Aetiological Agents of Diarrhoea in Infancy and Early Childhood

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Abstract

Aetiological agents of acute diarrhoea in the first three years of life were determined. The main causative agents were bacteria (25.6%), viruses (20.6%) and parasites (3.6%). Mixed infection of bacteria and viruses was also found.
Sixtyfour per cent children were malnourished and 23% were severely dehydrated. EPEC serotype 0111 : K58 was found to be predominant. Mixed infection mainly affected the infants and diarrhoea was more frequent in males under one year of age. (JPMA 35 : 274, 1985).

Introduction

Diarrhoeal diseases are a major cause of morbidity and mortality among infants and preschool children and is a major factor contributing to malnutrition.
Acute infectious diarrhoea may be caused by bacteria, viruses and parasites[1]. Enteropathogenic E. coli are the main bacterial agents found in diarrhoea[2]. Viruses, particularly rotaviruses, have attained a considerable importance in recent years and have been found in 25-50% of the patients suffering from diarrhoea in different geographical locations[3,4].

Material and Methods

Patients under three years of age with a history of acute diarrhoea and dehydration were obtained from the paediatnc unit of the Central Government Polyclinic Hospital, Islamabad from July 1981 to July 1982.
Bacteriological investigations were carried out according to the methods described else. where[2].
Bacterial identification was performed using a battery of biochemical tests and serotyping[5].
Intestinal parasites were examined in saline and iodine preparation by direct microscopy. ZnSO4 concentration method was carried out for the ova of helminths[6]
Rotavirus antigen was detected by the ELISA technique using the Rotazyme kit (Abbott). Nutritional status was determined using the Gomez classification.

