



Original Research Article

## **Predisposing and Risk Factors of Diarrhea in Children Seen At Enugu State University Teaching Hospital, Enugu-Nigeria**

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### **ABSTRACT**

This study was designated to discover and determine the predisposing and risk factors of diarrhea in children seen in Enugu State University Teaching Hospital. The research subjects were 296 mothers/ children under 5 years of age. Questions were used to elicit the vital information in order to achieve the above aim, questions which could evaluate the required responses from the subjects were asked. Stratified random sampling technique was used to select the study population. Data were collected using questionnaire. Data collected include personal information, socio- economic information, sanitation practices, refuse disposal practices and hygienic practices. Out of the children that had diarrhea that required treatment, 68.07% were within the age range of 0- 2 years. The 50.91% respondents indicated that they cleaned their toilet whenever dirty, 21(7.09%) respondents indicated that they had no toilets and 80.95% of them defecated directly inside bush. The rate of respondents that indicated not washing their children's hand before feeding was 26.69% of and 34.30% of them washed their children's hands with water only. However, 63.85% of the respondents sometimes washed their hands before preparing and feeding their children and 61.70%. The 74.66% of the respondents stored prepared food for later use and 40.72% did not reheat the food before reuse. While 44.26% of the respondents did clean their kitchen whenever dirty, 20.95% allowed animals to enter their kitchen. Low income, poor housing, crowded condition, unhygienic toilets and kitchens, poor environmental sanitation practices and improper washing of hands were all recognized and indicated as predisposing and risk factors for diarrhea in children.

**Keywords:** Diarrhea, Children, Risk factors.

### **INTRODUCTION**

Diarrhea still remains a major public health problem today. It is over 160 years since John Snow closed the Broad Street pump in central London after a cholera outbreak and thereby initiated the debate on diarrhea disease risk factors and their elimination. <sup>[1]</sup> About 80% of deaths due to diarrhea occur in the first two years of life.

World Health Organization <sup>[2]</sup> define diarrhea as having three or more loose or liquid stools per day, or as having more stools than is normal for that person. It sees it as a common cause of death in developing countries and the second most common cause of infant deaths worldwide. It was stated that diarrhea was estimated to have caused 1.1 million deaths in people aged 5

and over and 1.5 million deaths in children under the age of 5 years. [3] In developing countries, diarrhea is among the leading causes of childhood morbidity and mortality. [4]

Many times this number has long-term complications like malnutrition, growth retardation and immune impairment. Overall, these children experience an average of 3.2 episodes of diarrhea per child per year. Although the majority of diarrheal episodes are not severe and many do not require specific intervention, a large number are potentially fatal.

There are many impacts of diarrhea and factors that can predispose children to diarrhea disease. Many studies have established that the diarrhea prevalence is higher in younger children. The prevalence is highest for children between 6-11 months of age; remain at a high level among the 1 year old children and decrease in the 3<sup>rd</sup> and 4<sup>th</sup> years of life. Higher rate of diarrhea has been observed in boys than girls. [5]

Other demographic impacts like mothers' younger age, low level of mothers' education, high number of siblings, birth order were significantly associated with more diarrhea occurrence in children less than 5 years of age. Studies have also shown that the association between socio-economic impacts, such as poor housing, crowded conditions, low incomes and higher rate of diarrhea was statistically significant. [6]

Sanitation obviously plays a key role in reducing diarrhea morbidity. [7] Diarrhea is acquired through contaminated water and foods. Water – related factors are very important determinants of diarrhea occurrence. According to Diarrhea results from an imbalance in the absorption and secretion properties of the intestinal tract, if absorption decreases or secretion increases beyond normal, diarrhea results. [8] It can range in severity from an acute to a severe,

life threatening illness. However, frequent passing of formed stools is not diarrhea, nor is the passing of loose “pasty” stools by breastfed babies. [9] According to Children not washing hands before meals or after defecation, mothers not washing hands before preparing foods or feeding children, children eating with their hands rather than with spoons, eating of left over foods, child feeding with dirty feeding bottles and utensils were associated with impact factors of diarrhea morbidity. [10]

Some sanitation impacts, like indiscriminate or improper disposal of children's stool and household garbage, no existence of latrine/toilet, house without sewage system, unhygienic toilet/latrine, increased the risk for diarrhea in children. The major risk factor for viral diarrhea is contact with symptomatic person. For bacterial diarrhea, foreign travel and socio-economic factors are the main risk factors. [11]

This research is aimed at identifying the local predisposing and risk factors for diarrhea disease in children aged between 0 – 5 years founded in Enugu State University teaching Hospital Enugu. Identification of predisposing and risk factors, and then recommendations of simple, immediate and effective risk-reduction measures would help local health care services to reduce morbidity and mortality due to diarrhea among young children in the area.

