

## A Hospital Based Prospective Study to Evaluate the Clinical Profile & Outcome of Severe Acute Malnutrition (SAM) in Infants Below 6 Months of Age

Vijay Singh<sup>1</sup>, Brajesh Kumar Singhal<sup>2\*</sup>

<sup>1</sup>Senior Specialist & Head, Department of Pediatrics, Government District Hospital, Dholpur, Rajasthan, India

<sup>2</sup>Junior Specialist, Department of Pediatrics, Government District Hospital, Dholpur, Rajasthan, India

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### Abstract

**Background:** Severe acute malnutrition is increasingly being recognized in infants under 6 months of age and is often associated with higher mortality in young infants than in older infants and children. The aim of this study is to identify the clinical profile and primary outcome of severe acute malnutrition as defined by WHO growth reference standards in infants aged below 6 months of age at district hospital in Rajasthan. **Materials & Methods:** A prospective observational study was conducted in the Department of Pediatrics, District hospital, Dholpur, Rajasthan, India during one year period. 30 comprised infants with SAM as defined by current WHO guidelines: weight-for-length Z-score (WLZ) <-3 and/or bilateral nutritional oedema. Exclusions were infants from twin/multiple pregnancies and those with obvious congenital anomalies that could affect feeding (e.g., cleft lip or palate). Detailed clinical examination and anthropometric measurements-weight, height and mid arm circumference was recorded. **Results:** The mean age of admitted patients was  $5.03 \pm 1.18$  months. Majority of the cases, i.e. 24 (80%) were Hindus and among them 18 (60%) were living in rural area. 26 (86.66%) patients belong to lower socioeconomic scale (III, IV & V) and only 4 (13.33%) patients belonged to socioeconomic scale I and II. Fever was the most common presenting complaint in 21 (70%) patients, followed by vomiting in 15 (50%), loose motion in 15 (50%) and loss of appetite or weight loss in 10 (30%) patients. 18 (62.06%) were stunted at this time, and 11 (38%) severely stunted. **Conclusion:** We concluded that many factors such as literacy, income, age of marriage and sanitation facility indirectly or directly influence the nutritional status of infants.

**Keywords:** Clinical Profile, Outcome, Infants, Malnourished, Literacy.

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### Introduction

India is home to greatest population of severely malnourished children in the world and accounts for over 20% of under-five childhood death every year and 2.1 million children in India do not survive to celebrate their fifth birthday[1]. Severe Acute malnutrition remains a major killer of children as mortality rates in children with severe wasting- a widespread form of SAM is nine times higher than those in well-nourished children[2].

Severely malnourished children have a high mortality rate; almost 56% of childhood death is attributed to malnutrition. Optimal management of these acutely ill children and a good outcome depends on an evidence-based regimen of care. Despite concerted efforts in recent years involving policy makers, health care providers and social organisations morbidity and mortality of malnutrition remains a challenge. Severe acute malnutrition (SAM) continues to be an important cause of mortality. In addition to critical care, a nutritional therapy followed by nutritional rehabilitation is a very important aspect for these children[3].

In infants who are under 6 months of age, severe acute malnutrition is defined by a very low weight-for-length or the presence of bilateral pitting oedema. Severe acute malnutrition is increasingly being recognized in infants under 6 months of age and is often associated with higher mortality in young infants than in older infants and children[4]. WHO has developed a set of recommendations for the identification and management of severe acute malnutrition in infants who are under 6 months of age[4]. The aim of this study is to identify the clinical profile and primary outcome of severe acute malnutrition

as defined by WHO growth reference standards in infants aged below 6 months of age at district hospital in Rajasthan.

### Materials & methods

A prospective observational study was conducted in the Department of Pediatrics, District hospital, Dholpur, Rajasthan, India during one year period. 30 comprised infants with SAM as defined by current WHO guidelines: weight-for-length Z-score (WLZ) <-3 and/or bilateral nutritional oedema (WHO, 2013). Exclusions were infants from twin/multiple pregnancies and those with obvious congenital anomalies that could affect feeding (e.g., cleft lip or palate).

### Methods

Detailed clinical history including child's Personal data (age, sex, religion, area, birth weight); Immunization history, developmental history, nutritional history including feeding practices was obtained using a predesigned questionnaire. Modified Kuppaswamy scale was used for scoring socioeconomic class. Detailed clinical examination and anthropometric measurements-weight, height and mid arm circumference was recorded.

### Statistical analysis

Simple distribution of the study variables and the cross tabulation were applied. Student t-test was applied to compare the means of variables. Chi-square ( $\chi^2$ ) was done for statistical significance. Data was analyzed using SPSS 21.0 V software. p-value of <0.05 significant.

### Results

The mean age of admitted patients was  $5.03 \pm 1.18$  months. Majority of the cases, i.e. 24 (80%) were Hindus and among them 18 (60%) were living in rural area. 26 (86.66%) patients belong to lower socioeconomic scale (III, IV & V) and only 4 (13.33%) patients belonged to socioeconomic scale I and II (table 1).

\*Correspondence

**Dr. Brajesh Kumar Singhal**

Junior Specialist, Department of Pediatrics, Government District Hospital, Dholpur, Rajasthan, India.

