

Original Research

Risk factors for severe acute malnutrition in Central India

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ABSTRACT

Aim: To identify risk factors for severe malnutrition in children <5 years age. **Background:** Severe acute malnutrition (SAM) is a major cause of childhood morbidity and mortality in our country. However, little information is available on determinants of SAM. **Materials and Methods:** This was a prospective study done over a period of one year at a tertiary care hospital. Children under five years of age with SAM were enrolled, and the risk factors leading to malnutrition were identified. **Results:** The risk factors contributing to malnutrition were poor socioeconomic status, parental illiteracy, overcrowding, lack of immunization, lack of awareness among caregivers regarding appropriate child feeding practices. **Conclusion:** To decrease the prevalence of malnutrition, it is essential to provide education to caregivers about appropriate feeding practices.

Keywords: India, risk factors, severe acute malnutrition

INTRODUCTION

Severe acute malnutrition (SAM) remains a major killer of young children with mortality rates in preschool-aged children with severe wasting (weight-for-length/height z-score <-3SD from WHO standards median) being nine times higher than in well-nourished populations.¹ Globally, 17.3 million children, or 2.6% of the pre-school aged children, were severely wasted in 2012.² With a national prevalence of severe wasting of 6.8%, or approximately 8.4 million children, India is home to about half the total. The prevalence of malnutrition varies across states with Madhya Pradesh recording the highest rates (55%) and Kerela among the lowest (27%). SAM is an important contributor of under-five mortality.³ However, little information is available on risk factors for SAM, especially non-dietary ones. Mother's formal education, nutrition, her knowledge about infant feeding practices, working status, family beliefs, socioeconomic status, and any underlying infections or illnesses from which the child may be suffering have impact on overall nutrition and weight gain. The aim of this study was to determine the risk factors for SAM.

MATERIALS AND METHODS

This prospective study was done at a tertiary care center over a period of 1 year. Children <5 years of age with SAM

were enrolled. SAM was defined as per WHO definition of weight for height <70% with or without bilateral symmetrical edema, or a mid-upper arm circumference <110 mm in children age 1-5 years. WHO growth standards were used as reference criteria for expected weight and height.⁴ A total of 38 children were enrolled. The data were collected using structured questionnaire and information was collected on important demographic characteristics, knowledge and practice on nutrition from the immediate caregivers, which were usually the mothers. Immunization status of the children was assessed looking at vaccination card or asking the mother (caregiver). Completed immunization status according to the national program within 1 month after the recommended time qualified as "adequate immunization." Immunization that was either incomplete or delayed by more than a month according to the national program was classified as "not adequately immunized." Socioeconomic status was assessed using modified Kuppaswamy's scale.

RESULTS

The age of enrolled subjects ($n = 38$) ranged from 6 months to 27 months. The mean age was 13 months. Of the 38 subjects, 19 (50%) were between 6 and 12 months, 13 (34%) were between 13 and 24 months and 6 (16%) were

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more than 2-years-old. 32 (84%) children were male and 6 (16%) were females. 30 (79%) had severe wasting without edema and 8 (21%) had edematous malnutrition. The weight of study subjects ranged from 4.2 kg to 7 kg. The mean weight of children between 6 months to 1 year of age was 4.7 kg, between 1 to 2 years was 5.8 kg and in children more than 2 years age was 5.8 kg. The length of enrolled children ranged from 53 cm to 78 cm. The mean length was 61 cm in 6-12-month-old children, 65 cm in children between 1 and 2 years of age and 68 cm in children more than 2 years. The mean mid-upper arm circumference was 95 mm. 15 (39.5%) children had an illiterate father and 23 (60.5%) children had an illiterate mother. 7 (18.4%) children were unimmunized, 27 (70.9%) were not adequately immunized and 4 (10.5%) were adequately immunized (Table 1). The majority (73.6%) of caregivers were not aware of the child's nutritional status and appropriate feeding practices. Only 10 (26.3%) caregivers were aware of child's nutritional status. The per capita income was calculated and modified BJ Prasad classification was used to ascertain the socioeconomic status of the family. The majority (48%) belonged to Class IV and 16% belonged to Class V of this classification. 22 (60%) lived in joint and 16 (40%) lived in nuclear families (Table 2).