Results

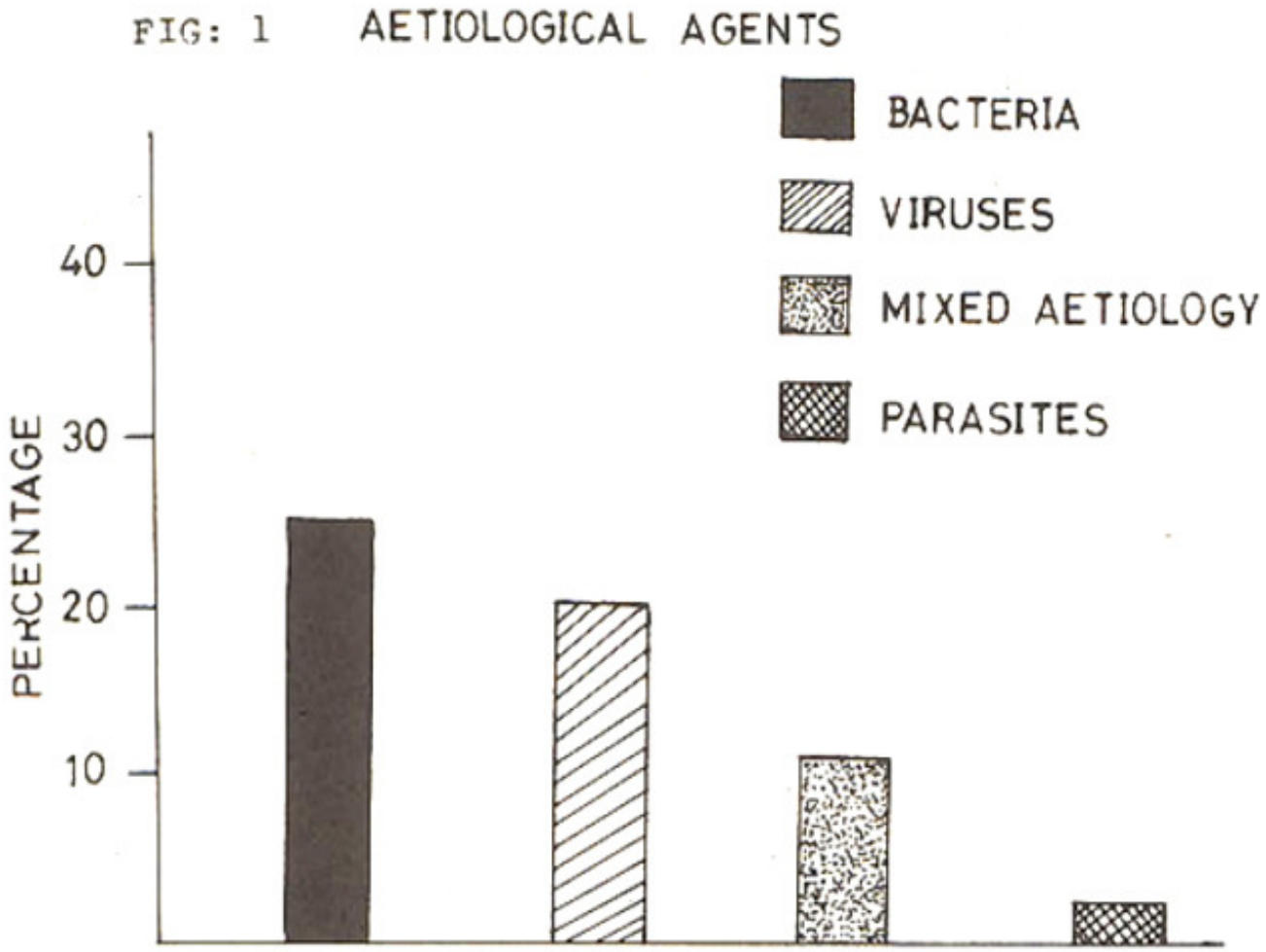


Figure 1 shows the aetiological agents of acute diarrhoea. Bacterial agents (25.6%) were the major causative factor compared to viruses (20.6%). Mixed infection of bacteria and viruses (11.4%) comprised a considerable proportion of diarrhoea! patients. Parasitic infection was found in only 3.6% of the total cases.

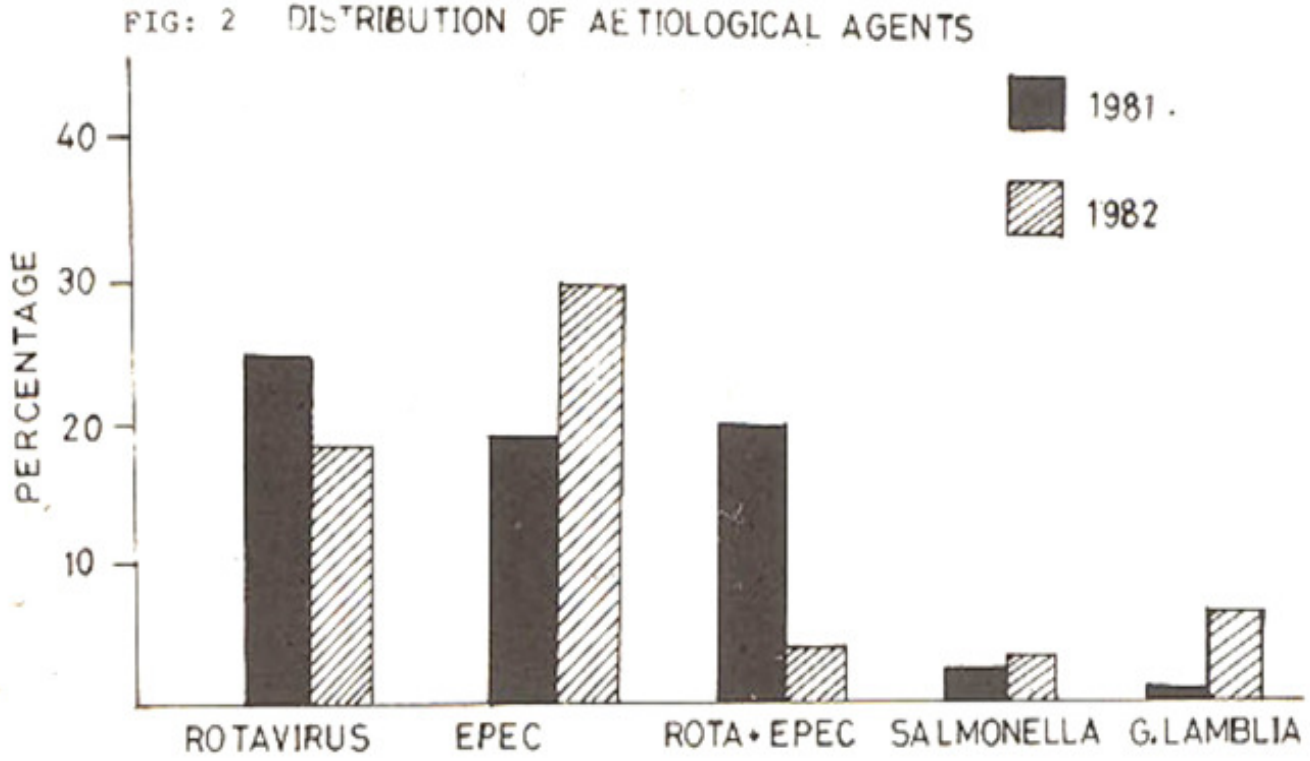


Figure 2 represents the distribution of aetiological agents. Rotaviruses were the major causative agents (23%) in 1981, whereas EPEC (29.1%) was the main aetiological agent in 1982. Similarly, mixed infection was more common (19%) in 1981 than 1982 (3.9%). Salmonella species were found in almost equal percentages in both the years. However, Giardia lamblia infection was raised considerably (6.6%) in 1982.

