

DIARRHOEA AND MALNUTRITION IN CHILDREN: A STUDY FROM KISHANGANJ DISTRICT, BIHARJitendra Bahadur Singh¹, Manoj Kumar², Kashif Shahnawaz³, Amrit Krishna⁴**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: INTRODUCTION: Diarrhoeal diseases are very important cause of malnutrition in children under five years old. Diarrhoea can lead to malnutrition and malnutrition can predispose to diarrhoea. Each episode of diarrhoea deprives the child of the nutrition necessary for growth. **OBJECTIVE:** This study was conducted to study the association of diarrhoea and malnutrition in children of one of the rural area of Kishanganj district, Bihar. **MATERIALS & METHODS:** Target sample size of approximate 3742 children, upto 12 years of age were selected for the study. The survey consisted of 30 clusters and each cluster consists of about 125 children. The association of diarrhoea in children were studied in relation to malnutrition. **OBSERVATION:** It was observed in our study that the number of children suffering from diarrhoea in each of the nutritional status group, i.e.; Normal, 1st degree, 2nd degree, 3rd degree & 4th degree was 43(5.9%), 79(8.7%), 308(22.3%), 187(28.9%) and 31(39.2%), respectively. **CONCLUSION:** The incidence of diarrhoea was found to be high in children suffering from 3rd and 4th degree of malnutrition. **RECOMMENDATION:** Strategies should be made to reduce child undernutrition, more effectively, by using experiences gained from successful nutrition programmers. Nutrition education, particularly of the mothers should be made an integral part of health education programs to prevent protein energy malnutrition (PEM), leading to diarrhoea in children.

KEYWORDS: Diarrhoea, Malnutrition.

INTRODUCTION: Diarrhoeal illness is one of the major causes of morbidity and mortality in children of developing countries¹⁻³ Diarrhoea can lead to malnutrition and malnutrition can predispose to diarrhoea. It has also been shown that the negative influence of diarrhoea on nutrition is enteropathogen specific.³ Diarrhoeal diseases is the second leading cause of death and also an important leading cause of malnutrition in children under five years old. In developing countries, children under three years old experience an average three episodes of diarrhoea every year. Each episode deprives the child of the nutrition necessary for growth. As a result, diarrhoea is a major cause of malnutrition and malnourished children are more likely to fall ill from diarrhoea. Children who die from diarrhoea often suffer from underlying malnutrition, which makes them more vulnerable to diarrhoea. Diarrhoea was defined as defecation frequency of three or more loose/ liquid stools in a day.⁴ It most often results from the ingestion of pathogens from faeces that have not been disposed of properly or from the lack of hygiene.

Despite the substantially declining mortality rate from diarrhoea in developing countries, diarrhoea still accounts for approximately 11% of all mortality in children under five years of age.⁵ Diarrhoea incidence remains a tremendous burden on children in low and middle income countries,⁶ due to multiple determinants.⁷ Child malnutrition is one of the important determinants among them.⁸ Prevalence of diarrhoea and malnutrition among children in low

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socio-economic areas are high, not only because children and their parents are exposed to the environmental factors that cause diarrhoea such as unsafe water, poor hygiene and sanitation, but also due to poor food-hygiene practice.

Bacterial diarrhoeal infection is more common in severe and complicated malnutrition and thought to occur in part due to the loss of the protective mucosal barriers in the gastrointestinal tract.⁹

MATERIALS AND METHODS: This study was conducted in Kishanganj district of Bihar, from the period of Nov-13 to Dec-13 (two months). Privacy of the guardians and children were maintained. Children selected for the study belonged to the age group of newborn to 12 years, who are mostly the permanent resident of this area or who are living in this zone for more than 6 months. Data collection in this study was divided into three phases: (a) Interview (b) Observation and (c) anthropometric measurements. A structured questionnaire, used for conducting interviews and observations, consisted of four sections: (a) general information (b) diarrhoea prevalence (c) complete list of food-hygiene practices, and (d) nutritional status. The questionnaire was developed, based on a similar survey, the guidelines set by WHO, information from staff members of the community health centres and voluntary mothers. In addition, the interview was conducted by the field worker to the mothers or caretakers in their house after the anthropometric measurement of their child. Anthropometric measurements were taken by trained research assistants at the time of enrollment. Each child was weighed in light cloths with an electronic weighing scale. Malnutrition was defined by weight for age Z-score < - 2. Nutritional status was assessed by comparing the weight of the study children with those of NCHS reference population of the same age and gender with the help of Epi-Info 6 version 6.04, Centres for Diseases Control and Prevention (CDC), USA computer package program. The survey in this study has been conducted as per standard WHO/CDD case management process, cluster sampling method as described in WHO/CDD household survey manual (CDD/SER/86.2, Rev.1989). The survey consisting of 30 clusters by and large from rural population. The sample size has been collected using standard method in CDD household survey manual. To ensure reasonable limit of precision target sample size of approximate 3742 children upto 12 years of age was selected. Thus each cluster consists of about 125 children. The diagnosis of diarrhoea in children was confirmed after detailed and thorough interrogation of the patients and their parents, clinical examination of the patient and by required pathological examination like routine examination of stool of the sufferer child. Finally, the relation of diarrhoea in children, in relation to their nutritional status was established.

