

Original Research Article

Socio-demographic characteristics, breast feeding practices and household sanitation as risk factors for diarrhoeal illness in under five children

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ABSTRACT

Background: Acute diarrhoeal disease among children under 5 years remains a major cause of morbidity and mortality. In India, diarrhoea attributes to 13% of under-5 mortality. As most diarrhoeal diseases have feco-oral route of transmission, the source of water supply, sanitary measures and personal hygiene are important factors in prevention of same. This study aims to determine various risk factors for diarrhoeal illnesses.

Methods: A descriptive cross-sectional observational case-control study done among under-5 children hospitalized during rainy months in paediatric ward of tertiary care centre. Information regarding participant's age, sex, immunization status and breast feeding practices collected from the mother or caregiver of the child using a structured questionnaire.

Results: Out of 55 cases and 55 controls enrolled, there was no significant difference in birth weight, gender, immunization status, socio economic profile, hygiene practices and sanitation facility between two groups. Statistically significant difference ($p = 0.01717$) was seen in wasting associated with cases and controls however no difference in proportion of stunting was noted. The cases showed early age of start of complimentary feeding ($5.86 \pm 1.38m$) and less duration of total breast feeding ($15.94 \pm 4.09m$) as compared to controls. Bottle feeding was seen in 69% cases as compared to 53% controls.

Conclusions: In socio economically and environmentally similar conditions, faulty feeding is a significant risk factor for diarrhoeal illness in under 5 children. Wasting is also a significant risk factor associated with the same.

Keywords: Breast feeding, Diarrhoea, Handwashing, Socio economic risk factors

INTRODUCTION

Diarrhoea is defined by World Health Organization (WHO) as "the passage of three or more loose or liquid stools per day or more frequently than is normal for the individual".¹ Acute diarrhoeal disease among children younger than 5 years old remains a major cause of morbidity and mortality world-wide. The estimated burden of diarrhoea includes 1.7 billion cases with an average of 2.9 episodes/child/year and an estimated 1.87

million deaths among children under 5 years of age.^{2,3} In India, diarrhoea attributes to 13% of under -5 mortality which is approximately around 3, 00,000 deaths per year.^{4,5} As most of the diarrhoeal diseases have fecal - oral route of transmission, the source of water supply, sanitary measures and personal hygiene are important factors in prevention of diarrhoeal disease.⁶ The other important factor in preventing diarrhoeal illnesses is exclusive breast feeding. Human milk glycans including oligosaccharides are part of natural immunological

mechanisms which protects breast fed infants against diarrhoea.⁷

Underlying malnutrition in children is a common modifying risk factor for contracting diarrhoea.⁸ It is imperative to identify the risk factors associated with diarrhoea in a community for effective preventive measure implementation. With this background authors conducted a case control study to assess the various risk factors for diarrhoea among under - 5 children.

METHODS

A descriptive cross sectional observational study was done among under - 5 children who were hospitalized during rainy months in paediatric ward of tertiary care centre.

Cases were children between 0-60 months, admitted with acute diarrhoea during study period. Acute diarrhoea was defined by the passage of three or more loose or watery stool in 24 hour period prior to admission. Controls were children between 0-60 month, admitted with non-diarrhoeal illness during study period and who did not fulfil the diarrhoea case definition during the 2 weeks preceding enrolment to the study.

Data collection

Information regarding participant's age, sex, immunization status and breast feeding practices was collected from the mother or caregiver of the child. Breast feeding history for both cases and control included the duration of exclusive breast feeding, total duration of breast feeding, h/o bottle feeding, h/o partial or mixed breast feeding. Mothers/ caregivers were interviewed regarding their age and education level.

Socioeconomic status was classified according to modified Kuppuswami classification. For statistical analysis upper and upper middle class were grouped as upper SES; lower middle class as middle SES and upper lower and lower class as lower SES. Information on household sanitation included toilet facility, source of water supply for drinking and other purposes, storage facility of drinking water and water for other purposes as well as personal hygiene practices. The primary source of water supply was through piped water or through tankers. The interviews were carried out using structured questionnaire.

