Risk Factors of Persistent Diarrhoea in Children Below Five Years of Age

Pages with reference to book, From 290 To 292

Mansoor Ahmed, Abdul Ghaffar Billoo, Ghulam Murtaza (Department of Paediatrics Medicine, Dow Medical College and Civil Hospital, Karachi.)

Abstract

Persistent diarrhoea has been identified as a major source of morbidity in the developing world. This study was conducted to evaluate the risk factors of persistent diarrhoea in children below five years of age. The data used is from a prospective analytical case control study carried out in the Department of Paediatrics, Dow Medical College and Civil Hospital, Karachi, during 1993-94. A total of 50 cases of persistent diarrhoea and 50 acute diarrhoea controls (matched for age and sex) under 5 comprised the study subjects in this analysis. The maximum incidence of persistent diarrhoea episodes occurred in children below one year of age. Male to female ratio was 3:2. The seasonal variation showed a peak incidence in summer rainy season. Risk factors for persistent diarrhoea recorded were young age, poor nutritional status, irrational use of antibiotics during acute diarrhoea, lack of exclusive breast feeding, incomplete vaccination, lack of tap water supply and sanitation facility at home and income < Rupees 2000/month of the earning members of the family. Thus, it is concluded that discouraging the irrational use of antibiotics and other drugs for the treatment of diarrhoea, promotion of breast feeding and Expanded Programme of Immunization (EPI), Standard Diarrhoea Case Management courses for doctors, medical students and paramedical staff and provision of safe drinking water and sanitation facility are important for the prevention of persistent diarrhoea (JPMA 45: 290, 1995).

Introduction

The diarrhoeal diseases are a leading cause of childhood morbidiy, mortality and malnutrition in developing countries like pakistan[1]. According to recent surveys, total population of Pakistan is 124.8 millions. About 16% of our population (21.7 million) is under 5 years of age, 9.5% infants are unable to celebrate their first birthday and 13.7% children die before reaching their 5th birthday[2]. Apart from acute respiratory infection, vaccine preventable diseases and malnutrition, diarrhoea remains a leading cause of such a high infant and under 5 mortality in Pakistan. Persistent diarrhoea may be defined as diarrhoea that persists for two weeks or more after an apparent episode of infectious gastroenteritis[1-3]. Recent surveys indicate that about 3 million children still die because of diarrhoea in Asia, Africa and Latin America[2]. Eighty percent of these deaths occur in children under 2 years of age. Nearly half of the diarrhoea deaths are attributed to persistent diarrhoea[4]. Although, the clinical characteristics of persistent diarrhoea have been described, little is known about the potential risk factors that may predispose the child to develop this condition. Such information is critical to our understanding its pathogenesis and to developing interventions to prevent persistence of an acute diarrhoeal illness. Several host and environmental factors have been proposed as risk factors for the development of persistent diarrhoea by studies done in Pakistan and abroad but still the data is insufficient and inconclusive. We carried out this study to evaluate the risk factors of persistent diarrhoea in children below five years of age.

Patients and Methods

This was a prospective case control analytical study carried out in the Department of Paediatrics, Dow Medical College and Civil Hospital, Karachi. Fifty cases of persistent diarrhoea and 50 acute diarrhoeal controls who visited the Diarrhoea Training Unit or admitted in the Paediatrics Ward of Dow Medical College and Civil Hospital, Karachi during 1993-94 were enrolled in the study. Sample size was chosen by computerised statistical analysis with confidence interval of 95%,. power of 90% and ratio of cases Vs controls as 1:1. Inclusion criteria for cases of persistent diarrhoea was children below 5 years with an apparent episode of infectious gastroenteritis persisting for 14 days or more. Inclusion criteria for acute diarrhoeal controls was children below 5 years of age with an episode of gastroenteritis of less than 5 days duration. All acute diarrhoeal controls were matched for age and sex with persistent diarrhoeal cases and these were followed for 2 weeks on weekly intervals to make sure that their diarrhoea did not persist. Controls who did not turn up for follow up or whose diarrhoea persisted for> 14 days during weekly follow-ups were dropped from the study. After taking a verbal consent from the parents, .~s and controls were included in the study and typed ques onnaire were filled by taking history from parents. Following quéstions were asked in the question aire. Diarrhoea (its duration, frequency and consistency), past history of (H/O) diarrhoea, treatment during diarrhoea, use of pre-lacteal feeds, exclusive breast feeding, weaning, bottle feeding, income, vaccination, water and sanitation, H/0 measles and H/0 parental loss. All children were also weighed. Data from the study was analyzed statistically by applying chi square using 2x2 table and P value of <0.05 was taken as significant.

Results

A total of 50 cases of persistent diarrhoea and fifty acute diarrhoeal controls comprised the study subjects in. this analysis. Out of 93, 43 acute diarrhoeal controls had to be dropped from the study as either they did not turn up for follow- up or their diarrhoea persisted beyond 14 days.

Table I. Age distribution of 50 cases of persistent diarrhoea.

