Original Research Article

Demographic and clinical profile of children with severe acute malnutrition: an experience from nutritional rehabilitation centre in South Kashmir

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ABSTRACT

Background: Malnutrition is significant contributor of childhood morbidity and mortality in developing countries. More than 1/3rd of world's severely malnourished children live in India. The aim was to evaluate the clinical-epidemiological profile and co-morbidities of SAM (severe acute malnutrition) children and to recognize socio-demographic risk factors of SAM children.

Methods: It was a prospective hospital based case study. The prospective hospital based study was conducted from September 2018 to February 2020 and included children less than 5 years admitted to an paediatrics ward and satisfying the WHO definition of SAM. Data were entered in Microsoft excel sheet and SPSS software version 16 for windows was used for analysis.

Results: 112 patients were taken for study. Mean age of admitted children were 16±3 months. Male:female ratio was 1:1.22. SAM is more common in nuclear families (N=67, 59.83%), illiterate mothers (N=72, 62.48%), children with high birth order more than 3 (N=42, 37%) and low socioeconomically status Kuppaswamy IV (N=72, 64.28%). The most common associated infections were acute gastroenteritis (82.14) and respiratory tract infections (54.20%). Hypoglycaemia (14.28) was the most common metabolic complication. The most commonly used supplementary food used was over diluted cow milk (43.67%).

Conclusions: The problem of SAM is multifactorial (rural background, low socioeconomic status, maternal illiteracy, incomplete immunization). The findings of this study confirm the association of severe acute malnutrition with appropriate infant and young child feeding practices. NRCS provide life-saving care for children.

Keywords: SAM, NRC, WHO

INTRODUCTION

Childhood undernutrition remains a key public health challenge in India and is a significant contributor to under-5 mortality. Nutritional rehabilitation centers have been set up by the government of India at a facility level to provide medical and nutritional care to SAM children

under the age of 5 years who have a medical complication.¹ Of the 19 million SAM children in developing countries, eight million (42%) are in India. National family health survey-4 (NFHS-4) reported that the prevalence of underweight, stunting and wasting among under-five is 35.7%, 38.4% and 21% respectively at the national level.² According to NFHS-5 prevalence of

underweight, stunting and wasting are 21%, 26.9% and 19% respectively in Jammu and Kashmir. Around 6.4% suffer from SAM. SAM children have high mortality ranging from 20%-30%. Malnutrition is not a direct cause of death among children under 5 years, however, it increases mortality and morbidity by reducing resistance to infections. The prevalence of malnutrition varies across states like Madhya Pradesh recording the highest rate (55%) and Kerala among the lowest (27%).^{1,2} For monitoring malnutrition among children (0-6 years of age prime ministers outreach scheme for holistic nutrition (Poshan Abiyan) has been launched under which near real-time monitoring is done through ICDS-CAS mobile-based software application, which enables identification of malnutrition children based on auto plotting of growth charts.¹⁵

In the early 1990s, the mortality rate in SAM was as high as 49%, which is now reduced due to trained staff and the presence of standardized WHO guidelines for the management of SAM.³ Considering the high mortality rate among malnourished children in India, the Indian academy of pediatrics (IAP) undertook the task of developing guidelines for the management of SAM based on adaptation from the WHO guidelines in the year 2006. If these guidelines are carefully followed, the mortality rate can be brought down to <5%, even in areas with a high prevalence of HIV/AIDS.⁴ The government of India has initiated various programs to combat the challenges of malnutrition in the country. Nutritional rehabilitation centres (NRCs) have been set up at the facility level to provide medical and nutritional care to severely acutely malnourished children under the age of 5 years who have medical complications. Recovery rates in inpatient facilities to treat SAM children (NRCs) varied from state to state ranging from 37.1% to 65%.³ In these centers, children with SAM receive therapeutic care following protocols based on the guidelines for the management of SAM by the IAP and WHO. Besides, counselling of the mothers/caregivers is done regarding proper feeding and once they are on the road to recovery, they are sent back home with regular follow up.⁵ As a part of this initiative of the government of India, one such centre was established in maternity and child care hospital (MCCH) hospital, government medical college, Anantnag, where the children with severe malnutrition from the whole of South Kashmir were treated.

Aims and objectives

The aim and objective of this study was to evaluate the clinico-epidemiological profile, complications and co-morbidities of SAM children and to identify socio-demographic risk factors of SAM.

METHODS

Our study was a prospective hospital based study. The present study was conducted in NRC located at MCCH hospital, associated hospital of government medical

college, Anantnag from September 2018 to February 2020. All the children up to 60 months of age admitted to NRC during the study period were included in the study.

