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ETIOLOGY AND MANAGEMENT OF ACUTE DIARRHOEAL DISEASES AMONG CHILDREN IN A TERTIARY CARE HOSPITAL, TIRUPATI

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ABSTRACT
Globally there are nearly 1.7 billion cases of diarrhea every year. It is the second leading cause of death in under five children with 7.6 lakh deaths every year. Breast feeding has definite role in reducing the severity and duration of illness. This cross sectional study was conducted during Jan-Feb 2010 among 200 diarrhoeal cases in under five children admitted in a tertiary care hospital, Tirupati. The findings were analyzed using Epiinfo software 7 version. Overall, out of 3,055 admissions, there were 369 cases of acute diarrhoeal diseases in under five children giving the prevalence rate as 12.1%. Etiologically, majority of them are viral related (74.0%) while among the bacterial causes, E.coli was commonest with 20.0% and protozoans being found in 5.5% cases. Most of the cases were treated with both oral rehydration solution and intravenous fluids (68.5%). The proportion of severe dehydration was found to be higher in partially breast fed children (46.1%) compared to that of exclusively breast fed infants (18.7%). Partially breast fed infants significantly took higher time for recovery with 96.2% taking more than 3 days to recover compared to exclusively breast fed infants who took less than 3 days in majority of cases (97.5%). Thus the acute diarrhoeal diseases in under five children are mostly viral in origin. The use of intravenous fluids therapy is universal in all cases due to large public demand. This study has demonstrated the protective role of breast feeding in reducing the severity as well as the duration of the disease.

INTRODUCTION

Globally there are nearly 1.7 billion cases of diarrhea every year. It is the second leading cause of death in under five children with 7.6 lakh deaths every year. It is also the leading cause of malnutrition in under five children [1]. Half of the deaths due to acute diarrhoeal diseases in under five children occur in five countries: India, Nigeria, Afghanisthan, Pakistan and Ethiopia [2]. It is estimated that one-third of total paediatric admissions and 17% of all deaths are attributed to acute diarrhoeal diseases. The household surveys carried out in India revealed a morbidity rate of 1.7 episodes of diarrhea per day per child [3]. Africa and South East Asia accounts for 80% of all the diarrhoeal deaths. Mortality due to acute diarrhoeal diseases among under fives has declined over the past two decades from an estimated 5 million deaths to around 1.5 million deaths in 2004. Despite this decline, it continues to be the second leading cause of death among under five children globally [4]. Thus the global estimates of mortality due to acute diarrhoeal diseases in under fives had shown steady decline since 1980. However the morbidity has not shown a corresponding decline and remains between 2-3 episodes of diarrhea per year per

child [5]. In India, the proportional mortality rate due to diarrhea was 9.1% with an estimated projection of increase in years of life lost (YLL) from 1.7 lakhs in 2006 to 1.9 lakhs by 2016 [6].

The overall point prevalence of diarrhea in under fives in a study in Kashmir, India was found to be 9.3% being highest in 6-11 months (19.2%) with a slight male preponderance (10.4% in males compared to 8.1% in females) [7]. Another study in India has found an overall annual incidence in the first year as 1.1 per child which increased to 1.9 per child in second year with subsequent decline in 3-5 years' age group with common organisms isolated as Escherichia coli (5.8%), rotaviruses (5.6%) and Shigella (3.5%) [8]. In a study in northern India, the incidence of persistent diarrhea was found to be 6.3 per 100 child years being highest in 0-11 months (31 per 100 child years) with commonest organisms isolated as Enterotoxigenic Escherichia coli (9.3%), Campylobacter (4.7%), Salmonella (4.7%), Shigella, E.histolytica, rotaviruses (2.3 % each) [9].

