ORIGINAL RESEARCH

Evaluation of risk factors for severe acute malnutrition

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ABSTRACT

Background: Severe Acute Malnutrition (SAM) is a critical condition that affects children, typically under the age of five, and is characterized by a very low weight-for-height ratio, visible severe wasting, or the presence of nutritional edema. The present study was conducted to assess risk factors for severe acute malnutrition. **Materials & Methods:** 75 children with SAM of both genders were selected. Parameters such as residence, maternal education, socio economic status, immunization status, feeding practices etc. was recorded. **Results:** Age group 6-12 months had 12, 1-2 years had 26, 2-3 years had 28 and 3-5 years had 9 patients. There were 45 male and 30 female. Residencewas rural in 32 and urban in 43 cases. Maternal education was illiterate in 25, primary in 30, high in 12 and graduate in 8 cases. Socio economic status was upper in 21, middle in 25 and lower in 29 cases. The difference was non- significant (P> 0.05). Etiology was acute gastroenteritis in 8, measles in 7, sepsis in 6, ARTI in 13, hypoglycaemia in 7, hypokalaemia in 12 and iron deficiency anaemia in 22 cases. Immunization status was completed in 21, not completed in 38 and non- immunized in 16 cases. Feeding practices was breastfeeding in 45, animal milk in 20 and formula feed in 10 cases. The difference was significant (P< 0.05). **Conclusion:** The risk variables for SAM were determined to include maternal education, lower socioeconomic position, joint family, and vaccination status. All community healthcare facilities should regularly conduct screenings to identify SAM children early. **Keywords:** Severe Acute Malnutrition, breastfeeding, gastroenteritis

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INTRODUCTION

Under rnutrition remains a leading cause of childhood morbidity and mortality in India and in many parts of the world, and thus, the World Health Organization (WHO) has launched the United Nations Decade of Action on Nutrition, 2016-2025¹. Over the past decade India's record of high economic growth has not transformed nutritional status of its population to the necessary extent: latest research shows that despite doubling the rate of stunting reduction in the past 10 years from the previous decade, India still has the largest share of the world's undernourished population².Severe acute malnutrition (SAM) is defined by a very low weight for height (below -3zscores of the median WHO growth standards), by visible severe wasting, or by the presence of nutritional edema³. Severe Acute malnutrition remains a major cause of mortality in children with severe wasting- a widespread form of SAM is nine times higher than those in well-nourished children⁴. India's fourth National Family Health Survey (NFHS-4) indicates that the prevalence of severe wasting is 7.5%⁵

Severe Acute Malnutrition (SAM) is a critical condition that affects children, typically under the age of five, and is characterized by a very low weight-for-height ratio, visible severe wasting, or the presence of nutritional edema.⁶ It occurs when a child has an insufficient intake of nutrients, either due to inadequate food or an underlying health issue, leading to an extreme deficiency in essential vitamins, minerals, and energy. SAM is a life-threatening condition that requires urgent treatment.⁷

Causes are inadequate food intake both in terms of quantity and quality.Conditions like diarrhea, pneumonia, and malaria can aggravate or trigger malnutrition by increasing nutrient needs and reducing appetite.Insufficient breastfeeding, improper weaning, or a lack of healthcare can lead to SAM.⁸In areas with limited access to food, children are at a higher risk.Extreme wasting, with a weight-for-height measurement well below the median, or nutritional edema are characteristics of the condition. The child's weight being significantly lower than what is normal for their height. It indicates recent, severe weight loss.⁹ Mid- upper arm circumference (MUAC)less than 115 mm is often used as a quick screening tool

for identifying SAM. Swelling in both feet due to a lack of protein in the diet (kwashiorkor) is another indicator. Lethargy, loss of appetite, and weakened immunity, making the child vulnerable to infections. SAM is a priority for global health initiatives since it affects millions of children under five, according to the World Health Organization (WHO).¹⁰The present study was conducted to assess risk factors for severe acute malnutrition.

