

Prevalence of Enteropathogenic *E. Coli* Among Hospitalized Diarrhoea Children in State Specialist Hospital Maiduguri, Borno, Nigeria

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ABSTRACT

Diarrhoea is a disease that seriously affects young children in developing countries. This study was aimed to determine the prevalence of Enteropathogenic E. coli among hospitalized diarrhea children in Maiduguri Specialized Hospital Borno, Nigeria. One hundred (100) children less than five years with diarrhea were used in this study. Out of the 100 stool samples collected, 60 were male and 40 were female. The overall prevalence rate of Enteropathogenic E. coli in this study is 15%. Distribution of children based on aged showed that children between 1- 12months had the highest prevalence of (35.7%), followed by 13- 36month (12.1%) and 37- 60 (10.7%). Males (18.3%) prevalent rate outnumber their females (10.0%) counterpart. Therefore governments are advice to establish standard surveillance and control strategist (such as provision of adequate potable drinking water etc) which is important in alleviating/eliminating the number of diarrhea cases due to EPEC in the State.

Key Words:

Diarrhea; EPEC; Children ; Hospital

INTRODUCTION

Diarrhoea is a disease that seriously affects young children in developing countries (Parashar *et al.*, 2003; Ifeanyi *et al.*, 2010).

The public health concerned about diarrheal disease cannot be over emphasized (Ifeanyi *et al.*, 2010). The disease is thought to be one of the most common causes of morbidity and mortality among young children and infant in developing countries (Samal *et al.*, 2008). Globally, an estimated four million children and adults die annually of infectious diarrheas (Synder and Merson, 1980). Infectious diarrheal diseases are of great concern throughout the world, as they are responsible for considerable morbidity and mortality, especially in developing countries (Jafari *et al.*, 2008; Guerrant *et al.*, 1990). Although extensive investigation of diarrhea has not been reported, the diarrhea – specific mortality in children younger than five years of age in Africa has been estimated at about 106 per 1000 (Olowe *et al.*, 2003; Ifeanyi *et al.*, 2010). According to the Federal Statistic Bulletin (FMHB, 1987), in Nigeria more than 300 children die every day as a result of dehydration and malnutrition caused by diarrhea. These statistics are likely to be underestimated as many patients do not have access to the limited number of hospitals and health centres that are available (Ogunsanya, 1994). Enteric bacteria account for a substantial proportion of diarrhoea episodes worldwide. The contribution of the various pathogens to diarrhoea may differ substantially between regions depending on local meteorological, geographic, and socio-economic conditions (Reither *et al.*, 2007:

Ifeanyi *et al.*, 2010). According to Holt *et al.* (1994), the Enterobacteriaceae merely causes about 50% of hospital acquired infections most frequently caused by *Escherichia coli*, *Klebsiella*, *Enterobacter*, *Proteus*, *Providentia* and *Serratia marcescens*. *E. coli* is one of the most frequent enteric bacteria causing diseases in infants. The disease is characterized by severe diarrhea and dehydration caused by enterotoxigenic and enteropathogenic strains. Enteric bacilli, especially *E. coli* and *Klebsiella species*, have been implicated in infantile meningitis (Prescott *et al.*, 2002). The association between enteropathogenic *Escherichia coli* (EPEC) and diarrhea has been reported in many countries. Studies have also shown that EPEC is an important causative agent in sporadic infantile diarrhoea in many developing countries (Gomes *et al.*, 1991). However, acute diarrhea has been recognized as a prominent killer of infants and young children in most developing countries. Underlying reasons for the spread of diarrheal diseases are found in poor hygiene and sanitation, limited access to safe drinking water as well as in inadequate education of health care providers and recipients (Curtis *et al.*, 2000; Thapar and Sanderson, 2004; Ifeanyi *et al.*, 2010). However, studies on the spread of these enteric bacteria in urban and rural areas have received only cursory attention in Nigeria. Unfortunately, due to limited resources the microbiological diagnoses of diarrhoea are not done easily in many settings in Nigeria (Ifeanyi *et al.*, 2010). The main objective of the present study was to determine the prevalence of Enteropathogenic *E. coli* isolated from hospitalized diarrhea children in Maiduguri Specialized Hospital Borno, Nigeria.

MATERIALS AND METHODS

COLLECTION OF SAMPLES

One hundred (100) children less than five years of age who admitted in the Borno State Specialist Hospital and reported to have diarrhea were randomly selected for this study. The samples were collected prior to the administration of antibiotics. The aged of the children were categorized into three (3) groups according to month; 1- 12, 13- 36 and 37- 60 months. The samples were transported to laboratory for analysis.