Several studies had pointed out relation with type of feeding whether breastfed or bottle fed. In an Ethiopian study, a higher prevalence was found in partially breast fed infants (40%) compared to exclusively breast fed (12%) [10]. A study in Qatar [11] has also found a higher attack rate in formula fed infants (48.7%) compared to exclusively breast fed (32.5%). It was also pointed out that low socioeconomic status of families and education and occupation of mother played a pivotal role in the diarrhoeal incidence and prevalence. A study in rural Alwar, India has found that incidence was higher with low socioeconomic status and illiteracy of mother [12]. Another study in India has also found a higher incidence with low socioeconomic status of the families [13]. The diarrhoeal incidence and prevalence also showed association with immunization and nutritional status of children. A population based study in South India found that partially immunized had 4.6 times higher risk of diarrhea while undernourished children had 14.4 times higher risk [14]. Malnutrition is an independent risk factor for frequency and severity of diarrhea and there is a vicious cycle in which sequential diarrhoeal disease leads to increasing nutritional deficiencies, impaired immune function and greater susceptibility to infection [15]. In this context, this present study was conducted to find the etiology and management of acute diarrheal diseases among under five children admitted to a tertiary care hospital, Tirupati, Andhra Pradesh.

MATERIALS AND METHODS

This cross sectional and analytical study was conducted in the Department of Paediatrics, Sri Venkateswara Ram Narayan Ruia Hospital, Tirupati which is a teaching hospital of Sri Venkateswara Medical College, Tirupati. The acute diarrhoeal cases admitted over a duration of 2 months (January and February 2010) in the hospital were taken serially and out of that 200 cases were selected randomly. A pretested interview schedule was used to collect the necessary information about the subjects. Ethical clearance was obtained from the Institutional Ethics Committee. Most of the cases, the informant was mother (97.5%) while in a few cases, where the mother was not available, another responsible female attendant was interviewed for collecting the information. The socioeconomic status of the subjects was determined using updated BG Prasad classification [16] based on per-capita monthly income of families using updated All India Consumer Price Index for July 2009 (1167) [17]. 'Exclusively breast fed' was defined as feeding of the infant with breast milk exclusively and nothing else while partially breast fed are those children who were fed with bottle milk or formula milk with or without breast milk. The immunization status of children was assessed using the immunization cards available with the children. In rare cases, where immunization card was not available, the immunization status was assessed by detailed questioning of the respondent. The nutritional status of the child was assessed using Indian Academy of Paediatrics (IAP) classification with grades of I, II, III and IV malnutrition with specific cut off points. Stool samples were collected in all the cases in impervious containers and sent for examination to the Department of Microbiology quickly for identification of the etiological organism. The diagnosis of viral aetiology is entirely based on the clinical criteria and inability to identify any bacterial or protozoal cause. The data was analyzed using Epiinfo version 7.0 for windows (Centres for Disease Control, Atlanta, USA) and descriptive statistics were presented using percentages. The differences between proportions were analyzed using chi-square test and a probability value of less than 0.05 is considered significant.

RESULTS

Overall, out of 3,055 admissions, there were 369 cases of acute diarrhoeal diseases in under five children giving the prevalence rate as 12.1%. As far as the etiology was concerned, majority of them are viral related (74.0%) while among the bacterial causes, E.coli was commonest with 20.0% aetiology and protozoans being found in 5.5% cases. Majority of the children were fully weaned (47.0%) while exclusive breastfeeding was given in 40.0% cases. A large proportion of them had some dehydration (45.0%) while 28.5% had severe dehydration. Most of the cases were treated with both oral rehydration solution and intravenous fluids (68.5%) (Table 1). The proportion of severe dehydration was found to be higher in partially breast fed children (46.1%) compared to that of fully weaned group (31.9%) and exclusively breast fed infants (18.7%) but the differences were however not statistically significant (Table 2). Partially breast fed infants took higher time for recovery with 96.2% taking more than 3 days to recover compared to exclusively breast fed infants who took less than 3 days in majority of cases (97.5%). The difference was also statistically significant (Table 3). In general, the proportion of complications like renal

failure, thromboembolism, hyponatremia, hypokalemia and metabolic acidosis being similar in both exclusively breast fed and partially breast fed infants. The differences were also not statistically significant (Table 4).

