

Social and Environmental Correlates of Childhood Diarrhoea -- A Longitudinal Study

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ABSTRACT A community based longitudinal study has been undertaken to understand the effect of social and environmental factors on the incidence of childhood diarrhoea. Three hundred and twenty children aged under five in Rahmathnagar slum in Hyderabad in India were followed up for a period of one year. About 55% of children develop at least one episode of diarrhoea during the study period. Attack rate of diarrhoea was found to be 1.64 episodes/child/year. Among the social factors religion, maternal literacy, family size and family income had significant effect on incidence of diarrhoea. The influence of environmental factors like source and storage of drinking water and hand washing practices is also analysed.

INTRODUCTION

Acute diarrhoeal diseases is one of the major causes of morbidity and mortality in India, especially among infants and children below 5 years of age. About 1.5 million children under age of five years die from diarrhoeal diseases in India every year. UNICEF (1991) in its strategies for children has set up a goal globally of reduction of diarrhoeal deaths in children aged under-five by 70% and diarrhoeal incidence rate by 25% by 2000 AD.

In India, the studies on the magnitude, morbidity and mortality due to diarrhoeal diseases were available more from rural population whereas studies in urban slums on the problem are inadequate. A study was therefore attempted to find out the influence of social and environmental factors on the incidence of childhood diarrhoea in Rahmathnagar slum of Hyderabad.

MATERIAL AND METHODS

A longitudinal study was conducted to study

the incidence of diarrhoea among under-fives in Rahmathnagar slum of Hyderabad. Rahmathnagar with a population of 10,146 was selected for the study since it is one of the largest slums in Hyderabad besides representing the general socio-economic composition of slum dwellers of Hyderabad.

Initially baseline demographic data of the slum were collected through house to house survey. All the children below 5 years of age were enumerated who were found to be 1,246. Though 350 children were selected for the study by simple random sampling method, only 320 children could be followed up for the full period of study.

In the beginning of the study, data on socio-economic background of the family, environmental conditions and personal hygiene practices were collected through pre-tested structured interview schedules. Selected children were followed up every fortnight for a period of one year to find out the occurrence of the diarrhoeal episodes. A diarrhoeal episode is said to have occurred if a child has three or more loose or watery stools in a day as per the guidelines of WHO. A new episode of diarrhoea was recorded if the loose stools recurred after a symptom free interval of 3 days.

RESULTS AND DISCUSSION

The effect of social and environmental variables like age, sex, religion, educational status of parents, family size, family income, source and storage of drinking water is presented in table 1. Incidence of diarrhoea in our study is 55%. Attack rate in the present study is observed to be 1.64 episodes/child/year. Chakraborty et

Table 1: Distribution of children with diarrhoea in relation to the correlates of diarrhoea