## **MATERIALS AND METHODS**

Materials included children that had/have diarrhea in Enugu State University Teaching Hospital Parklane were used in the study. Methods used were interview method with the use of questionnaire that was used to collect data from the mothers of the children.

A descriptive survey method was used for this study. The population of study comprises of children that had diarrhea in

Pediatrics ward, Children's emergency unit and Pediatrics clinic of Enugu State University Teaching Hospital. Samples of 74 subjects were selected as representative of total population of 91. Stratified random sampling method was used for each stratum.

**Questionnaire was used as an instrument for data collection.**

A total of 296 copies of the questionnaire were distributed to the mothers of the children in the pediatric ward, children's emergency unit and pediatrics clinic in Enugu State University Teaching Hospital. The questionnaire was made up of three (3) sections, section A which contains all the demographic and socio-economic data, section B and C which contains question on the basis of the objectives of the study in order to answer the research questions.

The questionnaires were taken to the various units. These were distributed to the mothers of the children and details and requirement from the respondents needed to answer the questions were explained in order to answer the questions properly. All the questionnaires given out were collected back. This was done within the all the five (5) days of the week that is from Monday to Friday that is to ensure that everybody was given equal right to participate.

After the collection of the data, percentage calculations of responses were done, frequency table were used to analyze the data as well as bar charts and pie charts.

**RESULTS**

Amongst the 296 respondents 32(10.81%) of the respondents lived in duplex, 33(11.25%) lived in bungalow, 132(44.60%) lived in 2-3 bedroom, 86(29.05%) lived in public yard and 13(4.39%) did not specified the type of accommodation they lived in (Figure 1).

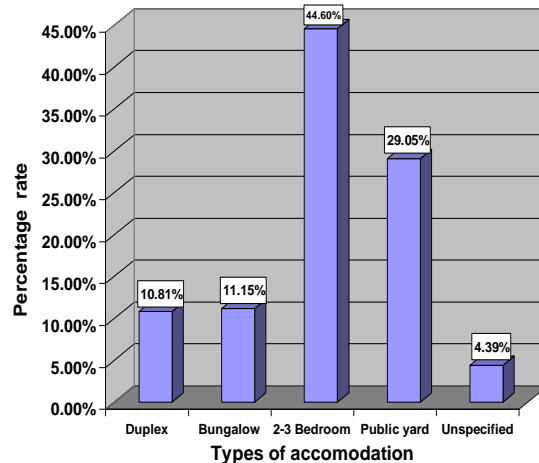


Figure 1: Type of Accomodation Of The Respondents

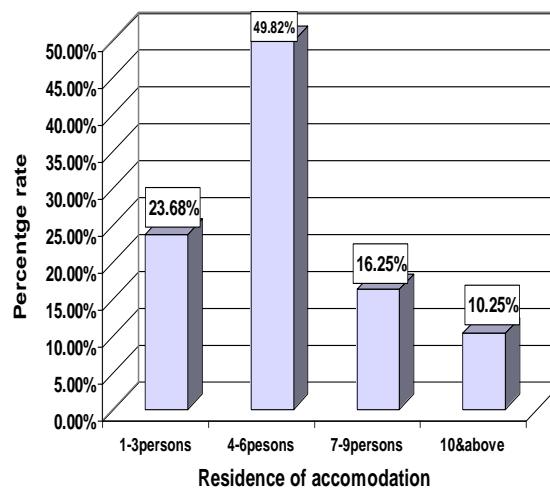


Figure 2: number of people occupying the accommodation.

The rate of occupancy of each home was as follows 1 – 3 persons(23.68%), 4 – 6 persons(49.82%), 7 – 9 persons(16.25%) and 10 and more persons was at the rate of 10.25% (Figure 2).

Most of the respondents (mothers) were educated, while 156(52.70%) had tertiary education, 101(34.12%) had secondary education and 26(8.78%) had primary education. Only 13(4.39%) had no formal education. The 41(13.85%) of the fathers were petty traders, 91(30.74%) were high class business men, 30(10.14%) were junior civil servants, 99(33.45%) were

senior civil servants and 35(11.82%) had no father

of 6 – 8 years and 6(3.61%) were 9 years and more (Figure 4).

