developing severe diarrheal disease (Demissie et al., 2021). Malnutrition is often associated with poverty, which can lead to limited access to clean water, proper sanitation facilities, and hygiene practices. Poor hygiene and sanitation increase the risk of diarrheal diseases as children may encounter contaminated water or food.

Table 1. Frequency and percentage of study sample on demographic variable

Variable	No of Respondent	Percentage
Age (years)		
Below 30	57	36%
30-49	93	58%
50 and above	10	6%
Marital Status		
Single	25	16%
Married	125	78%
Divorce	7	4%
Widow	3	2%
Educational Status		
No formal education	20	13%
FSLC	16	0%
SSCE	7	4%

ND/HND	35	22%
BSC and above	82	51%
Religion		
Christianity	154	96%
Muslim	0	0%
African Traditional religion	6	4
Total	160	100

According to the present research, unclean feeding practices are a contributing factor to the prevalence of diarrheal disease. This finding is consistent with Biswas et al. (2021) findings, which showed that diarrheal illnesses in children have been linked to inadequate food hygiene practices, caregivers' poor hand cleanliness, and children's mouthing of contaminated foods. The results concur with those of (Ghosh *et al.*, 2021), who showed that diarrhea prevalence among children under five was greater in rural areas. The same socioeconomic status and degree of use of facilities for water, sanitation, and hygiene in the research area may be the cause of this consistency in the prevalence of diarrhea.

Table 2. Result of the relationship between poor nutritional status and the cause of diarrhea

Variable	Causes of Diarrhea		Total	X ² cal Value	X ² critical value	D.F
	Yes	No				
High rate of poverty	110 (97.7)	15 (27.3)	125	32.1	3.84	1
Large family size	15 (27.3)	20 (7.7)	35			
Total	125	35	160			

This study also found a link between diarrhea in children and feeding them leftovers. Children from families that did not serve leftover food were more likely to develop diarrhea than children whose mothers did. Additionally, it agreed with earlier research from Northwest Ethiopia (Birhan *et al.*, 2023). Several bacteria that cause diarrhea may be more likely to contaminate food that has been preserved as leftovers. As a result, properly boiling food for children and serving it to them promptly after cooking may reduce the likelihood of further food contamination and stop diarrhea.

Table 3. Relationship between unhygienic feeding practices and diarrhea

Variable	Health Status of Children		Total	X ² cal Value	X ² critical value	D.F
	Yes	No				
Unhygienic food preparation	10 (25.1)	124 (27.3)	134	68.5	3.84	1
Sanitation practices	20 (4.9)	6 (21.1)	26			
Total	30	130	160			

Poor defecation habits among mothers and the prevalence of diarrhea are significantly correlated. This is in accordance with research from Bangladesh that showed visible feces in the household compound and close to areas where food is prepared and stored to be significant risk factors for diarrheal sickness in children (Giri, 2022; Uddin *et al.*, 2023). This is because of non-hygienic practices, such as open defecation, stools not removed from the soil, and children seen eating faeces increase the risk of diarrheal diseases.

Table 4. Relationship between poor defecation behaviour among mothers and diarrhea

Variable	Prevalence of diarrhea		Total	X ² cal Value	X ² critical value	D.F
	Yes	No				
Handwashing practices	100 (79.1)	10 (30.9)	110	62.7	3.84	1
Open defecation practices	15 (35.9)	35 (14.1)	50			
Total	115	45	160			

This study discovered that diarrhea was substantially linked with vectors and fly activity at food storage sites which is consistent with recent research in Ethiopia (Birhan 2023). Lack of sanitation in the latrines, garbage disposal near the restrooms and inside the residential enclosure, and the disposal of household sewage in these locations all appear to have a role in the presence of flies and other vectors near food storage facilities. The study found an association between diarrheal disease and lack of latrines which is supported by another study

conducted in kersa (Mulatu et al., 2022). This could be because the availability of latrines reduces faecal contamination of the environment and also reduce the chance of mechanical vectors having access to micro organisms that causes diarrhea thereby reducing diarrheal disease in children.

According to this study, children who drank water that had been contaminated by feces had a higher risk of developing diarrhea than those who did not. This result is consistent with research done in Ethiopia (Birhan et al., 2023). This is because germs in feces that are thrown in locations adjacent to the house, which can cause diarrheal sickness, might contaminate the environment and the food that children eat (Gizaw et al 2022).

4. CONCLUSIONS

The study revealed that the environmental condition of homes where children live, the level of personal hygiene of caregivers have impact on the health of children and determines the incidence of diarrheal diseases among their children. Unclean feeding practices are a contributing factor to the prevalence of diarrheal disease. This study therefore found a link between diarrhea in children and consumption of leftovers foods. Also, poor defecation habits among mothers and the prevalence of diarrhea are significantly correlated. An integrated approach for improving feeding, sanitation, and hygiene practices along with continuous health education especially for mothers and caregivers will help curtail the burden of diarrhea among children under five years.

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