

TO STUDY THE PREVALENCE OF MALNUTRITION IN CHILDREN WITH DIARRHOEA OF AGE SIX MONTHS TO FIVE YEARS IN A TERTIARY CENTER IN MADHYA PRADESH

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ABSTRACT

BACKGROUND

Mortality and morbidity of children with malnutrition in inpatient set-ups in our country still remains unacceptably high. We investigated the prevalence of malnutrition in children with diarrhoea in the age group 6 months to 5 years.

MATERIALS AND METHODS

Total 224 diagnosed cases of diarrhoea admitted in inpatient department were evaluated for malnutrition.

RESULTS

In this study, 102 (45.5%) of patients were in the youngest age group of 6 months to 1 year. Prevalence of malnutrition is 66.9% in a total of 224 children admitted with diarrhoea. There was strong association between severity of dehydration and severity of malnutrition. As less severe dehydration was associated with less severe grade of malnutrition.

CONCLUSION

In this study, we concluded that prevalence of malnutrition is higher in diarrhoea.

KEY WORDS

Malnutrition, Diarrhoea, Dehydration

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BACKGROUND

The greatest health difference between developed and developing countries is the burden of childhood diseases¹. Children born to poor families in developing world are significantly less likely to reach to adulthood than children in developed countries and much more likely to suffer permanent health problems as a result of childhood illness.¹

Malnutrition is common among poor family children in underdeveloped countries and is an important factor contributing to both morbidity and mortality. Many factors contribute to malnutrition among children in all the underdeveloping world including an inadequate availability of protein and calories rich diet and specific nutrients, illnesses and dietary monotony such as diarrhoea.² There are many strong evidences that demonstrate that diarrhoea leads to malnutrition.

Some researchers believe that, malnutrition increases children's risk for diarrhoeal incidence, and contributes to the duration of diarrhoeal episodes thereby resulting in a vicious cycle in more diarrhoea, which consequently worsening malnutrition². As the causal relationship between diarrhoea and malnutrition is established but there is currently very little specific information available about the mechanisms by which diarrhoea leads to poor nutritional status.³

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Diarrhoea and malnutrition are related bidirectionally to each other, children have a greater incidence of diarrhoea,³ and malnutrition can be worsened by significant diarrhoea.³ Prolonged diarrhoeal episodes are also associated with increased severe morbidity and mortality from other diseases and adversely affect neurodevelopment and growth stunting.⁴ The purpose of conducting this study was to further elucidate how and till which extent diarrhoea contribute to malnutrition.

Understanding the association between diarrhoea and malnutrition will contribute to the design of plan and interventions to improve the health of children in the developing world. Continuing advances in our understanding of the early diagnosis, prevention and treatment of diarrhoea and malnutrition, when broadly understood and applied, will allow more children and adults with diarrhoea and malnutrition to gain their full potential.

Objectives

- To establish the pattern of malnutrition among children six months to five years of age presenting with diarrhoea.
- To establish the prevalence of malnutrition in cases of diarrhoea in children age between six months to five years.

MATERIALS AND METHODS

Method

Total 224 children (age six months to five years) admitted in paediatric wards of Sri Aurobindo Institute of Medical Science, Indore M.P. and diagnosed as acute/chronic/persistent diarrhoea between January 2016 to June 2018 were thoroughly examined and evaluated for the severity of dehydration and pattern of stools. They were examined for

malnutrition and other co-morbid conditions associated with malnutrition and establish the pattern of malnutrition.

Study Design

Study is observational cross-sectional study.

Inclusion Criteria

Children of age six month to five years with acute/chronic or persistent diarrhoea admitted in in-patient department of paediatrics at SAIMS, Hospital Indore.

Exclusion Criteria

1. Age less than six month and greater than five years of age
2. Children with co-existing congenital, cardiac, respiratory, CNS and or GI malformations.
3. Children with growth retardation attributable to non-nutritional causes e.g. cerebral palsy, cystic fibrosis etc.

Sample Size and Sampling Design

Minimum 224 cases were included in the study. We have taken this sample size is based on level of precision; precision consists of allowable error. In this study 10% allowable error is considered. According to a previous similar study conducted in Chandigarh,⁵ the prevalence of PEM was 51.6%. So the prevalence of 51.6% was taken and the sample size was estimated using statistical formula-

$$n = 4 pq/d^2$$

Where, n is the required sample size

p is the prevalence = 51.6% in this study (q=100-p)

d is allowable error = 10%

Using the above formula, the sample size estimated was 99.8. As in the study area per annual total diarrhoea cases are approximately 200 to 300, so we included maximum cases.

