



# A cross-sectional study of socio-demographic determinants of recurrent diarrhoea among children under five of rural area of Western Maharashtra, India

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## RESEARCH

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## Abstract

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### Background

About 2 million episodes of diarrhoea occur each year in India. Of the 6.6 million deaths among children aged 28 days to 5 year; deaths from diarrhoea are estimated to account for 1.87 million. An average Indian child less than 5 years of age can have 2-3 episodes of diarrhoea. Mother's literacy, family income, feeding practices, environmental conditions are important determinants of the common childhood infection like diarrhoea. The present study was undertaken to study these important determinants of recurrent diarrhoea among children under five in a rural area of western Maharashtra, India.

### Method

A cross-sectional study was conducted in six randomly selected villages of Ahmednagar district in western Maharashtra, India. Three villages from two primary health centres and 652 children under five from these villages were chosen by a simple random sampling technique (every fifth child enrolled in Anganwadi). House-to-house survey

was done and data was collected by interviewing the mothers of these children. Nutritional status was assessed by measuring the weight and mid-arm circumference of the child. Statistical analysis was done with Microsoft Excel and Statistix 1.8 using percentage, proportions and chi-square test wherever applicable.

### Results

The prevalence of recurrent diarrhoea was 9.81%. Recurrent diarrhoea was more common in the age group of 13 - 24 months (29.6%) and 25 - 36 months (23.4%) and children belonging to lower socioeconomic class (64%). Malnutrition was significantly associated with recurrent diarrhoea and 21% of malnourished children had the same. Recurrent diarrhoea was significantly more common (39.1%) among children with introduction of top-up feeds before four to six months.

### Conclusion

Low socioeconomic status, bad sanitary practices, nutritional status and weaning practices significantly influence the prevalence of recurrent diarrhoea.

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Tables: 3

### Key Words

Recurrent diarrhoea, children under five, rural area

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### Background

Diarrhoea constitutes one of the major causes of infant mortality and morbidity especially in developing countries. 23% of all deaths among children under five in the South East Asian Region are caused by diarrhoea. India is one of the top 15 countries ranked according to the number of deaths in under fives due to diarrhoea. India alone is responsible for more than half a million diarrheal deaths<sup>1</sup>. Among all child deaths each year, seven in ten of these deaths are due to diarrhoea, acute respiratory infections, malnutrition or combination of these conditions<sup>2</sup>. In India, common illness in children less than 3 years of age are fever



(27%) acute respiratory infection (17%), diarrhoea (13%) and malnutrition and these are often in combination.<sup>3</sup> About 2 million episodes of diarrhoea occur each year in India. Of the 6.6 million deaths among children aged 28 days to 5 year; deaths from diarrhoea are estimated to account for 1.87million. An average Indian child less than 5 years of age will have 2-3 episodes of diarrhea.<sup>4</sup> Poor environmental sanitation and lack of safe drinking water result into high rate of infections and protein energy malnutrition.<sup>5</sup> Reliable information on the magnitude, patterns and causes of mortality and morbidity of children under five helps decision makers to assess program needs and prioritize the interventions.

Mother's literacy, family income, feeding practices and environmental conditions are the important determinants of growth and health status of children under five. Diarrhoea is one of the common childhood illness affecting growth and survival of Indian children.

The present study was undertaken to establish the magnitude of recurrent diarrhoea and to study some of the important determinants of diarrhoea among children under five in rural community.

### Method

This cross-sectional study was conducted in six randomly selected villages of Ahmednagar district in western Maharashtra belonging to the field practice area of Rural Medical College, Loni, Maharashtra, India. Three villages from two primary health centres were chosen by a simple random sampling technique. House-to-house survey was done and data was collected by interviewing the mothers of selected children under five. The children were selected by a systematic random sampling technique from the Anganwadis (functional unit of Integrated Child Development Scheme in India) of the villages. Every fifth child enrolled in Anganwadi was selected for the study. A total of 652 children under five were examined.