Age	Number of patients	Total No.	Percent
0-6 months	13	13	26
6-12 months	15	28	56
12-18 months	6	34	68
18-24 months	5	39	78
24-30 months	1	40	80
30-36 months	4	44	88
36-42 months	1	45	90
42-48 months	3	48	96
84-54 months	0	48	95
54-60 months	2	50	100

Table I shows the age distribution of the persistent diarrhoeal cases. Twenty-eight (56%) were below

one year and 39 (78%) patients were below the age of 2 years. There were 30 males and 20 females with male to female ratio of 3:2. A higher percentage of children with persistent diarrhoea was seen in sum met rainy season as compared to winter season.

Table II. Risk factors significantly related to persistent diarrhoea.

Risk factor	Persistent diarrhoea	Acute diarrhoea	P value	Odds Ratio
Use of antibiotics during diarrhoea	31	18	0.009	2.90
Lack of exclusive breast feeding during Ist 4 months of life	46	38	0.02	3.63
Lack of complete vaccination (for his/her age)	31	18	0.009	2.90
Lack of tap water supply	23	10	0.005	3.41
No sanitation facility	9	1	0.007	10.7
Income <2000 rupees/ month	36	24	0.01	2.79
PCM-III	32	11	<0.001	6.30

Table III. Risk factors insignificantly associated with persistent diarrhoea.

Risk factor	Persistent diarrhoea	Acute diarrhoea	P value	Odds Ratio
Watery consistency of stools at the beginning of diarrhoea	34	30	0.40	1.42
H/O diarrhoea in the last 3 months	27	28	0.84	0.92
Use of pre-lacteal feeds	27	21	0.22	1.62
Bottle feeding	32	26	0.22	1.64
Early weaning (<4 months)	6	3	0.29	2.14
Measles in the last 6 months	9	3	0.006	3.44
History of parental loss	4	1	0.16	4.26

Tables II and III list the risk factors that were considered to be related to persistent diarrhoea. Table II

shows the risk factors that were significantly associated with persistent diarrhoea in this study (P value <0.05). A higher percentage of children with persistent diarrhoea than with acute diarrhoea used antibiotics. Only 4 children with persistent diarrhoea were exclusively breast fed as compared to 12 children with acute diarrhoea. Children who were not completely vaccinated for their age and those who did not have tap water supply and/or sanitation facility at home were more likely to have persistent diarrhoea. Weight for age of 60% or less (grade III protein caloric malnutrition according to modified Gomez), an income of <2000 rupees/month of the earning members of the family were significantly associated with persistent diarrhoea. Table III lists the risk factors that showed no significant difference among cases and controls. These were watery consistency of stools at the beginning of diarrhoea, H/0 diarrhoea in the last 3 months, use of pre-lacteal feeds, bottle feeding, early weaning (<4 months of age), H/O measles in the last 6 months and protein calorie malnutrition according to modified Gornez RIO parental loss.

Discussion

Persistent diarrhoea is a major problem in this community. Our understanding of the factors which promote the occurrence of persistent diarrhoea among young children in developing countries remains extremely inadequate. Given the inadequacy of this knowledge of predisposing factors of persistent diarrhoea, we used our data and observed that the age-specific incidence of persistent diarrhoea in our study peaked in infancy and the lowest rate was observed in the 5th year of life (Table I). Recent reports from other developing countries also suggest that peak incidence of persistent diarrhoea occurs either in infancy or in the second year of life, Moy et al[5] and Malunud et al[6] in their studies also observed the peak incidence of persistent diarrhoea in infancy. In our study, male to female ratio was 3:2(30 males Vs 20 females). Cruz et al[7] also observed that males had more diarrhoea than females but Bhan et al[8] and Mahmud et al[6] in their studies could not observe any sex related difference in the incidence of persistent diarrhoea. The sex difference observed in our study might be because of male predominance in our society where male children seek more attention of parents and thus earlier referral to hospitals for medical treatment as compared to female children. In our study, persistent diarrhoea show edaseasonal pattern very similar to acute diarrhoea. The incidence peaked in summer rainy season, which is identical to the observations made by Khan[9] and others in their studies. Children with persistent diarrhoea in our series were often severely malnourished (64%) suggesting that this may be a risk factor for prolonged illness. However, from case series such as this one cannot distinguish cause from effect. The correlation between malnutrition and persistent diarrhoea could be both a cause and effect. Persistent diarrhoea is associated with malnutrition and anorexia. In addition, the malnourished child may be at higher risk of persistent diarrhoea[10]. Episodes of longer duration have particularly adverse effects on the growth of children. Marasmus and kwashiorkor may develop rapidly during such episodes. For surviving children, however, the long-term effect on growth is likely to be stunting rather than wasting[4]. Children who used antibiotics during the course of diarrhoea were more likely to suffer from persistent diarrhoea than children who did not. This finding supports various studies[11-14] where the role of dietary management of persistent diarrhoea has been emphasized and use of anti-diarrhoeals and antibiotics is prohibited unless indiicated[15,16]. Children who did not have the facility of tap water supply and/or sanitation at home had increased risk of developing persistent diarrhoea. Income less than 2000 rupees/month of the earning members of the family was also observed as a significant risk factor in our study. This observation indicates that only 56% of our population has access to safe water and 24% to adequate sanitation[2]. Unless these basic and fundamental requirements are fulfilled, it is not possible to control the high morbidity and mortality associated with water become diseases like diarrhoea. A small number of infants and children with