Anthropometric measurements were done for the children following standard procedures. Nutritional status was classified as wasting if weight for height 'z' score is less than -2 SD and stunting if height for age 'z' score is less than -2 SD using WHO growth standards.

Statistical analysis

Data were analysed by Openepi software version 3.0. Chi square test or Fisher exact test were applied for

qualitative data and student 't' test was applied for quantitative data.

RESULTS

Children's demographic profile showed maximum number in 1-3 year age group (51% Vs 38%). Statistically significant difference was noted in mean age of two groups, children with diarrhoea were younger than control group (18.74±4.82 Vs 19.30±3.56, p value 0.02782).

Table 1: Children's demographic and health characteristic.

Characteristic	Case (%) N = 55	Control (%) N=55	p value
Age (months)			
0-6	12 (22)	8 (15)	0.1773
6-12	10 (18)	19(34)	
12-36	28 (51)	21 (38)	
36-60	5 (9)	7(13)	
Mean age (yr)(SD)	18.74±4.82	19.30±3.56	0.02782
Sex			
Male	16 (29)	10 (18)	0.1884
Female	39(71)	45(82)	
Mean birth weight(kg)(SD)	2.406±0.50	2.63±0.43	0.2564
Immunization status			
Complete	36 (66)	42 (76)	0.3551
Incomplete	16 (29)	12 (22)	
Unimmunized	3 (5)	1 (2)	
Nutritional status			
Wasted (weight for height Z score < -2SD)	39 (62)	28 (51)	0.01717
Stunted (height for age Z score < - 2 SD)	26 (47)	20 (36)	0.1274
Breast feeding status			
Exclusive BF	21 (38)	28 (51)	0.0942
Partial BF	33 (60)	26 (47)	
No BF	1 (2)	1 (2)	
Mean duration of BF (month)(SD)	15.94±4.09	18.03±5.43	0.03946
Mean age of weaning (month)(SD)	5.86±1.38	6.6±1.78	0.01646
Bottle feeding	38 (69)	29 (53)	0.04191

On nutritional status comparison, a greater number of cases were having wasting than controls (62% Vs 51%, p value 0.01717), however there was no difference in proportion of stunting between two groups. There was no significant difference with regard to birth weight, gender and immunization status between two groups (Table 1).

Breast feeding practices showed exclusive breast feeding rate of 38% among cases and 51 % among control group. The case group showed early age of start of complimentary feeding (5.86±1.38) and less duration of total breast feeding (15.94±4.09) as compared to control group. Bottle feeding rate was seen in 69% among case as compared to 53% among control. There was significant statistical association seen with age of introduction of complimentary feed, duration of breast feeding and bottle feeding practice to diarrhoeal cases.

Maximum number of participant’s family head had education up to secondary level (44% Vs 58%), mother/caregiver had education up to primary level (71% Vs 58%), monthly family income between 10,000 to 20000 (42% Vs 51%) and middle SES (45% Vs 42%). Mean maternal age of cases was 21.45 years and control were 22.87 years. Socio economic profile comparison between two groups didn’t show any statistically significant association between socioeconomic class, family income per month, family head education level, maternal age or maternal/caregiver education level with diarrhoeal cases (Table 2).

Table 2: Socio Economic condition.

Characteristic	Case (%) N = 55	Control (%) N=55	p value
Household head education			
Primary	26 (47)	16 (29)	0.1457
Secondary	24 (44)	32 (58)	
Higher	5 (9)	7 (13)	
Mother’s education			
Primary	39 (71)	32 (58)	0.2276
Secondary	15 (27)	19 (34)	
Higher	1 (2)	4 (7)	
Family income per month			
>20000	9 (16)	13 (25)	0.1821
10000 - 20000	23 (42)	28 (51)	
<10000	23 (42)	14 (25)	
Mother’s age (year)			
<20	13 (24)	12 (22)	0.3879
20 - 29	38 (69)	34 (62)	
30 - 39	4 (7)	9 (16)	
Mean age	21.45±3.125	22.87±2.642	0.2205
Socio economic class			
Upper	16 (29)	11 (20)	0.2998
Middle	25 (45)	23 (42)	
Lower	14 (25)	21 (38)	

Among 56% of the mother/caregiver reported hand washing every time before handling food, while around 36% and 42% mother reported of occasional hand washing practices before handling food in both groups respectively. In response to hand washing after defecation, 91% and 80% said it to be done with water only in both groups respectively. Only 9% mother of cases and 20% mother of control were using soap for hand washing after defecation. There was no statistically

significant difference noted with regard to hygienic practices between two groups (Table 3).