Correlate	Sample n	Children with diarrhoea		Number of episodes	Attack rate (Epi/child/year)	Chi-sq. val., d.f. & p)
		n	%			
1. Age of the Child (in years)						
≤-2	159	99	62.26	294	1.85	6.74 d.f.1 p<0.01
2+	161	77	47.83	231	1.43	
Total	320	176	55.00	525	1.64	
2. Sex of the Child						
Male	170	101	59.41	317	1.86	2.85 d.f.1 p>0.05
Female	150	75	50.00	208	1.39	
Total	320	176	55.00	525	1.64	
3. Religion of the Child						
Hindu	155	75	48.39	228	1.47	9.04 d.f.2 p<0.05
Muslim	148	95	64.19	280	1.89	
Christian	17	6	35.29	17	1.00	
Total	320	176	55.00	525	1.64	
4. Educational Status of Father						
Illiterate	69	40	58.00	122	1.77	0.31 d.f.1 p>0.05
Literate	251	136	54.18	403	1.60	
Total	320	176	55.00	525	1.64	
5. Educational Status of Mother						
Illiterate	139	91	65.46	281	2.02	10.88 d.f.1 p<0.005
Literate	181	85	47.00	244	1.35	
Total	320	176	55.00	525	1.64	
6. Family Size						
3-5	135	64	47.40	201	1.49	7.14 d.f.2 p<0.05
6-10	151	88	58.28	266	1.76	
10+	34	24	70.59	58	1.70	
Total	320	176	55.00	525	1.64	
7. Total Monthly Family Income						
Rs. < -500	146	91	62.32	294	2.01	10.89 d.f.2 p<0.005
Rs. 501-1000	119	65	54.62	154	1.29	
Rs. 1001 +	55	20	36.36	77	1.40	
Total	320	176	55.00	525	1.64	
8. Source of Drinking Water						
Tap in house	236	130	55.08	383	1.62	0.01 d.f.1 p>0.05
Public tap	84	46	54.76	142	1.69	
Total	320	176	55.00	525	1.64	
9. Storage of Drinking Water						
Pot	124	86	69.35	269	2.17	31.69 d.f.2 p<0.005
Kuja or Sorai	79	21	26.58	81	1.03	
Metallic vassel	117	69	58.97	175	1.50	
Total	320	176	55.00	525	1.64	
10. Do Mothers Wash Their Hands Properly						
Yes	256	138	53.90	267	1.04	0.62 d.f.1 p>0.05
No	64	38	59.38	258	4.03	
Total	320	176	55.00	525	1.64	

al. (1983) in Calcutta and Kumar et al. (1985) in rural Haryana observed attack rates of 1.6 episodes/child/year and 2.16 episodes/child/year, respectively.

Out of 176 children who suffered from diarrhoea, 99 (56.25%) children belong to under 2 years age group. Chakraborty et al. (1983) in Calcutta slums observed that 45% of the total number of children attacked were under 2 years of age. It is observed that as age of the child is increasing the incidence of diarrhoea is decreasing. Sircar et al. (1984) in Calcutta and Shakuntala Bhatnagar et al. (1986) in Delhi revealed similar findings. In our study there is significant association between age of the child and incidence of diarrhoea ($\chi^2 = 6.74$, $P < 0.01$). About 59% of male children had diarrhoea as compared to 50% of female children and the difference was not significant ($\chi^2 = 2.85$, $p > 0.05$).

It is seen that 64.19% of Muslims had diarrhoea when compared to Hindus and Christians who had 48.39% and 35.29%, respectively. The difference was statistically significant ($\chi^2 = 9.04$, $p < 0.05$). Ghai et al. (1969) observed that Muslims had apparently higher incidence of diarrhoea. In our study annual attack rate of diarrhoea was highest in Muslims and lowest in Christians. It is 1.89 episodes/child/year in Muslims, 1.47 episodes/child/year in Hindus and 1 episode/child/year in Christians. There is no significant association between father's education and incidence of diarrhoea ($\chi^2 = 0.31$, $p > 0.05$). Ghai et al. (1969) observed similar findings. Incidence of diarrhoea was 65.46% in under fives of illiterate mothers as compared to 47% of literate mothers and the difference was statistically significant ($\chi^2 = 10.88$, $P < 0.01$). Bhatnagar and Dosajh (1986) in Delhi and Chakraborty et al. (1983) in Calcutta observed similar findings. Idhris et al. (1981) in Lucknow observed that the infants belonging to illiterate mothers had the highest incidence (57%).

Children with illiterate mothers had an attack rate of 2.02 episodes/child/year while children with literate mothers had an attack rate of 1.35 episodes/child/year.

It has been observed that incidence of diarrhoea was 62.32% in children whose monthly income was less than 500 and 36.36% in children whose family income was more than 1000. There is significant association between incidence of diarrhoea and family income ($\chi^2 = 10.89$, $p < 0.01$).

It has been observed that there is significant association between family size and incidence of diarrhoea. Incidence of diarrhoea was 70.59% in children whose family size was more than 10 when compared to children with family size between 3 and 5 whose incidence was 47.4% ($\chi^2 = 7.14$, $p < 0.05$). But Chakraborty et al. (1983) in their study in slums of Calcutta has observed no significant difference in attack rates in children belonging to large and small families.