Recurrent diarrhoea was defined as > 4 to 6 episodes of acute watery diarrhoea during one year.<sup>6</sup> Socioeconomic status of the family was assessed as per modified B.G. Prasad's classification based on monthly per capita income.<sup>7</sup> Nutritional status was assessed by measuring the weight and mid arm circumference of the child.<sup>8</sup> Environmental factors such as methods of sewage and waste disposal, water source and fly nuisance were observed and sanitary condition was classified as satisfactory and poor as per the guidelines.<sup>9</sup> Microsoft Excel and statistical software statistiXL 1.8 were used for statistical analysis using percentage, proportions and chi square test ( $\chi^2$ ) wherever applicable.  $p < 0.05$  was considered as statistically significant. Ethical approval was obtained from the Institutional Ethical Committee of Rural Medical College, Loni.

### Results

The sociodemographic profile of the study population is shown in table 1. Prevalence of recurrent diarrhoea among children under five in our study sample was 9.8% (n=64).

Recurrent diarrhoea was more common in the age group of 13-24 months (29.6%) and 25–36 months (23.4%) while only 12.5% children below 12 months were affected (see table 2).

**Table 1: Demographic Characteristics of Study Population**

	No. (%)
<b>Gender</b>	
Male	361 (55.4)
Female	291 (44.6)
Total	652 (100)
<b>Age Group</b>	
0-1 year	128 (20)
1-2 years	137 (21)
2-3 years	142 (22)
3-4 years	112 (17)
4-5 years	133 (20)
Total	652 (100)
<b>Educational Status of Mother</b>	
Illiterate	167 (25.6)
Primary	103 (15.8)
Secondary	280 (42.9)
Higher Secondary	78 (11.9)
Graduate or more	24 (3.7)
Total	652 (100)
<b>Religion</b>	
Hindu	537 (82.4)
Muslim	91 (13.9)
Christian	24 (3.7)
Total	652 (100)
<b>Socioeconomic Status</b>	
Upper (I)	22 (3.4)
Upper Middle (II)	70 (10.7)
Middle (III)	202 (30.9)
Lower Middle (IV)	193 (29.6)
Lower (V)	165 (25.3)
Total	652 (100)
<b>Family Type</b>	
Nuclear	255 (39.1)
Joint & extended	397 (60.9)
Total	652 (100)
Data in parenthesis indicates percentage	

**Table 2: Prevalence of children with recurrent diarrhoea according to age**

Age in months	No. of children with ARI
0-12	8 (12.5%)
13-24	19 (29.6%)



25-36	15 (23.47%)
37-48	12 (18.75%)
49-60	10 (15.6%)
<b>Total</b>	<b>64</b>

**Table 3: Association of sociodemographic factors with diarrhoea**

	Children with Diarrhea (%)	Children without Diarrhea (%)	Total	P value ( $\chi^2$ )
<b>Gender</b>				<b>p&gt;0.05 (0.8)</b>
Male	39 (10.8)	322 (89.2)	361	
Female	25 (8.6)	266 (91.4)	291	
Total	64 (9.8)	588 (90.2)	652	
<b>Socioeconomic status</b>				<b>p&lt;0.001 (27.8)</b>
Upper class (class I-III)	23 (25)	69 (75)	92	
Lower class (class IV-V)	41 (7.3)	519 (92.7)	560	
Total	64 (9.8)	588 (90.2)	652	
<b>Sanitary condition</b>				<b>p&lt;0.001 (41.7)</b>
Satisfactory	15 (3.7)	382 (94.3)	397	
Poor	49 (19.2)	206 (80.8)	255	
Total	64 (9.8)	588 (90.2)	652	
<b>Nutritional status</b>				<b>p&lt;0.001 (30.8)</b>
Well nourished	30 (6.1)	461 (93.9)	491	
Malnourished	34 (21.1)	127 (78.9)	161	
Total	64 (9.8)	588 (90.2)	652	
<b>Educational status of mother</b>				<b>p&gt;0.05 (5.2)</b>
Illiterate	24 (14.4)	143 (85.6)	167	
Primary/Secondary/Higher Secondary/Graduate or more	40 (8.2)	445 (91.7)	485	