TABLE I EPEC SEROTYPES

SEROTYPE	NUMBER (%)
O111 : K58	19 (15.9)
O26 : K60	16 (13.3)
O44 : K74	16 (13.3)
O125 : K70	16 (13.3)
O126 : K71	14 (11.7)
O55 : K59	9 (7.5)
O86a : K61	9 (7.5)
O127a: K63	8 (6.7)
O28 : K73	6 (5.0)
O18ab O18ac : K77	4 (3.3)
O128 : K67	3 (2.5)
TOTAL	120

Table I indicates the different serotypes of EPEC found to be incriminated in diarrhoea. EPEC strains belonged to 11 different serotypes. Predominant serotypes were 0111 : K58, 026 K60, 044:K74, 0125 : K70 and 0126 : K71. EPEC strains were also found in combination with rotaviruses, where 044 : K74 was the main serotype detected. (Table II)

TABLE 2 EPEC + ROTAVIRUS INFECTION

ROTAVIRUS + EPEC	<1 yr	>1 yr
ROTAVIRUS + O44 : K74	6	5
" + O125 : K70	5	3
" + O26 : K60	6	2
" + O111 : K58	5	2
" + O86a : K61	5	2
" + O18ab O18ac:K77	5	2
" + O126 : K71	4	1
" + O55 : K59	2	1
" + O127a: K63	1	0
TOTAL	39	18

followed by 0125: K70, 26: K60, 0111: K58 and 086a : K61.

TABLE 3 NUTRITIONAL STATUS
(after Gomez Classification)

NUTRITIONAL STATUS	0 - 3 yrs
GOOD	36.3 %
GRADE I	18.9 %
GRADE II	13.1 %
GRADE III	31.7 %

Table III shows the nutritional status of infants and children with diarrhoea. Sixtyfour per Cent of the

total Cases were suffering from 1st, 2nd and third grade of malnutrition while third grade of malnutrition affected 31.7% of the total cases. Dehydration was the major concern at the time of hospital admission and immediate fluid replacement was considered necessary, 53.5% of infants were moderately and 20.5% severely dehydrated (Table IV).

TABLE 4 DEHYDRATION STATUS

STATUS	< 1 yr	>1-3 yr.
MODERATE	53.5 %	24.5 %
SEVERE	20.5 %	1.5 %

In children over one year of age, 24.5% were moderately and only 1.5% severely dehydrated.