The criteria for admission for inpatient treatment in an NRC

Inclusion criteria for 6 months to 5 years age group

Patients with weight for length/height ≤ 3 standard deviation (SD); bilateral pedal edema; mid-upper arm circumference <11.5 cm were included in the study.⁵

Patient with any of the complications like anorexia (loss of appetite); fever (39°C) or hypothermia; persistent vomiting; severe dehydration base; not alert, very weak, apathetic, unconscious, convulsions; hypoglycaemia; severe anaemia (severe pal mar pallor) VIII; severe pneumonia; extensive superficial infection requiring intramuscular medications; any other general sign that a clinician thinks requires admission for further assessment were included.

Infants 6 Months criteria for SAM

Infant is too weak or feeble to suck effectively (independently of his/her weight for length) or weight for length ≤ 3 SD (in infants >45 cm) or visible severe wasting in infants <45 cm or presence of edema on both feet were the criteria for 6 months infant for SAM.

At NRCs children with SAM receive therapeutic care following protocols based on the guidelines for the management of SAM by the IAP and the WHO.⁵⁻⁷ Children were discharged from the NRC when they met the following discharged criteria: the child was active or alert; the child had no signs of bilateral pitting edema, fever and/or infection; the child had completed all age-appropriate immunizations; the child was being fed 120-130 kcal/kg weight/day and the primary caregiver knew the care that the child needed to receive at home. The data were entered into a Microsoft excel spreadsheet and results were calculated by percentages.

RESULTS

In the present study a total of 112 SAM cases were studied.

Table 1 shows the characteristic features of SAM children showing SAM is more common in female (N=65, 64.46%) patients in all age groups from 6 months to 5 years. SAM is most common age group of 12 months to 24 months (N= 35, 31.81%).

Among the studied patients (N=67, 59.83%) belonged to nuclear families. SAM was common in children with birth order >3 (N=42, 37%) and low literacy rate in mothers (N=72, 64.28%). Exclusive breastfeeding was seen in N=53, 47.32%. Bottle feeding was seen in N=47,

46.05%. Most mothers were using improperly diluted animal milk (Table 2).

Table 3 shows SAM is common in families with low socio economic scale. Kuppaswamy scale was used for socioeconomic status. SAM is most common in lower class (N=72, 64.57%), least common in upper middle class families (N=3, 2.67%).

Table 4 shows SAM is more common in children living in rural areas (N=89, 79.46%) versus urban areas (N=23, 20.53%).

Table 5 shows clinical characterizes of SAM patients. Acute gastroenteritis (N=92, 84.16%) was the most common infection in patients with SAM, followed by acute respiratory infection (N=74, 66.07%). Anaemia (N=64, 54.20%) was the most common comorbidity. Hypoglycemia (N=16, 14.28%) was most common metabolic abnormality.

Table 1: Characteristic features of SAM children.

Age (in months)	Male	Female	Total number (%)
6 -12	13	19	32 (28.57)
12-24	15	20	35 (31.81)
24-36	9	13	22 (19.64)
36-48	6	8	14 (12.50)
48-60	4	5	9 (8.03)

Table 2: Characteristic types of SAM children.

Characteristics	Number	Percent
Family type		
Joint	45	40.17
Nuclear	67	59.83
Birth order of index case in family		
1	25	22.32
2	37	33.00
≥3	42	37.00
Spacing between two children less than 24 months	66	69.00
Immunization status		
Unimmunized	19	16.96
Partially immunized	30	26.78
Completely immunized	63	56.00
Feeding pattern		
Exclusive breastfeeding for 6 months	53	47.32
Bottle feeding		
Formula milk	29	25.89
Animal milk	18	20.16
Education status of the mother		
Illiterate	72	64.28
Primary	21	18.75
Secondary	12	10.71
Higher secondary	7	6.25
College/degree	7	7

Table 3: Socioeconomical class.

Socioeconomical class	Number	Percent
Upper middle	3	2.67
Lower middle	5	4.46
Upper lower	32	28.57
Lower	72	64.57

Table 4: Types of areas.

Types	Number	Percent
Urban	23	20.53
Rural	89	79.46

Table 5: Clinical characterizes of SAM patients.

Characteristics	Number	Percent
Anaemia	64	54.20
Infections		
Acute gastroenteritis	92	82.14
Acute respiratory tract infections	74	66.07
Urinary tract infections	10	8.92
Skin infections	16	14.28
Sepsis	18	16.07
Otitis media	5	4.46
Metabolic disturbances		
Hypokalemia	10	8.9
Hyponatremia	8	7.1
Hypernatremia	6	5.35
Hypoglycaemia	16	14.28
Shock	5	4.46