Total	64 (9.8)	588 (90.2)	652	
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The majority of children with recurrent diarrhoea were male children under five (61%, p>0.05). Out of 64 children suffering from recurrent diarrhoea, 24 (37.5%) children had an illiterate mother and 15 (23.34%) children had mother having primary level of education while only 6 (9%) and 2 (3.1%) children's mothers were educated up to higher secondary and graduate level respectively.

Children residing in houses having poor sanitary condition were more prone for diarrhoea as compared to children residing in houses with satisfactory level of sanitary condition. (Table 3)

Recurrent diarrhoea was significantly more common (39.1%) among children with early introduction of top-up feeds before four to six months than children who were exclusively breastfed ( $\chi^2=23.1$ , p<0.001).

### Discussion

Diarrhoea, acute respiratory tract infections and malnutrition are major problems faced by children under five of developing countries like India. Recurrent infections in childhood significantly hamper the growth and development of preschool children.

The prevalence of recurrent diarrhoea in our study was 9.8%. The majority of children having diarrhoea belonged to the age group 12 to 36 months (53%). Similar finding was observed by Negi in his study; diarrhoea prevalence was 60.24% among the children of age group 10-25 months<sup>10</sup>. However, in his study conducted in urban slums, Lal reported that 42.6% children suffering from diarrhoea were in the 6 to 12 months age group and only 26.4% were above one year old<sup>11</sup>. This difference in the most affected age group could be explained on the basis of a difference in study areas, feeding practices and sanitary conditions. In our study, recurrent diarrhoea was more common among children having illiterate mothers (37.5%). Das reported the prevalence of 10.9 % and 14.9% among children of illiterate mothers and mothers with primary level of educational status respectively<sup>12</sup>. Mothers' literacy influences hygienic practices, feeding habits and sanitation which, in turn, were important determinants of recurrent diarrhoea.

Prevalence of recurrent diarrhoea was significantly more common among children belonging to lower socioeconomic class (64%,  $\chi^2=27.8$ , p<0.001). Out of 64 children with recurrent diarrhoea, 39 (60.9%) were residing in houses having poor sanitary conditions. As mentioned by Walia et al, poor socioeconomic status and poor sanitation were important factors responsible for high diarrhoea morbidity due to ease of transmission of infection<sup>13</sup>. It is a vicious circle; malnutrition contributes to infections and infections contribute to malnutrition. In our study also, recurrent diarrhoea was significantly more common among malnourished children. Das also mentioned similar



findings.<sup>12</sup> Several studies have shown that malnutrition is a risk factor for diarrhoea. Similarly in our study 21% of malnourished children had recurrent diarrhoea and only 6.1% well nourished children had diarrhoea.

Of 23 children who had a history of introduction of top-up feeds before 4-6 months of age; nine children (31.9%) had recurrent diarrhoea. A significant association was observed for early introduction of top-up feeds and recurrent diarrhoea ( $\chi^2=23.1$ ,  $p<0.001$ ). As mentioned in a memorandum of a World Health Organization meeting, a study in India had shown that the incidence of diarrhoea increases 2 to 3 fold during the first month following introduction of top-up feeds (animal milk). This increase might be due to decrease in protective factors of breast milk, contamination of food or due to mucosal damage<sup>14</sup>.

### Conclusion

To conclude the prevalence of recurrent diarrhoea in children under five living in a rural area of Western Maharashtra was 9.8%. Mothers' literacy, socioeconomic status, sanitation, nutritional status and infant feeding practices were important determinants of diarrhoea.

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### PEER REVIEW

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### CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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