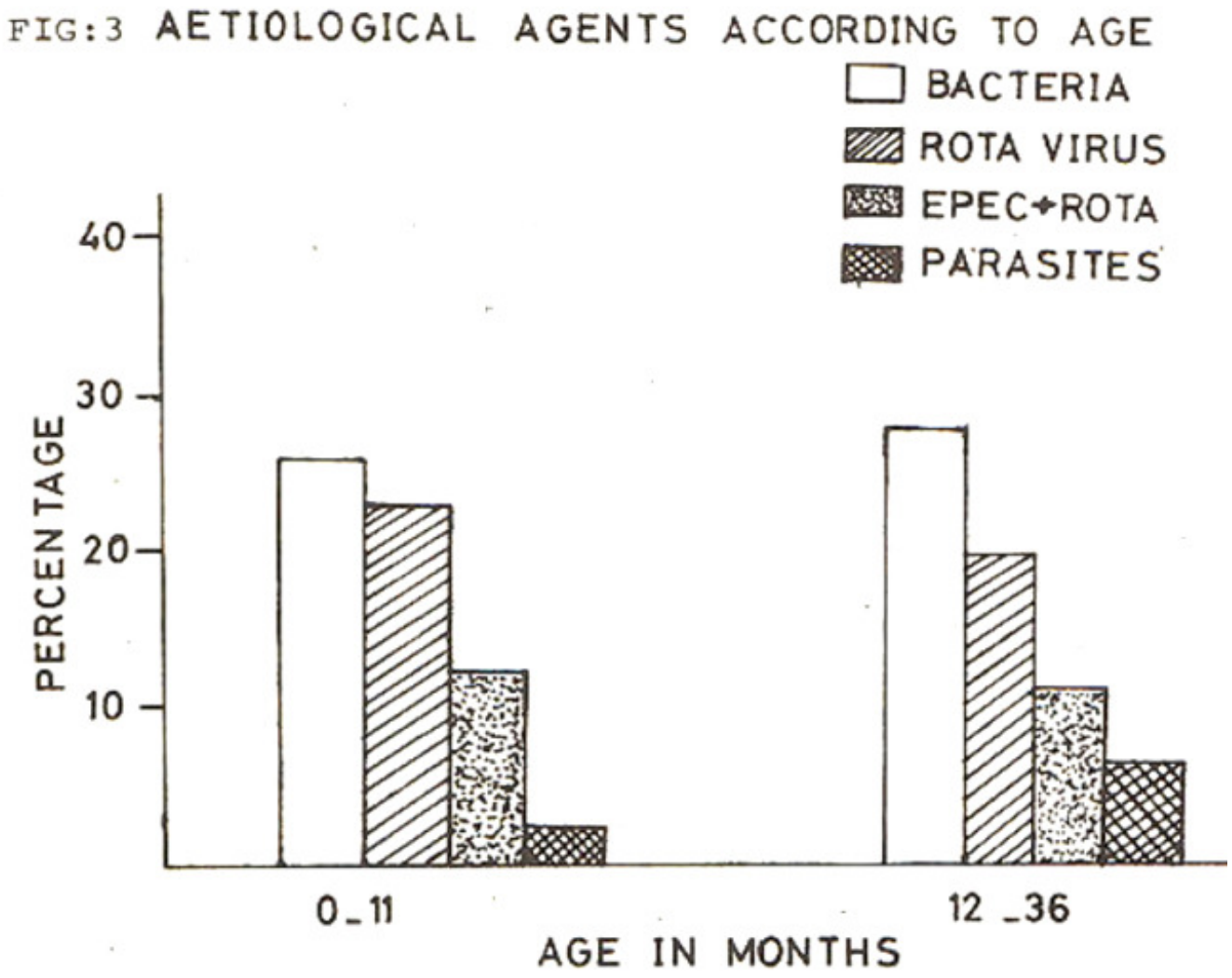
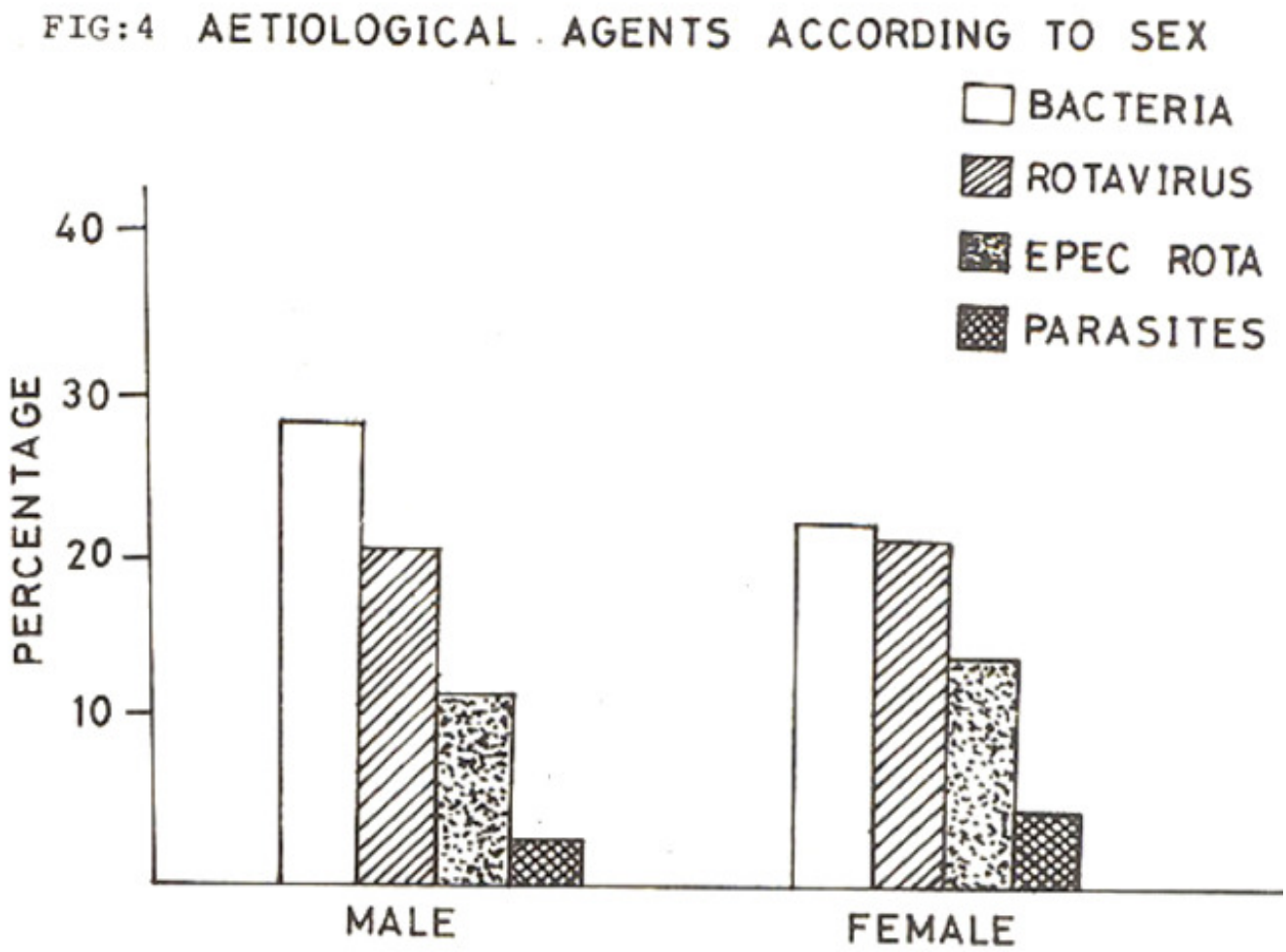