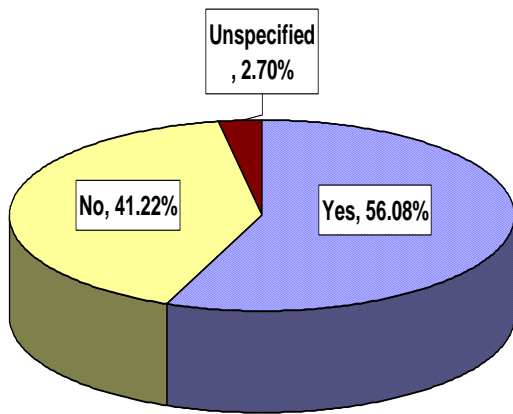


Figure 3: children that had diarrhea that required treatment.

The number of children that (indicated by their mothers) had diarrhea requiring treatment was 166 (56.08%) and 122(41.22%) had no diarrhea that required treatment while 8(2.70%) were unspecified (Figure 3).

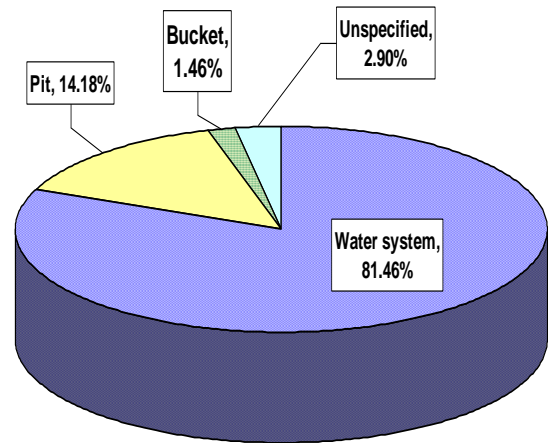


Figure 5: Respondents' Type Of Toilets

Figure 5 shows that 224(81.46%) respondents indicated they had water system, 39(14.18%) indicated they used pit toilet, 4(1.46%) used bucket toilet method and 8(2.90%) did not specify the type they had. Among the 21 respondents that had no toilet facility, 4(19.05%) of these excreted on the ground and 17(80.95%) excreted inside the bush.

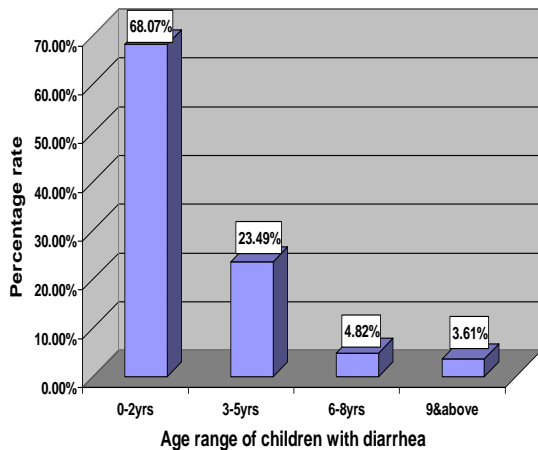


Figure 4: age range of children that had diarrhea that required treatment.

The age ranges of the children affected ranked from 0 to > 9 years. Those at age 0-2 years was 113(68.07%), 39(23.49%) were within the age range of 3 – 5 years, 8(4.82%) were within the age range

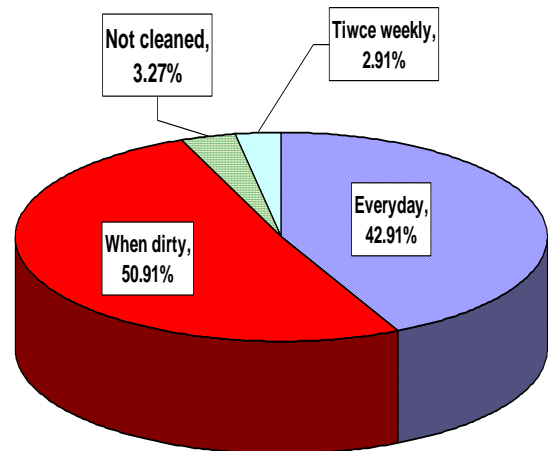


Figure 6: respondents who indicated how often the toilet/latrine are cleaned.

Figure 6 shows the frequency of toilet cleaning. Those that indicated cleaning

their toilet every day were 118(42.91%), 140(50.91%) indicated that they cleaned their toilet every time it was dirty/ spoiled, 9(3.27%) indicated not cleaning their toilet at all and 8(2.91%) indicated cleaning their toilet twice weekly. The mothers that indicated children being able to use toilet on their own were 112(40.73%) and 163(59.27%) indicated children being unable to use the toilet on their own.

