

**PREVALENCE AND ISOLATION OF BACTERIA ASSOCIATED WITH DIARRHOEA
AMONG CHILDREN ATTENDING HOSPITALS IN KASULI****Dr. Krishan Kumar* and Anita Kumari**

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ABSTRACT

A survey study was done to determine the prevalence of diarrhoea in children and isolation of bacterial species as a causative agent from three hospitals of Kasauli (Military Hospital, Primary Health Centre Kasauli Cantonment Hospital, ESIC Hospital, Kasauli). Bacterial agents causing infection, age- specificity, prevalence and feeding methods associated with diarrhoea in children younger than five years of age were determined. Out of the 400 fecal samples collected from diarrheal children, 220 samples was found to be positive for diarrhoea in children and highest prevalence was reported in the 0-6 months age, in infants in the present study. In the current study, the most predominant bacterial species isolated was *E.coli* in infants followed by *Salmonella*, *Shigella*, *Staphylococcus aureus*. The present study also provide information that bottle feeders are more infected than breast feeders due to unhygienic practices.

KEYWORDS: Diarrhoea, Fecal samples, Children, Bacterial.**INTRODUCTION**

Diarrhoea disease is one of the leading causes of illness in young children in developing countries (Parashar et al., 2003). The main cause of death from acute diarrhea is dehydration, which result from loss of fluid and electrolyte in stool. Another important cause of death is dysentery and under nutrition (Sinclair et al., 2003). Risk factors that predispose children to diarrhea include poor sanitation, poor social and economic status and malnutrition (Andu et al., 2002). The clinical syndromes of diarrhea include acute watery diarrhea, which refers to diarrhea that begins acutely and last less than 14 days (usually less than 7 days), and involve the passage of frequent loose or watery stool without visible blood. Vomiting may occur and fever may be present. Acute watery diarrhea causes dehydration which may result in death. Another clinical syndrome of diarrhea is dysentery, which refers to diarrhea with visible blood in faeces, the effect of which include anorexia, rapid weight loss and damage to the intestinal mucosa by invasive bacteria. The organisms implicated in this type of diarrhea include *Shigella*, *Campylobacter jejuni*, *Salmonella* and very rarely *Entamoeba histolytica* (Bahal et al., 2001). Most common organisms isolated from the diarrhoeal samples are- *E.coli*, *Salmonella*, *Staphylococcus*, *Klebsiella* & *Pseudomonas*. It is commonly found in the lower intestine of warm blooded animals and isolated on EMB & Mac-Conkey agar (Agarwal & Kumari, 1990). Diarrhoea is one of the commonest problems found in pediatric clinics in any

part of world. It is one of the leading causes of illness in young children in developing countries (Parashar et al., 2003). The public health significance of diarrhoeal disease cannot be over emphasized and epidemiological studies of diarrhoea have been reported from several African countries including Gabon (Presterl et al., 2003), Egypt (Rao et al., 2003) and Kenya (Sang et al., 1996).

MATERIALS AND METHODS**Sample Collection**

A total of 400 children samples were collected under the age group of 5 years, who had diarrhoea both outdoor patients and those who were admitted were randomly selected from three hospitals of Kasauli (Military Hospital, Primary Health Centre Kasauli Cantonment Hospital, ESIC Hospital, Kasauli).

Culture of the faecal specimens

The faecal specimens were cultured into liquid and solid media for isolation and identification of the bacterial. Enrichment broth (Selenite F) was used for the multiplication of bacteria and then subsequently sub-cultured into a MacConkey Agar (MCA) and Deoxycholate Citrate Agar (DCA) and then incubated aerobically at 37C for 24 hours (Cheesbrough, 2002).

Biochemical Screening Tests

The bacterial isolates were identified by standard biochemical tests. The following biochemical tests were

carried out: Gram stain, Motility, Oxidase test, Urease test, Indole test, Methyl red test, Vogue Proskauer test, Catalase test, Cogulase test, Citrate test, & Fermentation of glucose, lactose and sucrose.

Table 1: Distribution of Diarrheal Patients children on the basis of Age (in months).

Age (in months)	Number	Percentage
0-6	150	37.5%
7-12	90	22.5%
13-24	80	20%
25-36	35	8.75%
37-48	30	7.5%
49-60	15	3.75%
Total	400	100%

Table 2: Distribution of Diarrheal Patients children on the basis of Gender.

Gender	Number	Percentage
Male	225	56.25%
Female	175	43.75%

Table 3: Age distribution of diarrhoeal children in Kasauli.

Age (in months)	Number of sample	Postive	Percentage
0-6	150	100	25%
7-12	90	50	12.5%
13-24	80	30	7.5%
25-36	35	20	5%
37-48	30	15	3.75%
49-60	15	5	1.25%
Total	400	220	55%

Table 4: Distribution of Bacterial Organisms Isolated from diarrhoeal children in Kasauli.

