

OUTCOME AND COMORBIDITIES ASSOCIATED WITH SEVERE ACUTE MALNUTRITION: ADMITTED AT NUTRITION REHABILITATION CENTRE (NRC) OF A TERTIARY CARE CENTRE

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ABSTRACT

BACKGROUND

Infants and children with severe acute malnutrition are associated with numerous infectious and non-infectious comorbidities. This study was done to understand associated comorbidities of severely malnourished children and their outcome.

MATERIALS AND METHODS

This case control study was conducted in the Department of paediatrics, G.S.V.M. Medical College, Kanpur from January 2014 to December 2015. 200 children, aged 6 months- 5 years admitted at nutritional rehabilitation centre of our hospital with SAM were enrolled as cases. 200 children with normal nutritional status attending routine clinic were selected as controls.

RESULTS

Out of 200 cases in our study, 73 (36.5%) had Acute gastroenteritis, 53 (26.5%) had Acute respiratory tract infections, 22 (11%) had Sepsis, 8 (4%) had Urinary Tract Infection, 15 (7.5%) had Meningitis, 10 (5%) had Malaria, 4 (2%) had Measles, 5 (2.5%) had HIV Infection, 43 (21.5%) had Tuberculosis and 28 (14%) had Skin Infection, 14 (7%) had clinical feature of Vitamin B deficiency, 34 (17%) had Rickets, 3 (1.5%) had Scurvy, 17 (8.5%) had Vitamin A deficiency and 190 (95%) had Anaemia. In our study 43.5% were discharged after target weight gain, 47.5% were discharged without target weight gain, 7% were defaulters and 2% were expired.

CONCLUSION

Acute gastroenteritis followed by acute respiratory tract infections was most commonly associated Infective co-morbidity. Anaemia was the most common Nutritional Deficiency Co-morbidity.

KEYWORDS

NRC, Severe Acute Malnutrition, Comorbidities, Outcome.

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BACKGROUND

World Health Organization (WHO) defines malnutrition as "the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions".¹ It is globally the most important risk factor for illness and death, with hundreds of millions of young children affected.² Childhood under nutrition is an underlying cause in an estimated 35% of all deaths among children under five and 21% of total global Disability Adjusted Life Years (DALYs) lost among under 5 children. In 2009, the World Health Organization (WHO) estimated that 20 million children under 5 years suffered from severe acute malnutrition (SAM) worldwide, which is

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associated to more than half of their deaths each year in developing countries.³ Nearly 25% of the paediatrics hospital beds in India are occupied by children suffering from malnutrition and around 80% of hospitalized children are malnourished to some extent.⁴ Malnourished children are more susceptible to various associated complications⁵ and malnutrition is most common cause of immunodeficiency worldwide.⁶ SAM has been a major obstacle to the achievement of the fourth Millennium Development Goal (MDG).⁷

Aims and Objectives

- 1) To assess the outcome of severely malnourished children admitted to nutritional rehabilitation centre.
- 2) To study the co-morbidities in severely malnourished children admitted to nutritional rehabilitation centre.

MATERIALS AND METHODS

This observational study was conducted in the Department of Paediatrics, Ganesh Shankar Vidyarthi Memorial Medical College, Kanpur over a period of two years From January 2014 to December 2015. A total number of 200 children

admitted at our hospital with a diagnosis of severe acute malnutrition based on the WHO criteria between age group 6 month to 5 years were enrolled as cases.⁸ 200 children with normal nutritional status without infectious conditions attending routine clinic were selected as controls.

Children aged <6 months and >5 years, children with mild and moderate malnutrition and children with chronic illness and congenital Malformation were excluded from the study.

A written and informed consent was obtained from the parents. A detailed and thorough history along with complete anthropometry and physical examination was done. Clinical signs of micronutrient deficiencies were assessed. Frequencies of various comorbid conditions in study population were recorded. Severity of Anaemia was graded according to WHO criteria.⁹

RESULTS

Out of 200 cases in our study, 59% were males and 41% were females. 35.5% children belong to 6-11 months age group, 43% were between 12-23 months age group, 13.5% were between 24-35 months age group, 5% were between

36-47 months age group and 3% were between 48-59 months age group. 10.5% had oedematous malnutrition and 89.5% had non-oedematous malnutrition. 44% of the children with SAM were in socio-economic class (SEC) IV, 26% in SEC III, 23% in SEC V and only 1% in SEC I.

In our study, 36.5% had acute gastroenteritis, 26.5% had acute respiratory tract infections, 11% had Sepsis, 4% had Urinary Tract Infection, 7.5% had Meningitis, 5% had Malaria, 2% had Measles, 2.5% had HIV Infection, 21.5% had Tuberculosis and 14% had Skin Infection. In our study acute gastroenteritis followed by acute respiratory tract infections was most common associated infective co-morbidity (Table-1).

Anaemia (95%) was the most common Nutritional Deficiency Comorbidity, followed by Rickets (17%), Vitamin A deficiency (8.5%), Vitamin B deficiency (7%) and Scurvy (1.5%) (Table-2).

In our study 43.5% were discharged after target weight gain, 47.5% were discharged without target weight gain, 7% were defaulters and 2% were expired (Table-3).