MATERIALS & METHODS

The study was carried out 75 children with SAM of both genders. All gave their written consent to participate in the study. Children between 6 months to 5 year of age with severe acute malnutrition (as per WHO criteria) admitted in department of Pediatrics. Severe acute malnutrition among children (6-59 month of age) is defined by WHO and UNICEF as

RESULTS

 Table I: Baseline parameters

any of the following.1

1. Weight for height below - < 3 SD of the median WHO growth reference.

2. Visible severe wasting.

was considered significant.

- 3. Presence of bipedal pitting oedema.
- 4. Mid upper arm circumference below 11.5 cm.

Exclusion criteria :

1. Children having congenital malformation

2. Parents/ guardians not willing to participate in present study.

Data such as name, age, gender etc. was recorded. Parameters such as residence, maternal education, socio economic status, immunization status, feeding practices etc. was recorded. Results thus obtained were subjected to statistical analysis. P value < 0.05

Parameters	Variables	Number	P value
Age group (years)	6-12 months	12	0.36
	1-2 years	26	
	2-3 years	28	
	3-5 years	9	
Gender	Male	45	0.05
	Female	30	
Residence	Rural	32	0.17
	Urban	43	
Maternal education	Illiterate	25	0.03
	Primary	30	
	High	12	
	Graduate	8	
Socio economic status	Upper	21	0.79
	Middle	25	
	Lower	29	



Figure-1-Age Distribution



Figure-2- Gender Distribution

Table I and Figure 1 show that age group 6-12 months had 12, 1-2 years had 26, 2-3 years had 28 and 3-5 years had 9 patients. As in Table 1 and Figure 2, There were 45 male and 30 female. Residence was rural in 32 and urban in 43 cases. Maternal education was illiterate in 25, primary in 30, high in 12 and graduate in 8 cases. Socio economic status was upper in 21, middle in 25 and lower in 29 cases. The difference was non-significant (P> 0.05).

Table II: Etiology	and imn	nunization	status,	and fo	eeding	practices
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Parameters	Variables	Number	P value
Etiology	Acute gastroenteritis	8	0.02
	Measles	7	
	Sepsis	6	
	ARTI	13	
	Hypoglycaemia	7	
	Hypokalaemia	12	
	Iron deficiency anaemia	22	
Immunization status	Completed	21	0.05
	Not completed	38	
	Non- immunized	16	
Feeding practices	Breastfeeding	45	0.82
	Animal milk	20	
	Formula feed	10	



Figure-3—Etiology of the cases

Table II, Figure 3 shows that etiology was acute gastroenteritis in 8, measles in 7, sepsis in 6, ARTI in 13, hypoglycaemia in 7, hypokalaemia in 12 and iron deficiency anaemia in 22 cases. Immunization status was completed in 21, not completed in 38 and non- immunized in 16 cases. Feeding practices was breastfeeding in 45, animal milk in 20 and formula feed in 10 cases. The difference was significant (P< 0.05).

DISCUSSION

Nutrition is fundamental to health and well-being and is necessary for personal development. Children in more at risk preschool are for nutritional deficiencies.11,12 Their nutritional health in adolescence and adulthood is influenced by the food they are given throughout the first five years of life, in addition to having an impact on their growth and development at this crucial time.¹³ One preventable and curable cause of childhood sickness and mortality is severe acute malnutrition (SAM).^{14,15}The present study was conducted to assess risk factors for severe acute malnutrition.

