

A study of outcome of common complications of severe acute malnutrition in children (6 month to 5 year) admitted in upgraded Department of Pediatrics PMCH, Patna

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Abstract

Background: India has the highest burden of malnutrition. The National Family Health Survey-IV (2015-16) data has reported that in children below 5 years, 48.3% children are stunted whereas 20.8% are wasted and 43.9% are underweight in Bihar. The mortality rate of children with complicated SAM that receive treatment in inpatient setup has remained unacceptably high. Such high mortality in inpatient units has been attributed to co-morbidities such as infection and micronutrient deficiencies. The current study has been an attempt to observe the prevalence and outcome of common complication of Severe acute malnutrition in hospitalized children between 6 months to 5 years in the patients admitted in department of Pediatrics, PMCH, Patna. **Material and Methods:** Present study was a prospective, observational study conducted in children between 6 months to 5 year of age with severe acute malnutrition (as per WHO criteria) admitted in department of Pediatrics. **Results:** Out of 144 SAM children 69 (47.9%) children belongs to age groups 6-12 month while the average mean age of presentation in study population was 18.94 month. A total of 79 children (54.86%) were male while 65 children (45.14%) were female. A total of 119 cases (82.63%) had their weight for height/length below - 3 SD. 43 cases (30%) had visible severe wasting and 30 cases (20.83%) had bilateral pedal edema. All the SAM cases in study population had MUAC < 11.5 cm (100%). The families of around 78% SAM children belongs to lower socio-economic status (below poverty line) while 22% cases belongs to above poverty line. Diarrhoea (42.4%), pneumonia (34.72%), tuberculosis (29.9 %) and anemia (86.11%) were common complication associated with SAM. Out of Total 144 children 123 children (85.4%) discharged successfully, no. of defaulter case was 15 (10.4%) and total no. of death was 6 (4.1%) respectively. **Conclusion:** Most of the malnourished child are in the age group of 6 to 12 months with poor socio-economic background. Diarrhea and anemia were most common complications followed by Pneumonia and tuberculosis.

Key Words: Outcome, Severe acute malnutrition, Malnutrition treatment center, Nutritional rehabilitation

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INTRODUCTION

The term malnutrition refers to both undernutrition as well as overnutrition. India has the highest burden of malnutrition. The prevalence of underweight in children was higher in India than in any of the other 40 countries, but was only slightly higher than the prevalence in Bangladesh and Nepal.¹ It also observed that malnutrition in India is a concentrated phenomenon.² Bihar is included in these concentrated areas. The National Family Health Survey-IV (2015-16) data has reported that in children below 5 years, 48.3% children are stunted whereas 20.8% are wasted and 43.9% are underweight in Bihar.³ The

mortality rate of children with complicated SAM that receive treatment in inpatient setup has remained unacceptably high.⁴ Such high mortality in inpatient units has been attributed to co-morbidities such as infection and micronutrient deficiencies. Studies were conducted that shows high incidence of diarrhea in SAM children of 49% and 67%.^{5,6} A African study shows 36% of severe PEM has malaria and 45% had Diarrhea. In a previous study malaria and HIV infection were reported as major complication with total prevalence of 21.1 and 29.2%.⁷ In India, however, Diarrhea, respiratory tract infections and TB are most common complication in admitted children with SAM with the prevalence being 33.6%, 27.9% and 22.1 respectively followed by skin infection 18.2%, sepsis 9.6% meningitis (8.6%) malaria 3.8%, measles 3.8%.³ Measles also have severe impact on nutritional status. Another Indian study has showed up to 4% children of SAM have past history of measles.⁸ The current study has been an attempt to observe the prevalence and outcome of common complication of Severe acute malnutrition in hospitalized children between 6 months to 5 years in the patients admitted in department of Pediatrics, PMCH, Patna.

MATERIAL AND METHODS

Present study was a prospective, observational study conducted in upgraded department of Pediatrics, PMCH, Patna. Study period was from March 2017 to September 2018. Present study was approved by ethical committee.

RESULTS

Out of 144 SAM children 69 (47.9%) children belongs to age groups 6-12 month while 45 (31.25%) belongs to age group 13-24 Month and rest 30 (20.9%) children of age group more than 24 month.

Table 1: Prevalence of severe acute malnutrition in different age group

AGE GROUP	TOTAL NUMBER (PERCENTAGE)
6-12 Months	69 (47.91%)
13-24 Months	45 (31.25%)
> 24 Months	30 (20.9%)
Total	144 (100%)

The mean age of presentation in 6-12 month, 13-24 month and > 24 month was 9.21 month 19.31 month and 40.76 month respectively while the average mean age of presentation in study population was 18.94 month.