PROCESSING OF THE SAMPLES

The specimen were processed according to the guideline provided Cheesbrough (2006) for the diagnosis of Enteropathogenic *E. coli* (EPEC). The stool swabs were inoculated into MacConkey agar and Eosin Methylene Blue agar (Oxoid, England) and incubated for 24hours at 37⁰C. Colonies morphologically resemblance *E. coli* were further identifies based on appropriate biochemical reaction and they were confirmed as described by Cheesbrough (2006).

RESULTS AND DISCUSSION

One hundred (100) children less than five year old with infectious diarrheal were used in this study. Out of the 100 stool samples collected, 60 were male and 40 were female. Distribution of children based on aged showed that children between 1- 12months had the highest prevalence of (35.7%), followed by 13- 36month (12.1%) and 37- 60 (10.7%). Out of the 100 stool samples collected from diarrhea children 15 isolates of EPEC were obtained. Therefore, overall prevalence of this study was 15%. This figure is lower than the prevalence rate reported by Olanipekun (1996) among children with diarrheal attending University Teaching Hospital, Jos, Nigeria. It is lower than the prevalence of 68.5% reported by Ifeanyi *et al.* (2010) among diarrhea children in Federal Capital Territory, Abuja,

Nigeria. This value is also lower than 83.1% reported in Abakaliki, South-western, Nigeria (Ogbu *et al.*, 2008). This variation in prevalence rate might be due to differences in the standard of living and also maintenance of personal hygiene among the various States in the country.

The prevalence rate of 15.0% obtained for EPEC in this study is also comparable to what was reported elsewhere outside Nigeria. It is lower than 63.3- 71.83% reported in Tanzania, 50- 60% in other developing countries, 45% reported by Jafari *et al.* (2008) among patients admitted in different hospitals in Tehran, Iran; the 56% reported by Svenungsson *et al.* (2000) among adult patients presenting with acute diarrhea in Swedish. In contrast is higher than 4.8% reported by Cho *et al.* (2006) in Korea.

The distribution of EPEC among children with respect to age showed that children with 1- 12% had the highest prevalent rate of 35.7%, followed by 13- 36 month (12.1%) and 37- 60 month (10.7%) with highly significant difference ($P \leq 0.05$) (Table 1). The finding of this study is similar to the prevalence rate of 36% among children between 7- 12 month and 6.9% among children between 49- 60 month reported by Ifeanyi *et al.* (2010) among diarrhea children in Federal Capital Territory, Abuja, Nigeria. The high

prevalence rate of 15% reported in this study might be attributed to poor environmental sanitation and maintenance of personal hygiene among the dwellers in some part of the Metropolis. It also couple with inadequate water supplies which may lead to severe infectious diarrhea among children.

With respected to sex, male had the highest prevalent rate of 11(18.3%) than their counterpart female 4(10.0%). The result of this study is similar to the finding of Jafari *et al.* (2008) who reported the prevalence rate of 53.2% in male while 46.8% in female among patients attending different hospital in Tehran. However, no significant difference observed between the sex and prevalence of the infection (Table 2).

In conclusion, the present study revealed that the prevalence of EPEC among hospitalized diarrhea children in Borno State Specialist Hospital, Maiduguri, Nigeria, was 15.0%. It also showed that higher prevalent was recorded among children between 1- 12month than the other age groups. Males prevalent rate outnumber their females counterpart. Therefore governments are advice to establish standard surveillance and control strategist (such as provision of adequate potable drinking water etc) which is important in alleviating/eliminating the number of diarrhea cases due to EPEC in the State.

Table 1: Age distribution of EPEC among hospitalized diarrheal children in State Specialist Hospital Maiduguri

Age (Month)	Total No. of patient tested	No. of Positive	Positive (%)
1-12	14	5	35.7
13- 36	58	7	12.1

37- 60	28	3	10.7
Total	100	15	15.0

($\chi^2 = 5.9185$, df= 2, p= 0.05186)

Table 2: Sex distribution of EPEC among hospitalized diarrheal children in State Specialist Hospital Maiduguri

Sex	Total No. of patient tested	No. of Positive	Positive (%)
Male	60	11	18.3
Female	40	4	10.0
Total	100	15	15.0

($\chi^2 = 0.7353$, df= 1, p= 0.3912)

CONCLUSION

The results of this study pinpointed the prevalence of Enteropathogenic *E. coli* among hospitalized diarrhea children attending State Specialized Hospital Maiduguri. Out of the 100 stool samples collected, 60 were male and 40 were female. The overall prevalence rate of Enteropathogenic *E. coli* in this study is 15%. Distribution of children based on aged showed that children between 1- 12months had the highest prevalence of (35.7%), followed by 13- 36month (12.1%) and 37- 60 (10.7%). Males (18.3%) prevalent rate outnumber their females (10.0%) counterpart. Therefore governments are advice to establish standard surveillance and control strategist (such as provision of adequate potable drinking water etc) which is important in alleviating/eliminating the number of diarrhea cases due to EPEC in the State.

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