We found that age group 6-12 months had 12, 1-2 yearshad 26, 2-3 years had 28 and 3-5 years had 9 patients. There were 45 male and 30 female. Residencewas rural in 32 and urban in 43 cases. Maternal education was illiterate in 25, primaryin 30, high in 12 and graduate in 8 cases. Socio economic status was upper in 21, middle in 25 and lower in 29 cases. Kyasa et al^{16,17} aimed to identify key clinical and demographic risk factors associated with Severe Acute Malnutrition in children aged 6 to 59 months. A total of 110 children diagnosed with SAM, based on WHO criteria, were enrolled. Data collection involved a structured questionnaire addressing demographic clinical histories, and household profiles, characteristics. The study found that low parental education, large family size, and low socioeconomic status were significant demographic risk factors for SAM. Clinically, a history of recurrent infections, immunization coverage, and inadequate poor breastfeeding practices were strongly associated with SAM. Multivariate analysis indicated that recurrent infections and low socioeconomic status were the most significant predictors of SAM

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outcomes. One hundred and eighty-three (92.4%) children were cured and discharged and 15 (7.6%) children died in that study. Anemia (86.11%) the common micronutrient deficiency associated with malnutrition in our study, and this is consistent with the previous reports by Kumar et al.¹⁹ (88.3%), Suman RL et al.²⁰ (74%). In our study out of 144 children 123 (85.4%) children discharged successfully, while defaulter case were 15 (10.4%) and total no. of death was 6 (4.1%). In a another study by Dhanalakshmi K^{21} shows cure rate 81% death rate 6.52% and defaulter 12.09%. While Rajendra P Nagar²² shows 84% discharged rate and 1.3% mortality, which is very near to our study. The Indian government and a number of nongovernmental organizations (NGOs) are currently implementing various initiatives that address SAM across the country. Although the principal strategy being deployed remains inpatient care through Nutritional Rehabilitation Centres and Malnutrition Treatment Centres, there is a growing consensus within India that the adoption of communitybased management of acute malnutrition (CMAM) is crucial to achieving widespread effective coverage and treatment of all children with SAM. Undernutrition generally decreases with increasing mother's schooling, better nutritional status of the mother, an²³d larger child's size at birth. Stunting and underweight are higher in rural areas than in urban areas.²⁴ Malnutrition and infection often makes vicious cycle. Prevention and appropriate treatment of diarrhea, Pneumonia, TB, Measles and other infections in infancy are important to reduce malnutrition rates. Also, prevention and timely treatment of severe malnutrition significantly reduce the incidence of infectious diseases in children. Infectious diseases like diarrhea. Pneumonia, TB and other infections are more common in malnourished children than their well- nourished counterparts

CONCLUSION

Authors found that the risk variables for SAM were determined to include maternal education, lower socioeconomic position, joint family, and vaccination status. All community healthcare facilities should regularly conduct screenings to identify SAM children early.

REFERENCES

- 1. World Health Organization. *Healthier, fairer, safer: the global health journey, 2007–2017.* World Health Organization, 2017.
- Achadi, Endang, Arti Ahuja, Mohamed Ag Bendech, Zulfiqar Ahmed Bhutta, Luz Maria De-Regil, Jessica Fanzo, Patrizia Fracassi *et al. Global Nutrition Report: From Promise to Impact: Ending Malnutrition by* 2030. International Food Policy Research Institute, 2016.
- 3. WHO. Guideline: Updates on the Management of Severe Acute Malnutrition in Infants and Children. Geneva: World Health Organization; 2013.
- 4. Singh K, Badgaiyan N, Ranjan A, Dixit HO, Kaushik A, Kushwaha KP *et al.* Management of children with

severe acute malnutrition: Experience of nutrition rehabilitation centers in Uttar Pradesh, India. Indian Pediatr. 2014 Jan 1;51(1):21