Table 1: Age and immunization distribution of study subjects

Variable	Males (%)	Females (%)
Age		
<6 months	2 (5.2)	
6-12 months	14 (36.8)	3 (7.8)
13-24 months	11 (28.9)	2 (5.2)
25-36 months	5 (13.1)	1 (2.6)
Immunization status		
Unimmunized	7 (18.4)	0
Adequately immunized	4 (10.5)	0
Inadequately immunized	21 (55.2)	6 (15.7)

Table 2: Social and dietary factors attributing to SAM

Variable	Number	Percentage
Maternal illiteracy	23	60.5
Paternal illiteracy	15	39.4
Socioeconomic status as per BJ Prasad classification		
Class I	6	15.7
Class II	4	10.5
Class III	6	15.7
Class IV	17	44.7
Class V	6	15.7
Type of family		
Joint	22	60
Nuclear	16	40
Awareness of malnutrition		
Yes	10	26.3
No	28	73.6
Timely initiation of complementary feeding		
Not initiated	10	26.3
Initiated between 6 and 12 month of age	19	50
Between 1 and 2 years	5	13
After 2 years	4	10.5

SAM: Severe acute malnutrition

Of total ($n = 38$) 30 (79%) children received breastfeeding and 8 (21%) did not breast feed at all. 10 (26.3%) were exclusively breast fed and complementary feeds not given at all. 8 (21%) did not receive breast milk and were given diluted animal milk since birth. 18 (47.3%) were predominantly breastfed and were occasionally given diluted milk with little amount of sugar. The time of initiation of complementary feeding ranged from 6 months to 2 years. Complementary feeds were not initiated in 10 (26.3%) children. In 19 (50%) children complementary feeding in the form of diluted milk, tea and biscuits were started between 6 month to 1 year of age. In 5 (13%) of study subjects, complementary feeds was started between 1 and 2 years of age and in 4 (10.5%) top feeds were initiated after 2 years of age.

DISCUSSION

Malnutrition is a multidimensional entity. The nutritional status of under-five children is affected by the different spectrum of factors. This study aims at identifying determinants of SAM in under-five children.

In our study, 84.2% (32) patients were males and 15.8% (6) were females. In Indian scenario, this could be explained due to community gender bias, as a result parents or caregivers do not prefer to seek medical care for the girl child. The rate of illiteracy among parents was very high in our study. 39.4% fathers and 60.6% mothers were illiterate. Under-five children whose mother was illiterate is more likely severely wasted than those children having a literate mother. Parental illiteracy is found to be associated with a higher risk of SAM.^{5,6} In a case-control study in Bangladesh, the maternal illiteracy was associated with a fourfold increase in the risk of SAM in their children.⁷

In our study, maximum children lived in poor socioeconomic conditions. Similarly, poor family income has been found as a risk factor for SAM in previous studies.⁸⁻¹⁰

A community-based study was done in Jimma, Ethiopia showed that children with malnutrition lived in a household with low monthly income.¹¹ In our study, majority of children were not completely immunized. Some studies shown that failure to complete immunization were associated with SAM.^{12,13} Majority of our patients lived in the joint family. The effect of a large family size with overcrowding and inadequate spacing has been implicated as a risk factor for SAM in different studies.^{14,15}

As a global public health recommendation, infants should be exclusively breastfed for the first 6 months of life to achieve optimal growth, development, and health. Thereafter to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to 2 years of age or beyond.¹⁶ In our study, 8 (21%) children were administered diluted milk since birth and breastfeeding not done at all. Breastfeeding was given for <6 months in 13% (5), for 7-12 months in 50% (19) children. 13% (5) children received breast milk in the 2nd year and in 3% (1) child breastfeeding was continued till 27 months of age. Complementary feeding was initiated between 6 and 12 months of age in 50% of

children. In 13% (5) children complementary feeding was first initiated between 1 and 2 years and in 11% (4) children it was started beyond the 2nd year. In 10 (26%) children, complementary feeding was not initiated. Complementary feeding was ineffective. About 73% children were being administered diluted milk (buffalo/goat) without sugar. The possible reasons for inadequate complementary feeding may be unawareness, financial problems, concept that undiluted milk leads to diarrhea. Children having sub-optimal frequency of complementary feeding are more likely to have poor nutrition. This result is consistent with many studies conducted in Ethiopia, Africa and globally.¹⁷ The finding of this study also supports one of the health sector policy of strengthening infant and young child feeding practices to prevent child mortality.