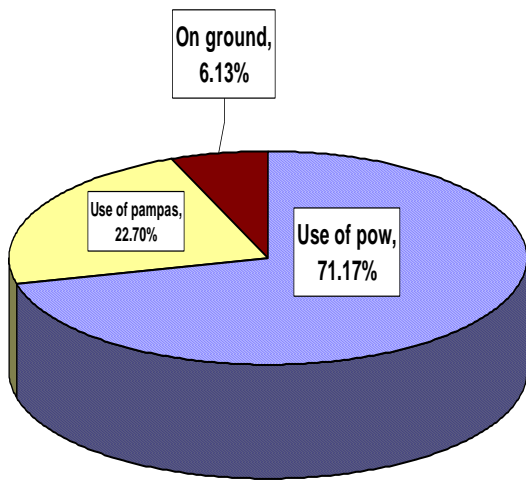


Figure 7: children method of defecating.

Figure 7 indicated the method of defecating of the children, 116(71.17%) of the children used pow(potty), 37(22.70%) used pampas, 10(6.13%) defecated on the ground/ floor.

Table 1: care giving to the child after defecating.

RESPONSES	FREQUENCY	PERCENTAGE
Wash anus with water	75	25.34%
Clean anus with paper	193	65.20%
Not cleaned at all	2	0.68%
Use others	26	8.78%
Total	296	100.00%

The various ways of cleaning up the children after defecation was also indicated in table 1, 75(25.34%) washed anus with water, 193(65.20%) cleaned anus with paper, 2(0.68%) did not clean at all and 26(8.78%) used other methods such as wiper to clean the anus.

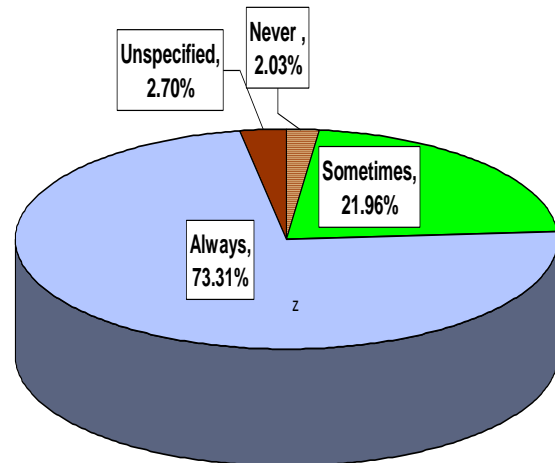


Figure 8: Respondents Indication Of Washing Hands After Defecating

The mothers (respondents) also indicated their frequency of hand wash after defecation. Here 6(2.03%) indicated never washing their hands, 65(21.96%) indicated washing their hands sometimes, 217(73.31%) indicated washing their hands always and 8(2.70%) did not specify (Fig. 8). The washing of hand was either by water only (33.69%) or with water and soap (66.31%).

There was also responses on usage of excreta as fertilizer, while 232(78.38%) did not use excreta as fertilizer, 64(21.62%) did.

Table 2: responses to disposal of household refuse.

REFUSE DISPOSAL	FREQUENCY	PERCENTAGE
Rubbish bin/waste	207	69.93%
Rubbish pit	23	7.77%
Open surrounding	22	7.44%
Inside bush	31	10.47%
Burn refuse	13	4.39%
Total	296	100.00%

The refuse disposal methods is shown in table 2, 207(69.93%) used rubbish bin/ waste, 23(7.77%) used rubbish pit, 22(7.445) dumped refuse in open surrounding, 31(10.47%) dumped refuse inside bush and 13(4.39%) burned their refuse.

## DISCUSSION

Socio-economic impacts such as poor housing, crowded condition, unhygienic toilets and sharing toilets increased the risk of diarrhea. As seen in this study (Figure 1 and 2), people living in 2-3 bed room apartment (44.60%) and public yard (29.05%) occurred more in the study than people living in duplex or town houses (10.81%) and bungalow (11.15%). The rate of occupancy were more also in 4-6 persons (49.82%) in an apartment. This supported the statement of Warren (2003) that poor housing and crowded conditions had higher rate of diarrhea disease. The percentage of the mothers that had formal education being more than those that did not, might be due to knowledge of the disease acquired by mothers that had formal education against those mothers that did not have formal education that made them to take their children to Teaching Hospitals (being the caption area of this study) for expert management while the later group may have taken their children to periphery health centers and might even stay with their children at home and procure medicine from patent medicine dealers.