DISCUSSION

Nutrition is vital for individual growth and the focal point of health and well-being. Preschool children are mainly a nutritionally vulnerable segment of the population. Nutrition during the first five years has an impact not only on growth and development in the growing age group, but also acts as a determinant of nutritional status in adolescent and adult life. SAM is a preventable and treatable cause of childhood mortality and morbidity. In our study, the mean age of admitted patients was 16 ± 3 months. A maximum number of children (approximately 60.38%) were within 6-24 months of age. A similar study by Kumar et al who had reported 59.6% of children in the age group of 6-12 months. Similar study by Choudhary reported most of the cases (96% and 71% respectively) were less than two years.⁶⁻⁷ In the first two years of life, rapid growth and development occur and demands of substrates for energy and building of tissues also rise, thus leading to deficiency of energy, protein and micronutrients often leading to malnutrition. Also, growth and nutritional requirement are maximum during the younger age group. In our study, females were more than males (60.04% versus 42.05%) with a ratio of 1.38:1. A higher number of female patients was also found by Sharma et al (60% versus 40%).⁸ Shah et al and Rao et al also reported that the extent of malnutrition was significantly higher in girls (80%) respectively.^{9,10} All these 3 studies were community-based studies. Syed et al, Choudhary et al and Goyal described higher incidence of malnutrition in males (54.5%, 74.6%, 53.7% and 84.3% respectively in their hospital-based studies.^{7,10,11} They postulated that due to ritual and social norms, parents give more importance and seek medical advice more often for the male child. However, our study,

despite being a hospital-based one, showed a higher number of female patients. In our study, maternal illiteracy rates were 64.28%, 18.75% of mothers studied up to primary school, 10.71% studied up to secondary and only 6.25% studied up to higher secondary and none up to college or degree. Higher illiteracy rates were described by Choudhary (89.3% mothers) and Goyal (60.6% mothers).^{7,10} This was due to regional variations in literacy rates. Joshi et al and Mittal et al described education beyond high school level among 31% and 21.2% of mothers of SAM children, which was similar to our study.¹² We observed that in the enrolled patients, 96.84% patients belonged to lower socio-economic strata (Kuppuswamy scale III, IV, V). Tariq et al and Goyal et al reported 96% and 83.6% patients belonging to lower socio-economic strata.^{10,11} This indicates that poor purchasing power, unavailability of food, improper distributions make the children vulnerable to malnutrition in a deprived community. Among the registered patients 82.14% were residents from the rural areas as compared to 20.53 % from urban strata. These results are consistent with studies done by Sharma et al and Basavaraj et al.^{8,12} Rural kids suffer a lot as a result of poor financial condition, poor maternal education and nutrition, lack of prenatal and newborn care, poor health-promoting activities, inadequate complementary feeding. In 40.47% of cases, the families were joint and in 33.03% cases, the birth order of the affected child was 2 and number of children in family >3 was 37.5 % and birth spacing <24 months in 69% of patients. Prevalence of SAM was 52% in the family having 3 or more children in the study by Choudhary et al. Sharma et al also reported the prevalence of malnutrition to be significantly higher in families having more than 3 children due to lower per capita income and poor childcare practices.^{7,8} 16.96% of

children were unimmunized and 26.78% were partially immunized in our study. The percentages were 42.7% versus 44% and 24% versus 62.3% in studies by Choudhary et al and Syed et al.^{7,11} Exclusive breastfeeding up to 6 months was done in 47.32% cases and 35% with mixed feeding. 46% of mothers practiced bottle feeding. The percentages of exclusive breast feeding, mixed feeding and predominantly bottle feeding were 42.5%, 44% and 24% respectively study by Basvarajan et al comparable to our study.¹³ Over diluted formula milk and cow's milk (56.67%) was the most common top milk supplementation in our study and a high incidence of bottle feeding have been reported by Basavarajan et al (45.5%), Choudhary et al 7 (17.3%) comparable to our studies.^{7,13} As per WHO and UNICEF recommendations, the infant should be exclusively breastfed for 1st six months of life to achieve optimal growth and development. Thereafter to meet their evolving nutritional requirement, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continued up to 2 years of age.^{16,17}

Acute gastroenteritis 82.14% was the most common associated infection followed by acute respiratory tract infections 66.07% in our study comparable to similar studies.^{11,14} The most common metabolic disturbances were hypoglycaemia 14.28% and hypokalemia 8.9% comparable to studies by Sharma et al and Syed et al.^{8,11}

The Government of India is currently strengthening the integrated child development (ICDS) scheme, working on national guidelines on community-based management of severe acute malnutrition in India (CMAM) and allowing controlled use of ready-to-use therapeutic food (RUTF) in various states so that in the years to come, more SAM children can be taken care well at home. However, in a vast country like India where there is a deficiency of community health workers, it would be difficult to monitor domiciliary care, especially in remote areas hence it is vital to continue with the functioning of NRCs.

The most important limitation of our study was lack of information on antenatal data like maternal age, antenatal care and birth weight of baby. Which contribute to SAM to great extent?

CONCLUSION

The problem of SAM is multidimensional and multifactorial. Lower maternal education, nuclear family, low socioeconomically status of family, lack of exclusive breastfeeding, high birth order contribute to SAM. Nutritional rehabilitation centers provide life-saving care for children with severe acute malnutrition.

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