Type of co-morbidities	Age Group in Months					
	Total Cases (%)	6-11 m (%)	12-23 m (%)	24-35 m (%)	36-47 m (%)	48-59 m (%)
Acute gastroenteritis	73 (36.5)	30 (41.09)	25 (34.25)	10 (13.69)	5 (6.84)	3 (4.10)
Acute respiratory tract infection	53 (26.5)	34 (64.15)	9 (16.98)	5 (9.43)	2 (3.77)	3 (5.66)
Sepsis	22 (11)	15 (68.18)	5 (22.72)	2 (9.09)	0	0
Urinary tract infection	8 (4)	2 (25)	5 (62.50)	1 (12.50)	0	0
Meningitis	15 (7.5)	7 (46.66)	5 (33.33)	2 (13.33)	0	1 (6.66)
Malaria	10 (5)	6 (60)	2 (20)	0	2 (20)	0
Measles	4 (2)	2 (50)	1 (25)	1 (25)	0	0
HIV infection	5 (2.5)	1 (20)	2 (40)	0	1 (20)	1 (20)
Tuberculosis	43 (21.5)	20 (46.51)	10 (23.25)	5 (11.62)	6 (13.95)	2 (4.65)
Pyoderma	10 (5)	6 (60)	3 (30)	0	1 (10)	0
Candidiasis	10 (5)	7 (70)	1 (10)	2 (20)	0	0
Scabies	8 (4)	5 (62.5)	2 (25)	0	1 (12.5)	0
CSOM	4 (2)	0	1 (25)	2 (50)	0	1 (25)

Table 1. Age-Wise Distribution of Infective Co-Morbidities in the Study Population

Type of co-morbidities	Age group in months					
	Total cases (%)	6-11 m (%)	12-23 m (%)	24-35 m (%)	36-47 m (%)	48-59 m (%)
Anaemia	190 (95)	70 (36.84)	85 (44.73)	24 (12.63)	7 (3.68)	4 (2.10)
Rickets	34 (17)	9 (24.32)	19 (55.88)	5 (14.70)	1 (2.94)	0
Vitamin A	17 (8.5)	5 (29.41)	8 (47.05)	3 (17.64)	1 (5.88)	0
Vitamin B	14 (7)	5 (35.71)	4 (28.57)	4 (28.57)	2 (14.28)	0
Scurvy	3 (1.5)	0	2 (66.66)	1 (33.33)	0	0

Table 2. Age-Wise Distribution of Nutritional Deficiency Co-Morbidities in the Study Population

Outcomes		No. of Cases	Percentage (%)
Discharged	Recovered	87	43.5
	Non-Recovered	95	47.5
Defaulters		14	7
Deaths		4	2
Total		200	100

Table 3. Outcomes in Study Population

DISCUSSION

In present study, Severe Acute Malnutrition was more common among male children (59%) as compared to female children (41%), as reported by previous study,^{10,11,12} however in certain studies female were more affected than male.^{13,14,15}

In our study severe acute malnutrition was more common among 12-23 months age group followed by 6-11 months, this finding was similar to previous studies,^{16,13,11}

however in certain studies higher prevalence is reported in the age group of 6 months to 1 years.¹⁷

In present study, non-oedematous malnutrition (89.5%) was more common than oedematous malnutrition (10.5%), this finding was similar to previous studies,^{16,18} however in another study Kwashiorkor was the most common type of severe acute malnutrition,¹² and majority of families belonged to lower socio-economic status,^{10,17}

In present study, 36.5% had acute gastroenteritis and 26.5% had acute respiratory tract infections. Tuberculosis was diagnosed in 21.5% of cases. Malaria and Measles were diagnosed in 5% and 2% cases, respectively. HIV infection was seen in 2.5% cases. Signs of vitamin B and vitamin A deficiency were seen in 7% and 8.5% cases, respectively. Measles was not found to be major co-morbid conditions. Anaemia and Vitamin D deficiency were two most common Micronutrients deficiencies associated with malnutrition in our study, similar finding was also reported by previous study¹³. Similar proportion of diarrhoea and acute respiratory tract infection as a comorbidity also reported by previous study,^{12,15} however in a previous study acute respiratory infection was the most common (37.3%) co-morbidity followed by acute gastrointestinal infection.¹⁸ Significant numbers of children were having urinary tract infections. Tuberculosis and Pyogenic skin infections were diagnosed in 23% and 14.7% cases respectively, which was comparable to our study (21.5% and 14%). Anaemia and Vitamin A deficiencies were found in 87% and 28% of children respectively but data from our hospital showed a comparatively greater incidence (95% and 34%).

In our study 43.5% were discharged after target weight gain, 47.5% were discharged without target weight gain, 7% were defaulters and 2% were expired. This finding was similar to previous study.¹¹ In study of Bhandari et al. 1981¹³ Improvement in nutritional status was observed in 62.35%, there was no change in 27.85%, while 1.78% deteriorated, 2.93% died and 5.89% left the area at the end of study year. In study conducted by Mahgoub and Adam, 2012, 5.5% of children died, 21.6% discharged against medical advice and 72.8% were discharged, of the children who died 18.0% had septicaemia followed diarrhoea and respiratory tract infections. The strongest and most consistent relation between malnutrition and an increased risk of death was observed for diarrhoea and acute respiratory infection.

CONCLUSION

Malnutrition is associated with various co-morbidities and poor outcomes, timely identification and treatment of these co-morbidities like Diarrhoea, Acute respiratory tract infection, Tuberculosis, Anaemia and Micronutrient deficiencies is vital in malnourished children, so as to break under nutritional-disease cycle, and to decrease mortality and to improve outcome.

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