E-mail: [docbks@yahoo.com](mailto:docbks@yahoo.com)

Fever was the most common presenting complaint in 21 (70 %) patients, followed by vomiting in 15 (50 %), loose motion in 15 (50%) and loss of appetite or weight loss in 10 (30%) patients. Other complaints were oedema in 5 (16.66%), abdominal distension in 2 (6.66%) and rash in 1 (3.33%) patients (Table 2).

Our study showed that eight (24%) infants were suffering from SAM at that time point. In this group, one (3.33%) infant had died, and two

(6.66%) were lost to follow-up. Despite all 30 being referred for inpatient treatment of SAM, only 6 (18%) parents had reported for care and most who did left the hospital before attaining the discharge criteria. 18 (62.06%) were stunted at this time, and 11 (38%) severely stunted (table 3).

**Table 1: Sociodemographic characteristics of the study participants**

Socio-demographic		SAM (N=30)
Age (in months)		5.03±1.18
Sex	Male	10
	Female	20
Area	Rural	18
	Urban	12
Religion	Hindus	24
	Muslims	5
	Others	1
Education	Illiterate	21
	Primary	7
	Higher	2
Socio-economic status	Lower	18
	Upper lower	8
	Lower middle	4
	Upper middle	0
Birth weight	<2.5 kg	21
	≥2.5 kg	9

**Table 2: Distribution according to Presenting Complaints.**

S. No.	Complaints	Number of patient n (%)
1	Fever	21 (70%)
2	Vomiting	15 (50%)
3	Loose motion	15 (50%)
5	Loss of appetite ( Weight loss)	10 (30%)
6	Oedema	5(16.66%)
7	Abdominal Distension	2 (6.66%)
8	Rash	1 (3.33%)

**Table 3: Primary outcome**

S. No.	Primary outcome	Number of patient n (%)
1	SAM (WLZ<3 or oedema)	8 (24%)
2	Not SAM	19 (63.33%)
3	Death ( with malnutrition)	1 (3.33%)
4	Left the community or could not be contacted	2 (6.66%)
5	Stunting (HAZ <-2)	18 (62.06%)
6	Severe stunting (HAZ <-3)	11 (38%)
7	Underweight (WAZ <-2)	18 (62.06%)
8	Severe underweight (WAZ <-3)	11 (38%)

## Discussion

Severe malnutrition is not only an important cause of morbidity and mortality, but also leads to permanent impairment of physical and possibly mental growth of those who survive. In addition to critical care, a nutritional therapy followed by nutritional rehabilitation is a very important aspect for these children. Male to female ratio in our study was 1:2. Similar observations were made by Iqbal et al., in their study done in Bangladesh (240 males and 239 females) and Abate et al, study done in Nairobi, Ethiopia (51.2% were male and 48.8% were female)[5,6].

Majority of cases (60%) reside in rural areas in present study. In rural areas inadequacies in nutrition and health education, nutritional surveillance, nutritional rehabilitation, primary health care, early diagnosis and prompt treatment etc. contribute to and perpetuate malnutrition.

Amsalu S et al in their study found that maternal illiteracy is one of the important risk factors associated with child malnutrition[7]. Studies done by Dhatrik PP et al[8]. at NKP Salve institute of

medical Sciences, Nagpur in and Paramita and Senugupta et al[9] done in Urban slum of Ludhiana have identified maternal education as a significant determinant of child nutrition with illiterate mothers having more underweight children (p=0.004).

This high prevalence was due to lack of awareness about malnutrition in community especially in rural population due to high illiteracy level of mothers and lower socioeconomic status of family. Since NFHS is community based while our study was hospital based and in India parents generally do not seek medical advice for these malnourished children until unless they suffer from some of the acute complications of SAM e.g.diarrhoea, vomiting, bronchopneumonia, fever, convulsion, skin infection etc.

In the index study, majority of the cases (60%) were Hindus and malnutrition was more (86.66%) in rural area. This represents the prevalence of these two communities in local population. Similarly, Malik et al[10]. reported that malnutrition was more in Hindus as compared to Muslims (70.7% v/s 29.2%) but the severity of malnutrition (PEM grade III and IV) was more in Muslims which

may be due to the fact that Muslims has large family size, low literacy level and belonged to low socioeconomic status. Singh et al[11]. and Rao et al[12]. also observed the same.

Females are more likely to be malnourished than males and severity of malnutrition is also more in female children. Similar to our study, Mittal et al[13]. observed that more males (35.29%) were affected with lower grades of PEM (grade I and II) than females (32.85%), where as severe grades of PEM (grade III and IV) were common in females (5.71%) than in males (2.94%).

Out of all severely malnourished patients, 62.06% had stunting; of which 38% were severely stunted. Mittal et al[13]. Also reported that 38.38% had low weight for age whereas 46.06% had low height for age.

Bernalet al[14]. And Bagga et al[15]. in their study also reported diarrhoea and fever as common presenting symptom. Ashraf et al[16]. also reported that diarrhoea (25.8%) and fever/vomiting (30.9%) were the common presenting symptoms in malnourished children, which was similar results found in this present study.

### Conclusion

We conclude that the problem of severe malnutrition is multi-dimensional and inter-generational in nature. The determinants of severe malnutrition includes household food insecurity, illiteracy, low socio economic status, lack of awareness to access health services, large family size and poor purchasing power etc. Besides these, faulty feeding practices, poor complementary feeding practices, ignorance about nutritional needs of infants and young children and repeated infections, also aggravates the malnutrition amongst children.

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