Table 3: Hygiene and sanitary condition.

Characteristic	Case (%) N = 55	Control (%) N=55	p value
Hand washing before handling/eating food			
Always	31 (56)	31 (56)	0.3662
Occasional	20 (36)	23 (42)	
Never	4 (7)	1 (2)	
Hand washing after defecation			
Yes with soap	5 (9)	11 (20)	0.05772
Yes with water	50 (91)	44 (80)	
Defecation facility			
In-house toilet facility	54 (98)	53 (96)	>0.99
Public toilet	1 (2)	2 (4)	
Open defecation	0	0	
Drinking water source			
Piped water supply	25 (45)	31 (56)	0.1305
Water storage facility			
Clean covered	31 (56)	34 (62)	0.2841
Unclean uncovered	24 (2)	21 (2)	

Sanitary measure characteristics included source of water supply, water storage facility and defecation practices. 45% household among cases and 56% household among control group had piped water supply which was statistically not significant. 56% among cases and 62% among control reported clean, covered water storage practice. No significant difference seen regarding water storage facility between two groups. 97% household had in house toilet facility and 3% had access to public toilet. No participant reported open air defecation practice. There was no statistically significant difference between two groups noted about defecation facility.

DISCUSSION

The present study was conducted to assess the risk factors like socio demographic condition, household sanitary condition and child feeding practices associated with diarrhoeal illness.

The result of our study showed mean age of children with diarrhoeal illness was 18.74±4.82 year which was younger than control group. Similar finding suggesting higher burden of diarrhoea in young children compared to older children has reported by different studies.⁹⁻¹¹ Authors also found more children with wasting among cases as compared to controls. It is a known fact that malnutrition predisposes to infection because of its negative impact on barrier protective effect of skin and mucus membrane and by alteration in host immune function. Ferdous and others found that malnourished

children were more likely to present with gastrointestinal infections and have increased diarrhoea disease severity irrespective of malnutrition being acute or chronic.¹²

This hospital is a tertiary care centre catering to people residing in an urban slum area. As this study was done in a hospitalized child who comes from similar living condition and so authors didn't found any difference in socio economic condition between two groups.

With regard to source of water supply and water storage practices no difference was found between two groups. Though diarrhoea is considered water borne disease, D Kattula et al found less incidence of diarrhoea in rural population than urban population despite widespread water contamination in both areas and they suggested that water may not be the primary mode of transmission in an endemic setting.⁹ Though authors have not found any association of hand washing methods (with soap or with only water) with diarrhoeal illness, the importance of using soap for hand washing to get rid of microbial contamination had been consistently demonstrated in various studies and so it can't be overlooked.^{2,13}

There was significant association found between length of breast-feeding duration, age of introduction of complimentary feeding and bottle-feeding practices with diarrhoeal illness. Even though there was no difference in proportion of children who had received exclusive breast feeding between two groups, early introduction of complimentary feed exposes the children to a contaminated environment at a younger age thus negating the protective effect of breast milk and make them vulnerable to diarrhoeal illness. The bottle feeding adds to the risk due to more chances of contamination.^{9,14,15}

CONCLUSION

In socio economically and environmentally similar conditions, faulty feeding practices are the significant risk factor for diarrheal illness in under 5 children.

Limitations of this study was that it was conducted in hospitalized children during rainy season. So, the results of this study are limited to the area catered by hospital and generalization of the study results may not be possible. Also, the seasonal differences in occurrence of diarrhoea have not been considered.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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