CONCLUSION

Malnutrition is a sociocultural problem. Poor socioeconomic status, parental illiteracy and lack of knowledge about appropriate feeding practice contribute towards severe malnutrition. To reduce the prevalence of malnutrition, these social issues need to be addressed.

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PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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REFERENCES

1. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, *et al.* Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet* 2013;382:427-51.
2. United Nations Children's Fund. World Health Organization.

- The World Bank. UNICEF-WHO-The World Bank: 2012 Joint Child Malnutrition Estimates – Levels and Trends. New York, Geneva, Washington, DC: UNICEF,WHO, The World Bank; 2013.
3. International Institute for Population Sciences (IIPS) and Macro International. National Family Health Survey (NFHS-3), 2005-2006. Mumbai, India: International Institute for Population Sciences; 2007.
4. World Health Organization. Management of Severe Malnutrition: A Manual for Physicians and Other Senior Health Workers. Geneva, Switzerland: World Health Organization; 1998.
5. Haidar J, Abate G, Kogi-Makau W, Sorensen P. Risk factors for child under-nutrition with a human rights edge in rural villages of North Wollo, Ethiopia. *East Afr Med J* 2005;82:625-30.
6. Rikimaru T, Yartey JE, Taniguchi K, Kennedy DO, Nkrumah FK. Risk factors for the prevalence of malnutrition among urban children in Ghana. *J Nutr Sci Vitaminol (Tokyo)* 1998;44:391-407.
7. Islam MA, Rahman MM, Mahalanabis D. Maternal and socioeconomic factors and the risk of severe malnutrition in a child: A case-control study. *Eur J Clin Nutr* 1994;48:416-24.
8. Jeyaseelan L, Lakshman M. Risk factors for malnutrition in south Indian children. *J Biosoc Sci* 1997;29:93-100.
9. Odunayo SI, Oyewole AO. Risk factors for malnutrition among rural Nigerian children. *Asia Pac J Clin Nutr* 2006;15:491-5.
10. Coulter JB, Omer MI, Suliman GI, Moody JB, Macfarlane SB, Hendrickse RG. Protein-energy malnutrition in northern Sudan: Prevalence, socio-economic factors and family background. *Ann Trop Paediatr* 1988;8:96-102.
11. Getaneh T, Assefa A, Tadesse Z. Protein-energy malnutrition in urban children: Prevalence and determinants. *Ethiop Med J* 1998;36:153-66.
12. Owor M, Tumwine JK, Kikafunda JK. Socio-economic risk factors for severe protein energy malnutrition among children in Mulago Hospital, Kampala. *East Afr Med J* 2000;77:471-5.
13. Mishra K, Kumar P, Basu S, Rai K, Aneja S. Risk factors for severe acute malnutrition in children below 5 y of age in India: A case-control study. *Indian J Pediatr* 2014;81:762-5.
14. Yimer G. Malnutrition among children in Southern Ethiopia: Levels and risk factors. *Ethiop J Health Dev* 2000;14:283-92.
15. Solomon A, Zemene T. Risk factors for severe acute malnutrition in children under the age of five: A case-control study. *Ethiop J Health Dev* 2008;2:22-5.
16. World Health Assembly Resolution. Infant and Young Child Nutrition. WHA 54.2, 2001. www.who.int/gb/archive/pdf_files/WHA54/ea54r2.pdf. [Last accessed on 2015 Apr 21].
17. Radebe BZ, Brady P, Siziya S, Todd H. Maternal risk factors for childhood malnutrition in the Mazowe District of Zimbabwe. *Cent Afr J Med* 1996;42:240-4.

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