Table 2: Mean age of presentation in different age group

AGE GROUP	MEAN AGE OF PRESENTATION
6-12 Month	9.21 Month
13-24 Month	19.31 Month
> 24 Month	40.76 Month
Average Mean Age of Presentation	18.94 Month

A total of 79 children (54.86%) were male while 65 children (45.14%) were female.

Inclusion criteria

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 any of the following.¹

1. Weight for height below - < 3 SD of the median WHO growth reference.
2. Visible severe wasting.
3. Presence of bipedal pitting oedema.
4. Mid upper arm circumference below 11.5 cm.

Exclusion criteria :

- Children having congenital malformation
- Parents/ guardians not willing to participate in present study

A written and informed consent will be taken from parents of the participants. All participants will have the option to withdraw from the study during anytime during this study. A detailed and complete history that also includes nutritional history will be taken from their mother or nearby relative.

Detailed physical examination, anthropometric measurements and relevant investigation [like CBC, MT, ESR, Chest X-ray, Urine R/E, Stool R/E, HIV) will be done as required. Clinical signs of micronutrient deficiency will be assessed.

All details were collected in a proforma, entered in Microsoft excel sheet. Categorical variables were expressed in percentages. Statistical analysis was done using descriptive statistics.

Table 3: Sex wise distribution in SAM children

AGE GROUP	TOTAL NO.	MALE (NO. and %)	FEMALE (NO. and %)
6-12 Month	69	38 (55.07%)	31 (44.93%)
13-24 Month	45	26 (57.77%)	19 (42.23%)
> 24 Month	30	15 (50%)	15 (50%)
Total	144	79 (54.86%)	65 (45.14%)

A total of 119 cases (82.63%) had their weight for height/length below – 3 SD. 43 cases (30%) had visible severe wasting and 30 cases (20.83%) had bilateral pedal edema. All the SAM cases in study population had MUAC < 11.5 cm (100%).

Table 4: Study population fulfilling different criteria for diagnosis of SAM

PARAMETER	TOTAL NO.	PERCENTAGE
Weight for Height/ Length < -3 SD	119	82.63%
Severe Visible Wasting	43	Approx 30%
Bilateral Pedal Edema	30	20.83%
MUAC < 11.5 cm	144	100%

Only 38.20 % of patient (55 cases) had received exclusive breast feeding upto to 6 month of age while 89 cases (61.80%) had received partial breast feeding. In the partial breast feeding group almost all (89) children received feeding by bottle. Almost all of bottle feeding baby received diluted cow milk

Table 5: Frequency of breastfeeding practice in SAM population

BREAST FEEDING PRACTICE	TOTAL NO.	PERCENTAGE
Exclusive Breast Feeding up to 6 month	55	38.20%
Partial Breast Feeding	89	61.80%

A total of 84 cases (58.3%) had received complete immunization according to their age while 60 cases (41.7%) had received only partial immunization.

Table 6: Status of immunisation in SAM population

IMMUNISATION STATUS	TOTAL NO.	PERCENTAGE
Complete Immunization	84	58.3%
Partial Immunization	60	41.7%

The families of around 78% SAM children belongs to lower socio-economic status (below poverty line) while 22% cases belongs to above poverty line.

Table 7: Socio-economic status of the SAM population

SOCIO-ECONOMIC STATUS	TOTAL NO.	PERCENTAGE
Below Poverty Line (BPL)	112	78%
Above Poverty Line (APL)	32	22%

Diarrhoea was found to be most common complication associated with severe acute malnutrition. 42.4% (61 cases) SAM children had Diarrhoea. Pneumonia was found second most common complication. 34.72% (50 Cases) had Pneumonia. Tuberculosis was found third most common complication 29.9 % (43 case) In the nutritional deficiency Anemia was found in 86.11% population. A total of 124 cases had different degree of Anemia.