persistent diarrhoea (8%) were exclusively breast fed during first 4 months of life. This finding highlights the importance of breast feeding which protects against the risk of allergy in early life, may aid in child spacing and provides IgA lactoferin and lysozyme, thus protecting against infections. This finding also correlates with studies on risk factors of persistent diarrhoea carried out in developing countnes4. Incomplete vaccination was also found to be a risk factor in our study. This may be because of increased incidence of measles in incompletely vaccinated children, we did not observe significant difference in incidence of measles between cases and controls. The variables which were not found to be significant in our study are listed in Table III. Although, bottle feeding was not found to be a risk factor of persistent diarrhoea in our study but a significant difference between the number of exclusively breast fed cases and controls indirectly highlighted the danger of bottle feeding. There is a possibility of recall bias for factors like prelacteal feeds and early weaning which is a limitation of our study.

Acknowledgements

The authors would like to thank Professor D. S. Akram and Assistant Professor Sadia Rafi for helping in collection of literature for this study. Thanks are also due to Assistant Professor Ayesha Mehnaz and Mr. Masood Rao for statistically analysing the results of this study. The credit for typing goes to Mr. Farooq A. Taj.

References

1. WHO. Programme for the control of diarrhoeal diseases: A manual for the treatment of diarrhoea, WHO/CDD/SERJ8O.2 Rev.2. 1990.
2. Grant, J.P. The state of the World's children. 1 994;UNICEF, Oxford, Oxford University Press, 1994.
3. Kliegman, R.M. Chronic persistent diarrhoea. In: Nelson Textbook of Pediatrics, (14th Edition), Philadelphia. W.B, Saunders Co., 1992, pp. 13,59:979-981.
4. WHO, Persistentdiarrhoea in children in developing countries- report of a WHO meeting. Geneva. Switzerland. WHO/CDD/88.27, 1987, pp. 1-14.
5. Moy, R.J.D., Booth, I.W., Choto, R.G.A.B. et al. Recurrent and persistent diarrhoea in a rural Zimbabwean Community: A prospective study. J. Trop. Pediatr., 1991;37:293-99.
6. Mahmud, A., Jalil, F., Karlberg, J. et al. Early child health in Lahore, Pakistan. VII Diarrhoea. Acts Paediatr., (Suppl.) 1993;390:79-85.
7. Cruz. JR., Bartlett, A.V., Mendez, H. et al. Epidemiology ofpersistent diarrhoea among Guatemalan rural children. Acta Paediatr.. (Suppl.) 1992;381 :22-26.
8. Bhan, M.K., Bhandari, N.. Sazawal, S. et al. Descriptive epidemiology of persistent diarrhoea amongyoung children in rural Northern India. Bull. WHO., 1989;67:281-288.
9. Khan, S.R. Diarrhoeal consequences Mortality In: Reflections on Diarrhoeal Diseases and Nutrition of Children- Proceedings of the Sixth Asian Conference onDiarrhoeal Diseases. 1992, p. 180.
10. Lima, A.A.M., Fang, G., Schorling, J.B. eta!. Persistent diarrhoea in Northeast Brazil: Etiologies and interactions with malnutrition. Acta Paediatr., (Suppl) 1992;381 :39-44.
11. Zaman, S. Diarrhoea! consequences risk factors for the development of chronic diarrhoea. In: Reflections on Diarrhoeal Diseases and Nutrition of Children. Proceedings of the Sixth Asian Conference on Diarrhoeal Diseases, 1992. p. 179
12. Bhatnagar, S., Bhan, M.K., Saazawal, S. et al. Efficacy of massive dose oral gentamicin therapy in non-bloody persistent diarrhoea with associated malnutrition. J.Pediatr. Gastroenterol. Nutr., 1992;15:117-124.
13. Bartlett, A. V., Torun, B., Morales, C. et al. Oral gentamicin is not effective treatment for persistent

diarrhoea. Acts Paediatr., (Suppl) 1992;381:149-154.
14. Bhan, M.K.. Arora, N.K., Khoshoo, V. et al. Chronic diarrhoea in infants and children. Indian J. Paediatr., 1985;52:483-495.
15. Molla, A.M. and Ban, A. Role of cereal-based oral rehydration therapy in persistent diarrhoea in children. Acts Paediatr.. (Suppl.) 1992;381:104-107.
16. Bhutta, Z.A., Molla, A.M.. Issani. Z. et al. Dietary management of persistent diarrhoea, Comparison of a traditional rice-lentil based diet with soy formula. Paediatrics, 1991;88:1010-1018.