In our study there is only marginal difference in incidence of diarrhoea between children using water from house tap and those use public tap (55.08% and 54.76%). Attack rate of diarrhoea in children using public tap was 1.69 episodes/child/year and those using house tap was 1.62 episodes/child/year. It has been observed that 26.58% of children developed diarrhoea who use Kuja or Sorai for storage of drinking water. Among the families who use pot and metallic vessel for storage of water, 69.35% and 58.97% of children developed diarrhoea, respectively. The difference among the three groups is statistically significant ($\chi^2 = 31.69$, $p < 0.01$). Deb et al. (1986) in their study in Calcutta slums have found that Cholera carrier rate in Sorai intervention groups was 4.4% when compared with 17.3% in the control group.

In the present study, we observed that the attack rate of diarrhoea was least in families using Kuja or Sorai (1.03 episodes/child/year) for storage of water. When compared to families using pot (2.17 episodes/child/year) and metallic vessel (1.50 episodes/child/year), respectively.

Attack rate of diarrhoea was 4.03 episodes/child/year in children whose mothers were not washing hands with soap and water after toilet

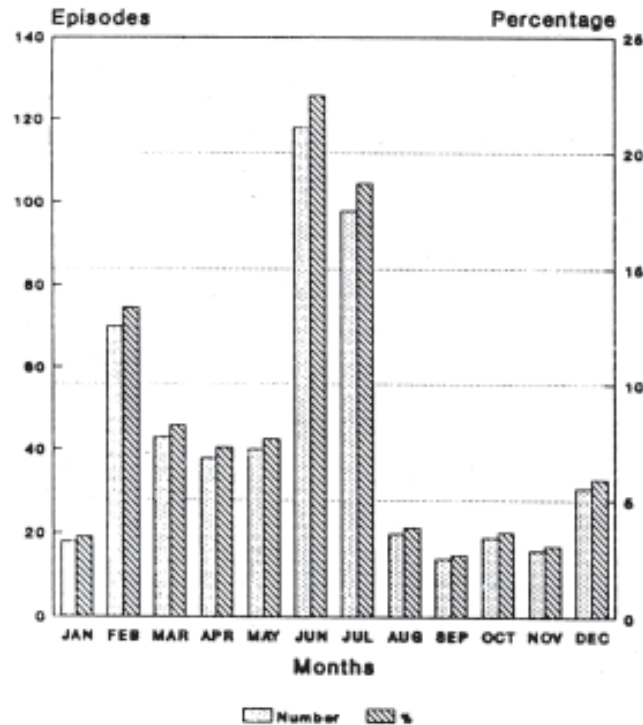


Fig. 1. Seasonal distribution of episodes of diarrhoea

while attack rate was 1.04 episodes/child/year among children whose mothers were washing hands properly.

Seasonal distribution of occurrence of diarrhoeal episodes is presented in figure 1. About 41% of the total number of episodes of diarrhoea occurred during rainy season in the months of June and July. Chakraborty et al. (1983) in Calcutta has found the highest incidence of diarrhoea during April and July. Saran et al. (1979) in Varanasi observed that higher number of children suffer from diarrhoea in summer months.

The role of water has a significant bearing on the incidence of diarrhoea. We do not have economic resources to provide abundant and pure water for all people. The reasonable solution therefore is to enhance the effect of water supplies with strong and well designed sanitary education programmes. In this regard, based on the analysis of data in the present study the

following measures are suggested.

- The use of Kuja or Sorai as against use of pot or metallic vessels for storage of water.
- Improving awareness of mothers regarding the need of washing hands with soap and water after going to toilet.

In our study socio-economic factors namely literacy of mothers, family income and family size are significantly associated with the incidence of diarrhoea. A dent on all round socio-economic development of the backward and poorer section of people is required to be made to control incidence of diarrhoea in the form of public welfare schemes.

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