Table 1. Etiology, feeding status, dehydration & type of management of acute diarrhoeal cases (N=200)

S.No	Parameter		No. of cases (%)
1.	**Etiology**		
	(a)	Viral	148 (74.0)
	(b)	E. coli	40 (20.0)
	(c)	Protozoans	11 (5.5)
	(d)	Others	1 (0.5)
2.	**Feeding status**		
	(a)	Exclusively breast fed	80 (40.0)
	(b)	Partially breast fed	26 (13.0)
	(c)	Fully weaned	94 (47.0)
3.	**Degree of dehydration**		
	(a)	No dehydration	53 (26.5)
	(b)	Some dehydration	90 (45.0)
	(c)	Severe dehydration	57 (28.5)
4.	**Type of management**		
	(a)	Oral rehydration solution (ORS) only	6 (3.0)
	(b)	ORS + Intravenous Fluids (IVF)	137 (68.5)
	(c)	IVF only	57 (28.5)

Table 2. Type of feeding and degree of dehydration (N=200)

Type of feeding	Degree of dehydration			Total (%)
	Nil	Some	Severe	
Exclusive breast feeding	25 (31.3)	40 (50.0)	15 (18.7)	80 (100.0)
Partial breast feeding	6 (23.1)	8 (30.8)	12 (46.1)	26 (100.0)
Fully weaned	22 (23.4)	42 (44.7)	30 (31.9)	94 (100.0)

χ^2= 8.65; P=0.07; NS

Table 3. Recovery of cases by type of feeding (N=106)

Type of feeding	Recovery period (days)		Total (%)
	Less than 3	More than 3	
Exclusive breast feeding	78 (97.5)	2 (2.5)	80 (100.0)
Partial breast feeding	1 (3.8)	25 (96.2)	26 (100.0)

χ^2=90.6; P<0.001; S

Table 4. Complication of diarrhoeal cases by type of feeding (N=106)

Type of complication	Type of feeding		P value and significance
	Exclusive breast fed (N=80)	Partially breast fed (N=26)	
Renal failure	1 (1.3)	1 (3.8)	0.41; NS
Thromboembolism	4 (5.0)	1 (3.8)	0.78; NS
Hyponatremia	4 (5.0)	2 (7.7)	0.60; NS
Hypokalemia	11 (13.8)	3 (11.5)	0.77; NS
Metabolic acidosis	20 (25.0)	9 (34.6)	0.34; NS

DISCUSSION

In the present study, majority of the acute diarrhoeal cases were viral related (74.0%) while among the bacterial causes, E.coli was commonest with 20.0% aetiology and protozoans found in 5.5% cases. In contrast, the Nepal study has found among the bacterial causes, shigella in 4.6% cases, E.coli in 2.3% cases and Salmonella in 1.9% cases while protozoal causes were found in 10.7% (E.histolytica-7.9%, Giardia lamblia - 3.4%) and helminthic aetiology was found in 1.3% cases [18,19]. Although in the present study, only 28.5% had severe dehydration, the intravenous fluids were administered in 97.0% cases mostly due to public demand

for intravenous fluids during diarrhoea. Sur & Bhattacharya [20] have mentioned in their review of treatment of acute diarrhoeal diseases that the management of acute diarrhoea in under fives should be entirely based on the degree of dehydration of cases. They recommended the usage of WHO recommended hypo-osmolar ORS solution for the treatment of some dehydration. Antibiotics should be sparingly used in selected cases only like severe cases of Cholera and blood diarrhoea. Zinc supplementation reduces the severity and duration of diarrhoea as well as the antidiarrhoeal and antimicrobial use. The current study had found higher proportion of severe dehydration in partially breast fed infants (46.1%) compared to that of fully weaned group (31.9%) and exclusively breast fed infants (18.7%). Partially breast fed infants took significantly higher time for recovery with 96.2% taking more than 3 days to recover compared to exclusively breast fed infants who took less than 3 days in majority of cases (97.5%). Feacham & Koblinsky [21] in their review of acute diarrhoeal diseases in under fives had found out that 83% studies reported protective role of breast feeding in exclusively breast fed infants compared to partially breast or no breast feeding infants. They also found that 76% studies supported the protective role of partial breast feeding compared to no breast feeding. Thus the protective role of breast feeding in diarrhoea was substantiated in the current study as well as several other studies.

CONCLUSION

The acute diarrhoeal diseases in under five children are mostly viral in origin. The use of intravenous fluids is universal in all cases due to large public demand. This study has demonstrated the protective role of breast feeding in reducing the severity as well as the duration of the disease.

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