Table 8: Prevalence of complication of SAM population

Type of complication	Total (%)	6-12 Month	13-24 Month	> 24 Month
Diarrhoea	61 (42.4%)	32 (46.37%)	18 (40%)	11 (36.66%)
Pneumonia	50 (34.7%)	25 (36.23%)	18 (40%)	7 (23.33%)
Tuberculosis	43 (29.9%)	22 (31.88%)	16 (35.5%)	5 (16.66%)
Meningitis	14 (9.7%)	7 (10.14%)	4 (8.89%)	3 (10%)
Malaria	5 (3.4%)	0	3 (6.66%)	2 (6.66%)
Measles	0	0	0	0
Sepsis	15 (10.4%)	11 (15.94%)	2 (4.44%)	2 (6.66%)
Anemia	124 (86.1%)	60 (86.95%)	39 (86.6%)	25 (83.33%)

Out of Total 144 children 123 children (85.4%) discharged successfully, no. of defaulter case was 15 (10.4%) and total no. of death was 6 (4.1%) respectively.

Table 9: Outcome of study

Parameter	No. and Percentage
Cured/Discharge	123 (85.41%)
Death	6 (4.1%)
Defaulter	15 (10.41%)

DISCUSSION

Severe Acute Malnutrition affects nearly twenty million under five children, and contributes to one million child deaths yearly.⁴ The mortality rate of children with complicated SAM that receive treatment in inpatient setups has remained unacceptably high.⁵ Such high mortality in inpatient units has been attributed to complication such as infections, fluid overload, dehydration micronutrient deficiencies and severe anaemia with oedema.⁶ Age plays an important role in etiology of Severe acute malnutrition. Due to lack of exclusive breastfeeding and improper complementary feeding, the nutrition deficiencies start at an early age. In our study we recorded highest prevalence of SAM in age group of 6 months to 12 months(47.91%) followed by 13 to 24 months age group. This results correlates well with the findings of the study done by Kumar *et al.*, where 59.6% of SAM children were in the age group of 6 months to 12 months.⁹ Also in a study done by Suman RL *et al.*, majority of the patients (82%) were in the age group of 6 to 24 months.¹⁰ The mean age of presentation was 18.94 months which also correlates with study of Suman RL *et al.*¹⁰ (16.54 months), Kumar *et al.*⁹ (14.30 months) and Dr. Tarachand Saini¹¹ (19.7 month). Male dominance was reported among SAM patients in study by Suman RL *et al.*¹⁰ (52% males), Tarachand Saini¹¹ (68.53% male). Similar results were noted in present study. Study by Kumar *et al.*,⁹ and Thapa A *et al.*¹² however reported a higher incidence in Females 51.9% and 51.7% respectively. This may be due to a sense of relative negligence by the parents towards the female child in the society regarding breast feeding, Immunization and other feeding practices. Study by Kumar *et al.*, which shows weight for height <- 3SD in 75.8% cases, severe visible wasting in 24.03% cases and bilateral pitting oedema in 27% cases.⁹ A study by Suman RL *et al.* shows edema in 100% cases because his study was only on edematous children.¹⁰ Exclusive breast feeding and proper breast-feeding practices play a very important role in nutritional status of a child. In our study population 38.20% children were exclusively breast fed up to 6 months of age. This is much higher than the incidence of exclusive breast feeding as reported by study of Kumar *et al.*⁹ The more breastfeeding percentage in our study may be due to increased awareness of people about exclusive breastfeeding over the years. The NFHS-4 (2015-16) report of Bihar for general population however shows that exclusive breastfeeding upto 6 months is 53.5% in Bihar.

This indicates that lack of exclusive breastfeeding is one of the major contributor in development of malnutrition. Socio-economic status of a family has a major impact on child nutrition. Children with lower socio-economic background have more chances of developing malnutrition because lack of nutritious food, lack of awareness, unhygienic living conditions, poor feeding practices and lack of health seeking behaviour. Overlapping nature of protein-energy malnutrition and micronutrient deficiencies were well understood and it is seen that lack of one micronutrient is typically associated with deficiency of others.¹³ 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.*⁹ (88.3%), Suman RL *et al.*¹⁰ (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 K¹⁴ shows cure rate 81% death rate 6.52% and defaulter 12.09%. While Rajendra P Nagar¹⁵ 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 community-based management of acute malnutrition (CMAM)¹⁶ 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, and larger child's size at birth. Stunting and underweight are higher in rural areas than in urban areas.³ 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

Most of the malnourished child are in the age group of 6 to 12 months with poor socio-economic background.

Diarrhea and anemia were most common complications followed by Pneumonia and tuberculosis. In order to prevent the development of SAM and their complication we need to focus on exclusive breastfeeding till 6 month of age, timely and complete immunization, timely introduction of complementary feeding, nutritional rehabilitation and early identification and treatment of complication like diarrhoea, pneumonia anaemia, in malnourished children so as to break undernutrition-disease cycle.

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