- National Family Health Survey-4, India Fact Sheet, 2015-2016, International Institute for Population Sciences, Mumbai.
- Sharma SD, Sharma P, Jamwal A, Saini G. Profile of children with severe acute malnutrition. Int J Sci Study. 2019;7(2):38-42.
- Shah RH, Bakul B. Javdekar. Management of children with severe acute malnutrition: Experience of nutrition rehabilitation centre at Baroda, Gujarat. Int J Contemp Pediatr. 2014;1(1):3-6.
- Goyal S, Agarwal N. Risk factors for severe acute malnutrition in Central India. Inter J Medical Sci Res Prac. 2015;2(2):70-2.
- Syed TA, Naik SA, Wasim RA, Saleem R. Demographic, clinical profile of severe acute malnutrition and our experience of nutrition rehabilitation centre at children hospital Srinagar Kashmir. Int J Contemp Pediatr. 2015; 2(3):233-7.
- David SM, Pricilla RA, Paul SS, et al. Risk factors for severe acute malnutrition among children aged 6-59 months: a community - based case -control study from Vellore, Southern India. J Family Med Prim Care 2020;9 (5): 2237-2243.
- Patil BM, Patil S, Mangshetty R, Boralkar PP. Severe acute malnutrition (SAM): a vicious socio-economic problem in South India. Paed Edu Res. 2020;8(2):57-65.
- UNICEF. Fact sheet: Breastfeeding: a mother's gift, for every child, 2018. Available at: https://www.unicef.org/publications/index_102 824.html. Accessed on 28 April 2021. 11. WHO. Fact sheet: Exclusive breastfeeding for six months best for babies everywhere, 2011. Available at: http://www.who.int. Accessed on 28 April 2021.
- Baskaran VM, Naaraayan SR, Priyadharishini D. Comorbidities in children hospitalized with severe acute malnutrition. Indian J Child Health. 2018;5(8):530-2.
- 14. Adimasu M, Sebsibie G, Abebe F, et al. Recovery time from severe acute malnutrition and associated factors among under-5 children in Yekatit 12 Hospital, Addis Ababa, Ethiopia: a retrospective cohort study. Epidemiol Health 2020;42:2020003.
- Kumar R, Singh J, Joshi K, Singh HP, Bijesh S. Comorbidities in hospitalized children with severe acute severe malnutrition. Indian Pediatr. 2014;51(2):125-7.
- Choudhary M, Sharma D, Nagar RP, Dutt B, Nagar T, Pandita A. Clinical profile of severe acute malnutrition in western Rajasthan: A prospective observational study from India. J PediatrNeonat Care. 2045;2(1):00057.
- Sai BrigishaKyasa, Kyasa Srinivas. Study of Risk Factors for Severe Acute Malnutrition with Respect to Clinical and Demographic Profile. International Journal of Pharmaceutical and Clinical Research 2024; 16(9); 169-174.
- Das K, Das S, Mohapatra S, Swain A, Mohakud NK. Risk and adverse outcome factors of severe acute malnutrition in children: a Hospital-Based Study in Odisha. Cureus. 2021 Sep;13(9).
- 19. Kumar R, Singh J, Joshi K, Singh HP, Bijesh S. Comorbidities in hospitalized children with severe acute malnutrition. Indian Pediatr. 2014;51:125

- 20. Suman RL, Sharma BL, Meena P, Kumar N. Clinicolaboratory profile and outcome of edematous severe acute malnutrition in children aged 6 months to 5 years. Int J Contemp Pediatr 2016;3:954-9.
- 21. Dhanalakshmi K., Devi CG. The outcome of severe acute malnutrition children admitted to Nutrition Rehabilitation Centre of a tertiary level care hospital. Int J Contemp Pediatr 2017;4:801-3.
- 22. Nagar RP, Nagar T, Gupta BD. Treatment outcome in patients with severe acute malnutrition managed with protocolised care at malnutrition treatment corner in Rajasthan, India: a prospective observational study (quasiexperimental). Int J Res Medical Sci. 2016;4(1):238-45.
- 23. Evaluation of Community Management of Acute Malnutrition (CMAM): Global Synthesis Report, United Nations Children's Fund, New York, 2013.
- International Institute for Population Sciences (IIPS) and ICF. 2017. National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS.