

# A Cross Sectional Study of Risk Factors for Development of Dehydration in Children under 5 Years Having Acute Watery Diarrhea

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## Research Article

**Abstract: Background:** Diarrhea is 2<sup>nd</sup> leading cause of death in children under 5 years old. Each year diarrhea kills around 760000 children under 5 years. **Objectives:** To identify risk factors for development of dehydration in under 5 years with acute watery Diarrhea. **Materials and Methods:** It was a cross sectional study conducted among 200 cases of diarrhea in under 5 years old attending pediatric OPD, GMC, Latur during 15 Oct. 2013 to 30 Nov. 2013. Structured questionnaire was used as tool for data collection. Mothers of children were interviewed in person and data was analyzed in statistical software SPSS version 21 and appropriate statistical test (chi square test) was applied. **Results:** Occurrence of diarrhea was more common in 0-12 months of age (37%), female sex (67%), rural areas (63.5%), lower SES of family, those who have not followed standard criteria of breast feeding. **Conclusion:** The study identified early cessation of breast feeding, lower educational status of mothers, lower SES, non-washing of hands by mother before preparation of food, as a risk factors for development of dehydration in children under 5 years having acute watery diarrhea. **Interpretation:** Timely intervention in the risk factors may prevent the development of dehydration in children under 5 years.

**Keywords:** Diarrhea, Dehydration, breast feeding, washing of hands.

## Introduction

Diarrhea is 2<sup>nd</sup> leading cause of death in children under 5 years of age. Each year diarrhea kills around 760000 children under 5 years.<sup>1</sup> In India, acute diarrheal disease accounts for about 8% of deaths in under 5 years of age group.<sup>2</sup> A significant proportion of diarrheal disease can be prevented through safe drinking-water and adequate sanitation and hygiene. An average Indian child less than 5 years of age can have 2-3 episodes of diarrhea.<sup>2</sup> Mother's literacy, family income, feeding practices, environmental conditions are important determinants of the common childhood infection like diarrhea.<sup>3</sup>

## Objectives

To identify risk factors for development of dehydration in under 5 years with acute watery Diarrhea

## Materials and Methods

**Study design:** A cross sectional study

**Study setting:** Pediatric OPD Government Medical College, Latur

**Study population:** 200 cases of diarrhea in under 5 children

**Study duration:** 15 October 2013 to 30 November 2013.

## Definition

**Diarrhea** is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual). Frequent passing of formed stools is not diarrhea, nor is the passing of loose, "pasty" stools by breastfed babies.<sup>1</sup> **Exclusive breast feeding** is defined when the infant only receives breast milk without any additional food or drink, not even water.<sup>4</sup> **Complimentary feeding** is defined as the transition from exclusive breastfeeding to family foods.<sup>5</sup> Dehydration was divided into no dehydration, some dehydration and severe dehydration.<sup>6</sup> Lethargic or unconscious child with sunken eye, not able to drink, skin pinch going back very slowly was classified into severe dehydration. Restless, irritable child with sunken eye, drinking eagerly, and skin pinch going back slowly was classified into some dehydration. Child which doesn't fit in either of above grades was classified into no dehydration. Socioeconomic status of the family was assessed as per modified B.G. Prasad's classification based on monthly per capita income<sup>7</sup>. Duration of exclusive breast feeding, age at starting of complimentary food, Education of mother and practice of hand washing before preparation of food were asked to mothers of children. Children were divided into 2 groups, those who have followed standard criteria (that is exclusive breast feeding for 6 months) and those who have not followed standard criteria (age of starting complimentary food either <6 months or >6 months).

## Statistical Analysis

Data were entered in Microsoft excel and analyzed in statistical software SPSS version 21 and appropriate statistical test (chi square) was applied.

