



A POPULATION BASED STUDY OF ACUTE DIARRHOEA AMONG CHILDREN UNDER 5 YEARS IN A RURAL COMMUNITY

Dr. Rashmi Vishwakarma

Assistant Professor, Department of Paediatrics, L. N Medical College & Research Centre, Bhopal, Madhya Pradesh.

Dr. Gulab Chandra Gautam*

Assistant Professor, Department of Paediatrics, L. N Medical College & Research Centre, Bhopal, Madhya Pradesh. *Corresponding Author

ABSTRACT **Aim of the study:** To estimate the prevalence of acute diarrhoea in children under 5 years in a rural population and to study the different modalities of treatment adopted by the caregivers.

Methodology: This was a population based study in which a total of three hundred under 5 children having acute diarrhoea at the time of interview or had acute diarrhoea in the preceding 2 weeks were included. Details of acute diarrhoea and treatment modalities were obtained among the respondents of under 5 children. A per-test questionnaire was used as a data collection tool and face to face interviews were conducted. All the data were analysed using IBM SPSS version 22 software. Chi square/Fisher Extract/Student t test and ANOVA test has been used.

Results: The prevalence of Acute diarrhoea was found to be 30.5% (95% CI 19.4% - 38.5%). The prevalence of acute diarrhoea among males and females were 31.4% and 29.8% respectively. Children in the age group 7-12 months had the highest prevalence of diarrhoea to the extent of 43.5% followed by the age group 13-24 months, 0-6 months and group 25 months. Oral Rehydration Therapy use rate was found to be 47.6% (95% CI 56.5 - 76.9). There was no marked difference in ORT use among male and female children.

Conclusion: The prevalence of acute diarrhoea among under 5 children was found to be 30.5 % and the most vulnerable age group was 7-12 months which corresponds to the time of weaning. The ORT use rate was found to be 67.2% much higher than other studies. The ORT use rate was higher among literate mother.

KEYWORDS : Acute Diarrhoea, Oral Rehydration Therapy, Under five children and Population based study.

INTRODUCTION:

Diarrhoea is defined as at least three or more loose stools in 24 hours. However, it is the recent change in consistency and character of stools rather than the number of stools that is more important. Although our country has made a steady progress and growth in reducing diarrheal deaths in children younger than five years, it is still an important killer in our society.[1]

The annual global burden of infectious diarrhoea is enormous, involving 3 to 5 billion cases and nearly 2 million deaths, with the later accounting for almost 20% of deaths in children younger than 5 years. Of these diarrhoea related deaths, acute watery diarrhoea is responsible for 35% of the total.[2]The challenge of the time is to study child health in relation to community, social values and social policy.[3]Child health has been given greatest priority over the years both at National level and at State level.[4] The high mortality and morbidity due to diarrheal diseases can be markedly reduced by Oral Rehydration Therapy (ORT) which includes proper home management with Home Available Fluids (HAF) and Oral Rehydration Salt solution (ORS) and by continuing usual feeding. The Oral Rehydration Therapy is rightly considered as one of the important medical advances of the 20th century in terms of simplicity and scope to save lives.[5] The prevalence of diarrhoea and the community practices relating to ORT and other treatment modalities also vary from place to place.[6, 7] It is important to know the prevalence of diarrhoea in children in different populations and how the mother and other family members respond in treating the child with diarrhoea. This may help in planning appropriate preventive measures for effectively reducing mortality and morbidity due to diarrhoea in children. In view of this a population based study of acute diarrhoea among children under-5 years and ORT was taken up in one of the rural populations in Bhopal.

MATERIAL & METHODS:

This population based cross sectional study was done in Bhopal, Madhya Pradesh. The study population included the under 5 children residing in the rural areas near the study centre. Cluster sampling method was used for selecting the under-5 children as study subjects from the above study population. Based on the assumption of 20% as prevalence of acute diarrhoea in under 5 children and with an alpha error of 5%, and limit of accuracy of 25% of prevalence and a design effect of 2, the minimum sample size required for the study was found to be 232. Fifteen clusters were selected by probability proportionate to size (PPS) method and 20 under 5 children were selected from each cluster to obtain a total sample of 300 under 5 children for this study.