Figure 3 indicates the distribution of aetiological agents according to age. In both age groups, patients

were mainly affected with bacteria followed by rotaviruses. Mixed infection (12.4%) was more common in patients under one year of age, whereas Giardia lamblia infection was more prevalent (6.2%) in children above one year of age. Both the sexes were affected equally by Rotaviruses and parasites (Figure 4),



whereas bacterial infection was more common in males (28 .3%) as compared to females (21.9%). Mixed infection was higher in females (12.4%) than males (10.7%).

Discussion

This study was undertaken to determine the pattern of aetiological agents causing diarrhoea in pre-school children. Various serotypes of EPEC causing diarrhoea has found in many series in developing countries[3,7] and frequency of EPEC serotypes varies considerably. Studies from Sudan[8] and India[9] showed that 17% of the cases were due to EPEC strains whereas a high EPEC rate (24%) was detected in this study. Another 19% of the cases were found to have EPEC in combination with rotaviruses. In another study, higher EPEC rate (34%) was also found[10]

Salmonella infection was low (1.9%) which is keeping with our previous study[2]. However, a high incidence of salmonella infection (23 51%) has been reported from two other developing countries[11,12] Rotaviruses were responsible for severe diarrhoea in children between the ages of 6 months and two years in both tropical and subtropical areas of the world. The study from Bangladesh[13] had shown that 46% children of less than two years of age had diarrhoea due to rotaviruses. Our study also indicates

that rotavirus is a common pathogen for children less than two years of age and this finding is in agreempnt with other studies in both developed and developing countries[14,15,16] More than one bacterial agent was recovered from diarrhoeal cases in some studies[12,17] and in a similar study we found that mixed infection due to rotaviruses and EPEC strains occurred in 19% cases.

Several epidemiological studies have identified a significant association between diarrhoea and faltering body weight in infants and young children[18,19] This may be due to the reduced body fluids during diarrhoeal episodes. In the present study 63.7% patients had first, second or third grade of malnutrition as assessed by the Gomez classification which is in agreement with earlier studies which indicated that 54-67% of the children suffered from malnutrition[3,20]. Dehydration is the commonest problem associated with diarrhoea which often leads to fatality. This is further aggravated by the high environmental temperature in summer and stoppage of food, milk and other fluids by the mother. We found that 78% patients were moderately and 22% severely dehydrated, which is comparable with our previous study[3].

Children of 0-3 years of age were mainly infected with bacterial and viral agents, where as parasitic infection was more prevalent (6.2%) in children above one year of age and is in agreement with other studies[2,3,8] Our findings indicate that male patients were more susceptible than females however, the reasons may be simple and indicative of the fact that the male child is more vigilant and parents tend to show more care for the males than females as is the case in the majority of the developing countries.

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