## Results

The socio-demographic profile of study population was shown in table-1. Acute water diarrhea was more common in children age group 0-12 months (37%) and followed by age group 13-24 months (24.5). Majority of children with acute diarrhea were female (67%) and residing in rural area (63.5%). Out of total children 49.5% of children with acute diarrhea had an illiterate mother and 25.5% had mother having primary level of education. Mothers of 64% of children with acute diarrhea did not practice hand-washing method before preparation of food. Out of 200 children studied, 86 children had previous episodes of diarrhea, out of which 33 had 1 episode, 40 had 2 episodes, and 13 had 3 episodes of diarrhea. Out of 86 children, 77 had been started on complimentary food at <6 months of age by their mothers.

- Occurrence of  $\geq 1$  previous episodes of diarrhea was significantly more common among children whose mother was illiterate ( $\chi^2 = 9.593$ ,  $P < 0.001$ ) and who belonged to lower SES ( $\chi^2 = 6.559$ ,  $P < 0.001$ ). Not practicing hand washing before preparation of food was significantly associated with repeated episode of diarrhea ( $\chi^2 = 25.537$ ,  $P = 0.000$ ). Children who had not followed standard criteria of breast feeding and who had started on complimentary feeding at <6 months of age was highly significantly associated with  $\geq 1$  episode of diarrhea ( $\chi^2 = 8.362$ ,  $P < 0.001$  and  $\chi^2 = 7.682$ ,  $P < 0.001$  respectively).
- Development of dehydration was significantly more common in children whose mother was illiterate ( $\chi^2 = 19.261$ ,  $P < 0.05$ ) and who belonged to lower SES ( $\chi^2 = 21.741$ ,  $P < 0.005$ ). Not practicing hand washing before preparation of food was significantly associated with development of dehydration ( $\chi^2 = 6.563$ ,  $P < 0.05$ ). Children who had not followed standard criteria of breast feeding and who had started on complimentary feeding at <6 months of age was highly significantly associated with development of dehydration ( $\chi^2 = 6.109$ ,  $P < 0.05$  and  $\chi^2 = 8.125$ ,  $P < 0.05$  respectively).

## Discussion

Diarrhea, acute respiratory tract infections and malnutrition are major problems faced by children under five of developing countries like India. The majority of children having diarrhea belonged to the age group 0 to

24 months (61.5%). Similar finding was observed by Negi<sup>8</sup> and Lal<sup>9</sup> in his. Diarrhea was more common in females (67%) as compared to males and in rural areas (63.5%) as compared to urban areas. In present study, diarrhea was more common among children having illiterate mothers (49.5%) and mothers with primary level of education (25.5%), as compared Das<sup>10</sup> 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 diarrhea. Prevalence of diarrhea was significantly more common among children belonging to lower socioeconomic class (70.5%,  $\chi^2 = 21.741$ ,  $p < 0.005$ ). As mentioned by Walia<sup>11</sup> *et al*, poor socioeconomic status and poor sanitation were important factors responsible for high diarrhea morbidity due to ease of transmission of infection. It is a vicious circle; malnutrition contributes to infections and infections contribute to malnutrition. Risk of dehydration was more common in children who not followed standard criteria of breast feeding (70%). A significant association was observed for early introduction of top-up feeds and diarrhea ( $\chi^2 = 8.125$ ,  $p < 0.05$ ). As mentioned in a memorandum of a World Health Organization meeting<sup>12</sup>, a study in India had shown that the incidence of diarrhea 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. In this study risk of developing diarrhea was found significantly associated with mother not practicing hand washing method before preparation of food ( $\chi^2 = 6.563$ ,  $P < 0.05$ ). Study done by Curtis V and Cairncross had shown that a 42%-47% reduction in diarrhea can occur when hand washing with soap and water is introduced into a community<sup>13</sup>.

## Conclusion

The study identified early cessation of breast feeding, lower educational status of mothers, lower SES classification, non-washing of hands by mother before preparation of food, as risk factors for development of dehydration in children under 5 years having acute watery diarrhea. Timely intervention in the risk factors may prevent the development of dehydration in children under 5 years.