Data Collection

A brief introduction was given to the respondents regarding the purpose of study, if a child under 5 years was present in the house. After getting the informed consent orally, relevant information about the under 5 child in the family was obtained from the respondent using a pretested structured questionnaire in the local language. If there were more than one child in the family, one of them was chosen randomly. The environmental conditions of the household were also surveyed. Any of the selected children having acute diarrhoea at the time of interview or had acute diarrhoea in the preceding 2 weeks was included in the study. The weights of the children were measured and on the basis of IAP Classification, they were classified as undernourished and normal. The duration of breast feeding were also collected from children less than 18 months.

Data Analysis

Data entry and analysis were done using IBM SPSS version 22 software. Chi square/Fisher Extract/Student t test and ANOVA test has been used. Prevalence of diarrhoea and 95% confidence interval (C.I) were calculated. The 95% C.I was corrected for the design effect of cluster sampling by multiplying the variance by a factor of 2. The association between risk factors and diarrhoea was estimated by odds ratio and 95% CI calculated. Adjusted odds ratios were calculated by using logistic regression.

RESULTS:

Using cluster sampling method, 300 under 5 children were selected. There was no refusal to take part in the study. Among the selected under 5 children 57% were males. The mean age was 25.7 months ranging from 2 months to 59 months. A large proportion of the selected children (80%) belong to nuclear family, the average size of the family was 3.2 ranging from 1 to 4. Based on Gupta's socio economic classification[8], a large proportion of selected children (56.5%) belong to Class IV. Majority of the respondents for the study were mothers (75.5%) followed by grand parents (19.8%) and the rest were brothers, sisters and others.

Table 1: Age and Sex Distribution of Children

Age	Males(%)	Females(%)	Total(%)
0-6 months	36(12%)	39(13%)	75(25%)
7-12 months	47(15.6%)	35(11.6%)	82(27.3%)
13-24 months	39(13%)	41(13.6%)	80(26.6%)
25 & above	49(16.3%)	14(4.6%)	63(21%)
Total	171(57%)	129(43%)	300

Table 2: Prevalence of Diarrhoea by Sex and Age

		Prevalence of diarrhoea in percentage
Sex	Males	31.4
	Females	29.8
Age group in months	0-6 m	18.5
	7-12 m	43.5
	13-24 m	38.2
	25 & above	18.6

Table 3: Association between risk factors and acute diarrhoea in under 5 children

		Diarrhoea	
		Present	Not present
Birth weight			
N=300	Less than 2.5	125	73
	More than 2.5	57	45
Immunisation			
N=190	Partially immunised	113	42
	Fully immunised	10	25
Vitamin A supplement			
6-60 months N=225	Not received	139	45
	Received	18	23
Nutrition			
	Undernourished	175	33
	Normal	36	56
Personal hygiene			
	Unsatisfactory	148	45
	Satisfactory	18	89
Overcrowding			
	Yes	126	56
	No	73	45
Garbage disposal			
	Insanitary	156	12
	Sanitary	34	98
Source of water supply			
	Public tap & well	89	45
	House tap & well	67	99
Excreta disposal			
	Insanitary	176	8
	Sanitary	34	82

Table 4 : Association Between Risk Factors And Acute Diarrhoea In Under 5 Children After Adjustment

Background Characteristics	Adjusted Odds ratio	95%CI
Birth weight (kg)	4.7	2.6-9.6
Less than 2.5		
More than 2.5		
Immunisation status	10.2	1.7-68.8
Partial		
Complete		
Nutritional status	11.2	4.5-24.7
Undernourished		
Normal		
Sources of water	2	0.3-7.9
Public tap & well		
House tap & well		
Personal hygiene	6.8	1.5-35.8
Unsatisfactory		
Satisfactory		
Overcrowding	2.3	0.7-6.6
Yes		
No		

DISCUSSION:

Diarrheal diseases in childhood account for a large proportion (9%) of childhood deaths with an estimated 0.71 million deaths per year globally, making it the second most common cause of child's death worldwide.[9] This study has shown that the prevalence of acute diarrhoea among under-5 children in the rural population is high to the extent of 30.5% which once again reinforces the fact that acute diarrhoea in children is an important health priority and that every effort has to be taken to control and prevent acute diarrhoea. The 95%

confidence interval for the prevalence of acute diarrhoea is quite precise (19.4-38.5) indicating good internal validity for the study. There are few studies done on prevalence of acute diarrhoea in under-5 children in Bhopal earlier also. A study done in Bhopal by S.C. Tiwari et al has reported a prevalence of acute diarrhoea among under 5 children as 27.4% which is slightly less than the present study than the present study. [10]The study done in Aligarh of Uttar Pradesh by Ansari et al has reported a prevalence of 16%. The study by Ansari et al relates to the patients attending the clinics under Rome scheme which may not be representative of the population.[11] A study done in East Africa by Mtiike has reported 18% as prevalence of diarrhoea among children both in rural and urban population.[12]