OBSERVATION:

Nutritional Status	Number of Children	Percentage
Normal	722	19.3
1 st degree	901	24.1
2 nd degree	1393	37.2
3 rd degree	647	17.3
4 th degree	79	2.1
Total	3742	100

Table 1

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Distribution of children according to Nutritional Status.

In the present study, the children were weighed and the nutritional status was observed, taking into account the expected weight for age, for each of the children. The children were divided into five groups as per classification given by Indian Academy of pediatrics.

Normal: upto 80% of expected weight.

First degree: Weight between 80-70% of expected weight. Second degree: Weight between 70-60% of expected weight. Third degree: Weight between 60-50% of expected weight. Fourth degree: Weight less than 50% of expected weight.

The number of children in each of these above group was 722(19.3%), 901(24.1%), 1393(37.2%), 647(17.3%) and 79(2.1%), respectively.

Nutritional Status	Number of Children	Suffering from Diarrhoea		Percentage
		Yes	No	
Normal	722	43	679	5.9
1 st degree	901	79	822	8.7
2 nd degree	1393	308	1085	22.1
3 rd degree	647	187	460	28.9
4 th degree	79	31	48	39.2
Total	3742	648	3094	
Percentage	100	17.3	82.7	

Table 2

Current Status of Diarrhoea in relation to Nutritional Status of Children

In the present study, the number of children suffering from diarrhoea in each of the nutritional status group, i.e.; Normal, 1st degree, 2nd degree, 3rd degree and 4th degree, was 43(5.9%), 79(8.7%), 308(22.3%), 187(28.9%) and 31(39.2%) respectively.

DISCUSSION: In the present study, 3742 children under the age of 12 years, residing in the 30 villages of Kishanganj district of Bihar, were surveyed with a view of finding out the incidence of diarrhoea in the child population and its relation with the nutritional status among them. The children were divided into four age groups, i.e., 0-5 months, 6-11 months, 12-35 months and 36th months to 12 years. The frequency of each of these age group was 149(4%), 175(4.7%), 684(18.3%) and 2734(73%) respectively. In the present study, the frequency of children in the different nutritional status group, i.e., Normal, 1st degree, 2nd degree, 3rd degree and 4th degree was 19.3%, 24.1%, 37.2%, 17.3% and 2.1%, respectively. Higher incidence of diarrhoea was found in 3rd and 4th degree malnutrition [Table-2].

Manchanda et al (1958)¹⁰ observed children from upper class with good nutritional status also suffered from diarrhoea, but the effects were less serious than in malnourished and debilitated children of poorer families. These observations were corroborated in the studies of Jellife (1966),¹¹ Udani et al (1968)¹² and Khanduja et al (1969).¹³ They were of the opinion that

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nutritional status and diarrhoea run in various cycles affecting each other, particularly Jelliffe (1966),¹¹ stated that though severe acute diarrhoea could occur in well-nourished children, enterio-infectious developed more easily and persisted longer in children with malnutrition. He further concluded that diarrhoea could be an important predisposing factor leading to marasmus & kwashiorkor. A high incidence of PEM in children victim of diarrhoea were noted by Ghai and Kumar (1969),¹⁴ who concluded that this protein malnutrition is an important predisposing factor of diarrhoea in children. F.Z. et al (1989) found a strong association between malnutrition and sub-nutritious state and diarrhoea. In their study they found mildly malnourished children have three times risk of diarrhoea than normally nourished children whereas moderately malnourished children bear twice the risk. Lima et al (1992),¹⁵ in their publication from the series of their study stated that malnutrition definitely and significantly predisposed children to a greater incidence, severity, duration and chronically of diarrhoea.

The association of diarrhoea and severe acute malnutrition (SAM) is a well-documented fact, from different studies.¹⁶⁻¹⁹ Deaths attributable to under nutrition encompass 53% of all childhood deaths, echoing the previous estimate of 55% of all deaths to young children.²⁰ Among the principal causes of death in young children, 60.7% of deaths as a result of diarrhoea, are attributable to under nutrition.

CONCLUSION: The present study has been carried out to find the incidence of diarrhoea in relation to malnutrition, in children under 12 years of age, in a rural area of Kishanganj district of Bihar; and also to collect data on various social & dietary practices of the children of this area and their relation to the condition of diarrhoea. The conclusions of our study were:

1. 3742 children under the age of 12 years from a sample population of 67184 were studied to find out cases of diarrhoea.
2. A total number of 648 children were found to be suffering from diarrhoea during the time of interview.
3. The highest incidence of diarrhoea was seen in 4th degree malnutrition (39.2%). The incidence of diarrhoea decreased as the nutritional status of children improved.

RECOMMENDATION: These conclusions underscore the need to improve the nutritional status of children a priority. In addition to reducing growth faltering, investments in child nutrition programs would support and complement disease specific prevention and control programs in developing countries. Large proportion of child deaths could be prevented by child nutrition interventions. With current programmatic efforts, rates of undernutrition among children are declining in most countries at 1% per year or less.⁽²¹⁾ We and others argue that this amount of progress is unacceptable.⁽²²⁾ Strategies to more effectively reduce child undernutrition by using experiences gained from successful nutrition programmers are urgently needed. Nutritional education should be made an integral part of health education programs to prevent protein energy malnutrition, leading to diarrhoea. Mothers should be educated more effectively during health education programs regarding correct type of feeding practices.

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