**Table 1:** Demographic characteristics of study population (n=200)

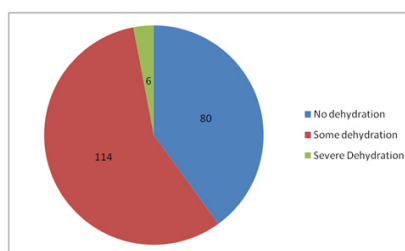
Age (in months)	
0-12	74(37.0)
13-24	49(24.5)
25-36	28(14.0)

37-48	32(16.0)
49-60	17(8.5)
<b>Gender</b>	
Male	66(33)
Female	134(67)
<b>Place of residence</b>	
Urban	73(36.5)
Rural	127(63.5)
<b>Education of mother</b>	
Illerate	99(49.5)
Primary	51(25.5)
Secondary	38(19)
HSC	5(2.5)
Graduate	7(3.5)
<b>SES</b>	
I	3(1.5)
II	5(2.5)
III	41(20.5)
IV	73(36.5)
V	78(34)

Figures in parenthesis indicate percentage

**Table 2:** Association of sociodemographic factors with repeated episode of diarrhea

		No. of previous episode of diarrhea			Total	Chi square	P value
		1	2	3			
Education of mother	Illerate	13	18	4	35	9.593	0<0.001
	Primary	9	11	3	23		
	Secondary	10	6	6	22		
	HSC	0	1	1	2		
	Graduate	1	3	0	4		
	<b>Total</b>	<b>33</b>	<b>39</b>	<b>14</b>	<b>86</b>		
SES	I	1	0	0	1	6.559	<0.001
	II	0	2	0	2		
	III	7	6	7	20		
	IV	9	16	4	29		
	V	16	15	3	34		
	<b>Total</b>	<b>33</b>	<b>39</b>	<b>14</b>	<b>86</b>		
Practice of hand washing	Yes	15	1	0	16	25.537	0.000
	No	18	38	14	70		
	<b>Total</b>	<b>33</b>	<b>39</b>	<b>14</b>	<b>86</b>		
Duration of EBF	Standard criteria followed	5	5	0	10	8.362	<0.001
	Standard criteria not followed	28	34	14	76		
	<b>Total</b>	<b>33</b>	<b>39</b>	<b>14</b>	<b>86</b>		
Age of starting complimentary food	Early	23	36	14	73	7.682	<0.001
	Appropriate	10	3	0	13		
	<b>Total</b>	<b>33</b>	<b>39</b>	<b>14</b>	<b>86</b>		



**Figure 1:** Grades of dehydration

**Table 3:** Association of sociodemographic factors with grades of dehydration

		Grades of dehydration			Total	Chi <sup>2</sup>	P value
		No	Some	Severe			
Education of mother	Illerate	15	28	3	46	19.261	<0.05
	Primary	31	30	2	63		
	Secondary	24	24	0	48		
	HSC	9	27	0	36		
	Graduate	1	5	1	7		
	<b>Total</b>	<b>80</b>	<b>114</b>	<b>6</b>	<b>200</b>		
SES	I	2	0	1	3	21.741	<0.005
	II	1	3	2	6		
	III	17	24	0	41		
	IV	30	41	1	72		
	V	30	46	2	78		
	Total	80	114	6	200		
Practice of hand washing	Yes	13	37	2	52	6.563	<0.05
	No	67	77	4	148		
	<b>Total</b>	<b>80</b>	<b>114</b>	<b>6</b>	<b>200</b>		
Duration of EBF	Standard criteria followed	17	41	2	60	6.109	<0.05
	Standard criteria not followed	63	73	4	140		
	<b>Total</b>	<b>80</b>	<b>114</b>	<b>6</b>	<b>200</b>		
Age of starting complimentary food	Early	48	77	1	126	8.125	<0.05
	Appropriate	24	28	3	55		
	EBF	8	9	2	19		
	<b>Total</b>	<b>80</b>	<b>114</b>	<b>6</b>	<b>200</b>		

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