National Family Health Survey – I (NFHS I) was done in the year 1992 and. NFHS–II was done after about 6 years in 1998-99. In both NFHS surveys prevalence of diarrhoea was calculated as percentage of children who had diarrhoea at the time of interview or during the preceding 2 weeks as done in this study. NFHS – 1 has reported prevalence of diarrhoea for children under-4 years and NFHS-II has reported it for children under-3 years. For rural Tamil Nadu the prevalence of diarrhoea for children under 4 years was 12.9% and for children [13,14] under 3 years it was 14% as per NFHS I and II respectively. The present study has found much higher prevalence of diarrhoea in children under 5 years. This may be because the present study was done during peak season for diarrhoea (April to August) or because the study population is more vulnerable and has higher prevalence of diarrhoea compared to the overall prevalence in rural areas of central India.

The present study has shown a very high prevalence of acute diarrhoea (43.5%) in the age group 7 - 12 months, compared to other age groups (Table 2) and the difference is also statistically significant. This may be because at this age, weaning foods are introduced and the child is also exposed more to the environmental condition as it starts crawling and walking. The next vulnerable age group was found to be 13-24 months. Similar trend is reported in NFHS II in which the prevalence of diarrhoea is reported as highest in the age group 7-12 months (17%) followed by 13-24 [14] months (8.6%) though the prevalence reported are much lower.

The prevalence of diarrhoea was found to be only 18.5% in the age group 0-6 months which reflects probably, the protection offered by breast feeding. Though female children had slightly higher prevalence of acute diarrhoea (31.4%) than males (29.8%), the difference is not statistically significant. A similar pattern is seen in the NFHS I study report, where the females have slightly higher prevalence.[13] However in NHFS II the prevalence of acute diarrhoea in males (14.7%) is reported slightly higher than females (14%). [14] Partially immunised children had higher risk for diarrhoea (OR 4.6) compared to fully immunised children. (Table 3) This is obviously due to the protective effect of immunization especially with reference to measles immunisation.[15] The percentage of fully immunised children in the study population was 19%. Improving immunization coverage will help to reduce the burden of illnesses due to diarrhoea in children. Those children who did not take any dose of vitamin A supplementation within preceding 6 months had 7.4 times higher risk for acute diarrhoea compared to those who had vitamin A supplementation. It lays emphasis on the concept that Vitamin A is protective of the intestinal epithelium.[16] The vitamin-A supplementation coverage found in the study population was 19%. Improving the vitamin-A supplementation coverage will definitely help in reducing the burden of illnesses due to diarrhoea in children. The under-nourished children had 14.4 times higher risk for acute diarrhoea than normal children. This is in conformity with the statement made by international centre for Diarrhoeal Disease Research in Bangladesh that diarrhoea is common in malnourished children.[17]

The prevalence of under nutrition in the study population was 69.9%. It is very important to prevent under nutrition by proper implementation of the various nutritional programmes for reducing the problem of diarrhoea in children.

As expected the study has shown that good personal hygiene has a protective effect against diarrhoea (Table 3). Similar observations have been found in a study done in Maharashtra (Yavatmal) by Khadse et al who have stated that hand washing with soap and water after defecation and before feeding had a protective value against

diarrhoea.[18]

The risk of diarrhoea was 4.3 times more where insanitary practices of garbage disposal was observed (Table 3) compared to children whose family followed sanitary disposal of garbage. This may be due to increased fly nuisance affecting food hygiene at the family level. Similar observations have been made by this study that children living in over crowded houses and in insanitary condition have higher risk of diarrhoea.

One of the important objectives of diarrhoeal diseases control programme is to increase the use of ORT to prevent death due to diarrhoea as a result of dehydration. This study has found that ORT use was much higher (67.2%) when the mother was literate compared to (23.2%) when the mother was illiterate and the difference is statistically significant. This shows that improving female literacy will further increase ORT use also. This study found that a major source of ORS as a single entity was private practitioners. Hence it is important to have continuing medical education for them, regarding correct composition and use of ORS through Indian Medical Association and other professional bodies.