Data Collection

Children with age group six months to five years diagnosed with diarrhoea admitted in the in-patient paediatric wards were studied by measuring the height and weight. Anthropometric measurements, following standard guidelines, were done to collect information on nutrition status of the eligible children. Weight measurements were taken in a portable digital platform weighing balance. The scale was adjusted to zero before each measurement. Weight was recorded to the nearest 0.1 kg. Height was measured to the nearest 0.5 cm using a measuring tape fixed vertically on

a smooth wall perpendicular to the ground. Each reading was taken twice to ensure correctness of the measurement and to minimize intrapersonal errors. Data collected was entered in the Microsoft excel spreadsheet and analysed with SPSS version 17.0, WHO and IAP Growth standards" was used for classifying the malnutrition. Z scores of weight for age, height for age and weight for height were calculated. Wherever applicable, proportions and mean (SD) were calculated. Chi square test was used to compare proportions. For statistical significance, P value of <0.05 was considered.

RESULTS

In present study total 224 cases of diarrhoea with age group six months to five years were taken, in which there were 112 (50%) boys and 112 (50%) girls. In this study, 102 (45.5%) of patients were in the youngest age group of 6 months to 1 year, which forms more than 40% of the child mortality rate in our country.

The prevalence of diarrhoea decreases as the age increases being only (1.7%) in the age group of 4 yrs. to 5 yrs.

Sr. No.	Age Group	Sex		Total
		Female	Male	
1	6 Months to 1 yr.	56	46	102 (45.5%)
2	1 yr. to 2 yrs.	40	56	96 (42.8%)
3	2 yrs. to 3 yrs.	1	9	10 (4.4%)
4	3 yrs. to 4 yrs.	11	1	12 (5.3%)
5	4 yrs. to 5 yrs.	4	0	4 (1.7%)
Total		112	112	224

Table 1. Distribution of The Children with Age and Sex

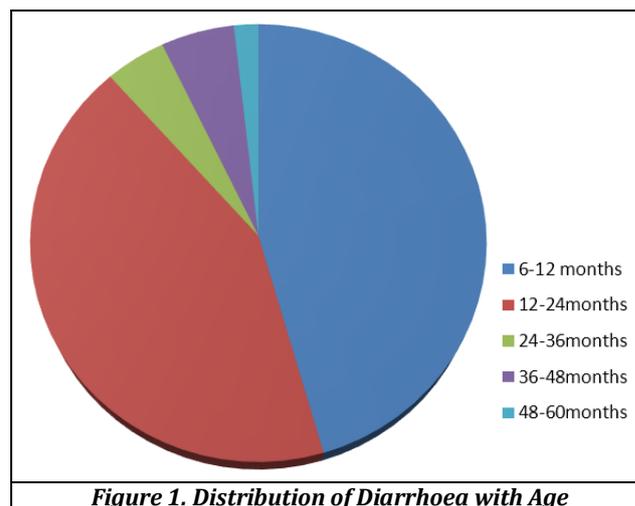


Figure 1. Distribution of Diarrhoea with Age

Sr. No.	IAP Classification	No. of Children and Percentage	Age Groups					Total
			6 Months to 1 yr.	1 yr. to 2 yrs.	2 yrs. to 3 yrs.	3 yrs. to 4 yrs.	4 yrs. to 5 yrs.	
1	Grade 0	No.	41	33	0	0	0	74 (33%)
		%	55.4%	44.6%	0.0%	0.0%	0.0%	
2	Grade 1	No.	37	53	10	12	4	116 (51.7%)
		%	31.9%	45.7%	8.6%	10.3%	3.4%	
3	Grade 2	No.	7	10	0	0	0	17 (7.5%)
		%	41.2%	58.8%	0.0%	0.0%	0.0%	
4	Grade 3	No.	10	0	0	0	0	10 (4.4%)
		%	100.0%	0.0%	0.0%	0.0%	0.0%	
5	Grade 4	No.	7	0	0	0	0	7 (3.1%)
		%	100.0%	0.0%	0.0%	0.0%	0.0%	
Total		No.	102	96	10	12	4	224

Table 2. Distribution of The Children as Per Nutritional Status and Age (Based on IAP Classification of Malnutrition)

Applying chi-square test, it was found that $\chi (16) = 50.240, p = 0.001$, which means that there was statistically significant association between age and malnutrition (IAP classification); that is, younger patients are more in the Grade III group.