Bacterial Isolates	Number of Isolates	Percentage
Escherichia coli	70	31.8%
Salmonella species	45	20.5%
Shigella species	35	15.9%
Staphylococcus aureus	30	13.6%
Pseudomonas aeruginosa	15	6.8%
Klebsiella species	10	4.5%
Proteus	10	4.5%
Enterobacter species	5	2.3%
Total	220	55%

Table 5: Bacterial isolates in relation to method of feeding of children in Kasauli.

Bacterial Isolates	Bottle fed	Breast fed	Total
Escherichia coli	40	30	70
Salmonella species	30	15	45
Shigella species	20	15	35

RESULTS

Four Hundred (400) children younger than five years of age with acute diarrhoea were included in the study, Out of which, 150 samples were from the 0-6 months infants (37.5%) followed by 22.5% (7-12), 20% (13-24), 8.75% (25-36), 7.5% (37-48) and 3.75% (49-60) months age group of children. In the present study, the higher prevalence of diarrhea was found in infants. The present study matches with the **Adegunloye (2005)** who also reported in his study diarrhoea is an important cause of morbidity and mortality in infants and young children in most developing countries including Nigeria due to bacterial infections. Table 1 shows the distribution of diarrhoeal children by age. Out of 400 samples, 225 (56.25%) were male and 175 (43.55%) were female. Out of the 400 samples examined, 220 samples were positive for bacterial growth and the highest incidence occurred in the age group of 0-6 months (25%) due to the use of unhygienic bottles that are not properly cleaned with

water and detergents and also not properly boiled in water. The lowest occurrence was in age group of 37-48 & 49-60 may be due to children within this age group on their own differentiate between what to eat and what not to eat & about hygienic practices.

Table 4 showed the percentage occurrence of the bacterial isolates in faecal samples. Out of the 400 faecal samples cultured, Escherichia coli accounted for 70 (31.8%) isolates, second prevalent bacterial species was Salmonella 45 (20.5%) followed by 35 (15.9%) Shigella sp, 30 (13.6%) Staphylococcus aureus, 15 (6.8%) Pseudomonas aeruginosa, 10 (4.5%) Klebsiella species, 10 (4.5%) Proteus species and 5 (2.5%) Enterobacter species respectively. This is in agreement with the report of **Huilan et al (1991)** and **Clarke (2001)** stated that the bacterial pathogen most commonly associated with endemic forms of childhood diarrhoea and the most prevalent bacterial species is Escherichia coli. Higher risks of Diarrhoeal diseases caused by Shigella species, Salmonella species and Escherichia coli among children was reported in many earlier studies. This could be due to so many factors such as developmental difference between children and adults with respect to anatomical nature of their organs infected (e.g. large intestine, terminal ileum, colon) that are weaker than that of older aged. In addition, these children are frequently exposed to the hospital environment where the organisms have

high rate of colonization and are transferred mostly to them by the health workers that deliver health services to them. From Table-5, maximum number of bacterial isolates were from bottle feeders followed by breast feeders. In this research work, Bottle feeding children were more infected with Diarrhoeal diseases than breast fed children. In this work, it was observed that, there were higher risks of diarrhoeal diseases among those children that were bottle-fed than the children that depended solely on breast milk. These findings coincides with work of **Wadgaonkar et al., (2005)** and **Jolly, (2005)** who also reported bottle feeding children are more prone to diarrhoeal bacterial infections. This may be due to the fact that, the bottle milk may not be properly pasteurized and bottle milk can easily be contaminated during preparation either from water, utensils or hands of persons preparing the milk (**Jolly, 2005**). The low or rare diarrhoeal diseases among breast fed children is probably because breast feeding especially during the first 6-9 months of life without supplements is the most effective preventive measure against infections generally among infants (**Jolly, 2005**). The breast milk has a high lactose content when it broken down by anaerobic Lactobacilli forms lactic acid that creates a low PH environment which prevents the proliferation of Shigellae, Salmonellae, Escherichia coli (**Tauxe et al., 2005**). Also, human breast milk has other antibacterial substance such as Lactoferrin, Transferin, Lysozymes, Milk lipid and Lactobacillus promoting factors. However, breast milk is rich in humoral and cellular mediated responses that protects the body against external pathogen e.g. Shigellae, Salmonellae, Vibrio, Escherichia coli etc. Also, breast feeding substantially shifts the spectrum of severity in Diarrhoeal diseases from severe to non severe illness (**Jolly, 2005**). Out of 70 isolates of E.coli, 40 isolates of E.coli and next prevalent bacterial species were Salmonella and Shigella species in bottle feeding children in Kasauli followed by breast fed children.

CONCLUSION

In conclusion, Bacteriological investigations of Diarrhoeal diseases were carried out among 400 children in the age group of 0 –60 months (younger 5 years) children in Kasauli. Out of those, 220 children were found to have Diarrhoeal diseases in which bottle-fed were infected more than breast-fed children. The Bacterial species isolated comprised of Escherichia coli was found to be the most common among children, and then followed by Salmonella and Shigella species. In the present study, in Kasauli, diarrhoeal diseases are still the major cause of bacterial infection in infants followed by 7-12 months.

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