Out of the 166(56.08%) of the total population that had diarrhea that required treatment, 113(68.07%) were within the age range of 0 – 2 years and the highest, followed by 39(23.49%) of age range 3 – 5 years and the lowest (3.61%) diarrhea rate was within 9 years and above (figure 2). The incidence of the diarrhea was inversely proportional to the age of the children. This agreed with the statement that diarrhea prevalence is higher in younger children and decrease as the age increases. [5] His work documented that rate of diarrhea were highest for children 6-12 months of age, remain at high level among the 1- year - older children and decreased when children got older. A decrease in number of cases among older children might have resulted

from the fact that the immune system in older children got stronger and resisted against disease agents. Therefore, they could have been taken to Health centers or Cottage Hospital instead of the Enugu State University Teaching Hospital.

Using bucket or pit toilets (figure 5) or defecating on the ground could really be a risk to the spread of diarrhea. Also the use of ordinary papers to clean-up after defecation increases the risk of diarrhea because these papers could not be flushed with water and they were kept in the open buckets, where they increased the risk of spreading infection. Irregular cleaning the toilet increased the risk (Figure 6). Obviously, more people sharing a toilet coupled with irregular cleaning of the toilet reduce the hygienic level of the toilet. Use of open pow/potty (71.17%) for children's toileting is another predisposing factor for diarrhea because most of the time these potty were not properly cleaned flies that perched on them disseminating infection.

From the study 63.85% of the respondents did not regularly wash their hands before preparing and feeding children. This agreed with the study of Fewtrell and Colford. [10] that irregular washing of hands before preparing and feeding children would predispose the children to diarrhea disease. Washing hands have been clearly shown to reduce the occurrence of diarrhea. Ignorance, irrespective of level of education, may explain why many mothers do not wash hands before preparing and feeding their children. They do not realized that their sanitation and food hygienic-related-practices are very important to their children's health.

## CONCLUSION

From the study, it was also discovered that unhygienic practices such as indiscriminate or improper disposal of household refuse, children's stool, and poor

care of children after toileting, unhygienic toilets, and poor washing of hands were significantly important in predisposing and risk factors of diarrhea. Also socio-economic conditions such as poor housing and crowded conditions were determinants of risk factors of diarrhea.

## REFERENCES

1. Patwarri A.K Diarrhea and Malnutrition interaction. Indian J. Paediatrics. 1999;66(1):S124-34
2. World Health Organization “Mortality and Burden of disease”. Estimated for WHO member states. Wikipedia the Free Encyclopedia 2004; Available from [www.en.wikipedia.org/wiki/diarrhea](http://www.en.wikipedia.org/wiki/diarrhea) accessed.
3. World Health Organization. Diarrhea Diseases, Wikipedia the Free Encyclopedia 2009. Available from [www.en.wikipedia.org/wiki/diarrhea](http://www.en.wikipedia.org/wiki/diarrhea)
4. Molbak K. The epidemiology of diarrhea diseases in early childhood”. A review of community Studies in Guinea – Bissau. Danish Medical Bulletin. 2000;47:340-58
5. Katz M.H. Multivariable analysis. A practical guide for clinical. Cambridge University Press. 2<sup>nd</sup> ed. 2006. Pg 14 – 23.
6. Nataro J. P. Diarrhea among children in developing countries. Adv Exp Med Biol. 2013; 746:73-80.
7. Curtis V, Cairncross S, Yonli R. Domestic hygienic and diarrhea pinpointing the problem. Tropical Medical International Health. 2000; 5(1) 22 – 3.
8. Jensen P.K., Ensink J.H, Jayasinghe G, Van der Hoek W.*et al.*, Domestic transmission routes of pathogens. The problem of in – house contamination of drinking water during storage in developing countries. Tropical Medical International Health. 2002; 7(7): 604 – 9.
9. Webb A, Starr M. Acute gastroenteritis in children. Australia family Physician. 2005;34(4): 227 – 31 PMID 15861741
10. Fewtrell L, Colford J M.,”Water, Sanitation and hygiene in developing countries”. Intervention and diarrhea – a review. Water Science Technology. 2005; 52(8): 133 – 42.
11. Johnnie Yates M.D. Traveler’s Diarrhea. Am Fam Physician. 2005; 1:71(11):2095-2100.

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