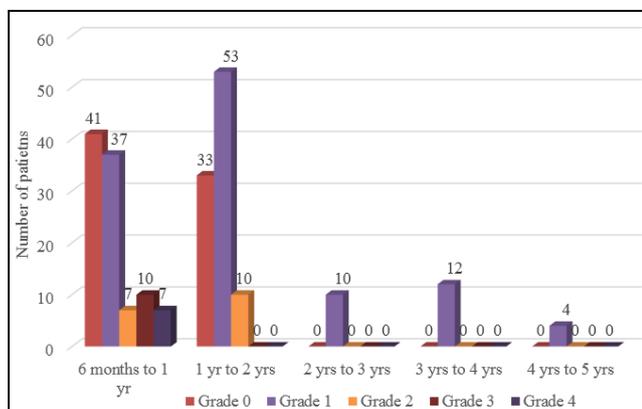


Figure 2. Distribution of The Children as Per Nutritional Status and Age (Based on IAP Classification of Malnutrition)

Sr. No.	IAP Classification	Dehydration Status			Total	
		No. Dehydration	Some Dehydration	Severe Dehydration		
1	Grade 0	No.	30	44	0	74
		%	40.5%	59.5%	0.0%	
2	Grade 1	No.	94	22	0	116
		%	81.0%	19.0%	0.0%	
3	Grade 2	No.	0	16	1	17
		%	0.0%	94.1%	5.9%	
4	Grade 3	No.	0	6	4	10
		%	0.0%	60.0%	40.0%	
5	Grade 4	No.	0	6	1	7
		%	0.0%	85.7%	14.3%	
Total		No.	124	94	6	224
		%	55.4%	42.0%	2.7%	

Table 3. Association Between Malnutrition (According to IAP) and Dehydration Status

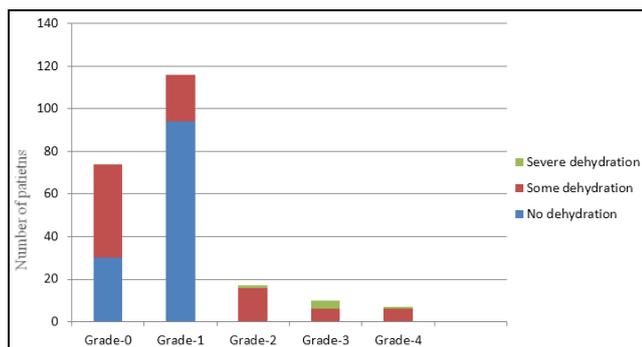


Figure 3. Association Between Malnutrition (According to IAP) and Dehydration Status

DISCUSSION

General Profile

The present study was conducted to know the prevalence of malnutrition among 6 to 60 months of children with diarrhoea admitted in paediatric in-patient department of Sri Aurobindo Institute of Medical Science, Indore and along with this objective this study throws light upon association of protein energy malnutrition with diarrhoea.

Age and Sex

The age group of our study was 6 to 60 months included 50% boys and 50% girls, out of total 224 diarrhoeal patients, maximum numbers of children were in (The younger age group) 6-12 months age group which constituted about 45.5% of study subject. It was observed that 42.8% of study subjects belong to age 1-2 years and 1.7% belong to the age 4-5 years. Similar result found in study done by Goudappa and S. Veera at VIMS, Bellary that maximum patients are in younger age group 12 to 24 months 30% and 49 to 60 months 17.8%. In another study done by Bajan R at AIMS Bellur, Karnataka give similar result age 1-2 years 22.9% and 4-5 years 12.5%. Similar age distribution found in study conducted by S Chakraborty et al in Rajasthan, India. In present study 50% child are males and 50% females. In study by Gopal Chandra Mandal et al (2009) similar sex wise distribution, 49.2% child were boys and 50.8% were girls. Another study conducted by Deshmukh PR et al (2007) under 5 years children of were 52% boys and 48% were girls.

Prevalence of malnutrition is 66.9% in total 224 children admitted with diarrhoea. As total 150 children are malnourished out of 224. (As per IAP classification).

After applying chi-square test, it was found that $\chi (8) = 131.840, p = 0.001$, there was statistically significant association between IAP malnutrition grades and dehydration status (Severe dehydration, moderate dehydration and no dehydration), that is less severity of malnutrition has less severity of dehydration. 85.7% of grade IV malnutrition had some dehydration and 14.3% patients had severe dehydration. Similarly, in Grade III, 60% and 40% of children had some and severe dehydration respectively. In Grade II, 94.1% and 5.9% of children had some dehydration and severe dehydration respectively.

CONCLUSION

This study was done to evaluate the association of malnutrition and diarrhoea in age group six months to five years. Children presenting in age group of 6-12 months were maximum in number (45.5%). In a total of 224 diarrhoeal children, 66.9% were PEM, out of this, maximum number of children were in grade-I PEM (IAP classification). Patient who presented with diarrhoea, maximum had no dehydration (55%) and severe dehydration were 2.7%. There was strong association between severe malnutrition and severe dehydration.

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