Although antibiotics may be useful in reducing the duration and volume of diarrhoea in specific bacterial infection, use of antibiotics and other anti diarrhoeal drugs are not generally recommended for treatment of childhood diarrhoea. However, this study has found that 56.8%, 22.6% and 35% of children who had acute diarrhoea received tablets, suspensions and injections respectively. NFHS II also found that 41% of children who had diarrhoea received pills or syrup and 28% received injections.[14]

The other important unsound practice found in the study population was that 38% of mothers who were breast feeding the children did not continue to breast feed them when the children had acute diarrhoea. This may be because of the wrong belief, that intake of milk would further aggravate diarrhoea in children. The above findings indicate poor knowledge about proper treatment of diarrhoea not only among mothers and family members. The results underscore the need for informational programmes for mothers that emphasise the importance of ORT, increased fluid intake, and continuing feeding.

CONCLUSION

The prevalence of acute diarrhoea is found to be 30.5% in children under 5 years in a rural population in Bhopal & the most vulnerable age group is 7-12 months. Pre-existing malnutrition further complicates the situation. The ORT use rate is found to be 47.6% much higher than found in other studies. ORT use is higher when the mother is literate. Practice of hand washing is a cost effective measure in preventing diarrhoea.

REFERENCES:

- Gohiya P, Shrivastava V. Prognostic significance of initial management of diarrhoea in rural areas: as observational study. *Int J Contemp Pediatr*. 2019 Nov;6(6):2493-2496
- Uma Maheshwari B, Biswal N, Adisivam B, Parija SC, Srinivasan S. Persistent diarrhoea: Risk factors and outcome. *Indi J Pediatr*. 2010;77(8):885-8.
- WHO. Report of training courses on organization of MCH field practice programmes in medical colleges; SEA/MCH/56 Dec. 1969. Report of Director General, WHO.
- K. Park. Preventive medicine in Obstetrics, Pediatrics and Geriatrics. Text book of Preventive and Social Medicine, 21st Edition 9 : 360, 383.
- Greenough WB III. A simple solution. *J. Diarrhoeal Dis* 1993 11 : 1-5
- Banerjee, K.B. and Narian J.P. combined surveys on ARI, diarrhoea and EPI. *NICD*, 1988 : 3
- Reis E.C. Goepf JG, Katz, Santhosam. M. Barriers to use of oral rehydration therapy. *Indian journal of pediatrics* 1994, 93 708-711.
- M.C. Gupta, B.K. Mahajan. Social Environment. Text Book of Preventive and Social medicine, II Edition 11 : 135.
- WHO global health observatory
- S.C. Tivari, Y. Saraf, G. Nambiar. Study of diarrhoeal diseases in 0-5 years old children and practices of oral rehydration solution, Bhopal, Madhya Pradesh in Conference Proceedings of the 9th Asian conference on diarrhoeal diseases and nutrition. Sep 28-30, 2001, New Delhi.
- M.A. Ansari, Z. Khan, I.M. Khan. A clinico-social study to assess the magnitude of diarrhoeal diseases among children in rural areas of Alligarh, Uttar Pradesh in Conference Proceedings of the 9th Asian conference on diarrhoeal diseases and nutrition. Sep 28-30 2001, New Delhi.
- G. Mtike. Prevalence of acute and persistent diarrhoea in North Gondar zone, Ethiopia. *East Afr. Med. J.* 2001, 78 (8) 433-8.
- National Family Health Survey I. Population Research Centre, the Gandhighram Institute of Rural Health and Family Welfare Trust, Ambathurai, Tamil Nadu 1992. NFHS I 158-164.
- National Family Health Survey II. Population Research Centre, the Gandhighram Institute of Rural Health and Family Welfare Trust, Ambathurai, Tamil Nadu 1998 - 1999. NFHS II 133-140.
- Jawetz, Melnick & Adelberg. Clinical guide to the role of microorganisms play in health and illness. Review of Medical Microbiology. McGraw-Hill, XIV Edition 1980 : 236
- Truswell, A.S. Protective effect of vitamin A. *Br. Med. J.* 1985, 291 : 1033.
- Jean - Gerard Pelletier, Children in the tropics, severe malnutrition : A Global approach 1993 - No. : 208-209.

- S.S. Khadse V.S. Dani, L.R. Kulkarni, Shri Vasantrao Naik. Study of behavioural risk factors for recurrent acute diarrhoea in children, Yavatmal in Conference Proceedings of the 9th Asian conference on diarrhoeal diseases and nutrition. Sep 28-30 2001, New Delhi.