



ORIGINAL RESEARCH PAPER

Paediatrics

STUDY OF COMORBIDITIES IN PATIENTS WITH SEVERE ACUTE MALNUTRITION IN A TERTIARY CARE CENTRE

KEY WORDS: Severe acute malnutrition, Mortality, Co-morbidity

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ABSTRACT

INTRODUCTION: Severe acute malnutrition, is characterized by wasting (marasmus), oedema (as a result of kwashiorkor), or both (marasmic kwashiorkor), and occurs mostly in children. Globally, co morbidities such as diarrhoea, acute respiratory tract infections and urinary tract infection, which result from a relatively defective immune status, remain the major causes of comorbidities among children with severe acute malnutrition. This study was carried out to find out co-morbidities such as infections and outcome in children with severe acute malnutrition.

METHODS: In this hospital based descriptive type of observational study, 50 severe acute malnourished children were included. Patients underwent relevant investigations to find out associated co morbidities.

RESULTS: Acute gastroenteritis (58%), acute respiratory infections/ pneumonia (44%) were found to be the major comorbid conditions in hospitalized SAM children followed by urinary tract infection(30%), skin infection(12%), worm infestations(2%).

CONCLUSIONS: Timely identification and treatment of various co-morbidities is likely to break undernutrition-disease cycle, and to decrease mortality and improve outcome.

INTRODUCTION

Severe acute malnutrition (SAM) is the one of the main contributing factor for under five mortality and morbidity worldwide.

All SAM children without complications are treated as outpatient basis and this is one of the cost effective treatment. Many cases of SAM are complicated by infective illness like acute respiratory tract infections, acute watery diarrhea, gram negative septicemia, urinary tract infections, measles, anemia, organic diseases, HIV, TB and Meningitis. These children are managed by hospital inpatient care.

SAM is associated with high rates of mortality and morbidity and needs specialized care and preventive measures. SAM is one of the most common reasons for pediatric hospital admissions in India.

OBJECTIVES

Primary objective

To identify the co morbidities in hospitalized children with severe acute malnutrition

Secondary objective

To identify the risk factors for mortality in hospitalized children with severe acute malnutrition.

METHODOLOGY

Study design- Hospital based descriptive study

Study setting- Paediatrics wards and Nutritional Rehabilitation Centre of Civil Hospital Ahmedabad.

Study period - may 2020 to April 2021.

Study population- 50

INCLUSION CRITERIA: All children admitted in hospital with SAM as per WHO criteria Diagnosis of SAM was made by any one of the following features:

1. Weight for height <70% of expected or <-3 Z score
2. Visible severe wasting
3. Bilateral pitting edema

4. MUAC<115mm in children 6-60 months of age (MUAC<110mm if length <66cm)

EXCLUSION CRITERIA:None

RESULTS

A total of 50 children with severe acute malnutrition who were hospitalized during the study period were included in the study. Mean age of presentation was 18 months. Among 50 children, 58% of patients were in the age group of 1 to 3 years. 34% of the patients were in the age group of less than 1 year whereas only 8% were in the age group of 3 to 5 years. 60% were completely immunized, 36% were partially immunized and 6% were unimmunized.

Severe acute malnutrition was more common in females (54%) as compared to males (46%). 68% children had normal birth weight while 30% had low birth weight and only 2% were large for gestational age.

Table 1- demographic Profile Of Study Population

S.no.	Demographic profile	Number (n=50)	Percentage
1	Age category		
	<1 yr	17	34%
	1-3 yr	29	58%
	3-5 yr	4	8%
2	Sex		
	Males	23	46%
	Females	27	54%
3	Immunisation status		
	Fully immunized	30	60%
	Partially immunized	18	34%
	Unimmunised	3	6%

Among 50 hospitalized Severe Acute Malnutrition (SAM) children, 49 (98%) were breast fed and only 1 (2%) child was never breast fed due to maternal death during delivery. Only 10% were given exclusive breastfeed till 6 month of age while rest were started on top milk before 6 months of age. The most common type of top milk was animal milk (71%) and the next common was formula milk accounting for 28% of the total. The most common mode of feeding was bottle feeding (69%). The other modes of feeding were by paladai (22%), cup and spoon (4.5%) and glass (2.5%).

In 62% of the patients complementary feeds was started after 1 year of age which was not appropriate for the energy requirements of the patient. In 20% of the patients complimentary feeding was started before 6 month of age in the form of biscuits and other packed food items like wafers. In 18% complimentary feeds were started around 7 to 8 months of age in form of dal water, porridge, khichdi.

48% of the total children had achieved developmental milestones upto age while 42% had isolated motor milestone delay and 6% had global developmental delay and 4% had isolated speech delay.

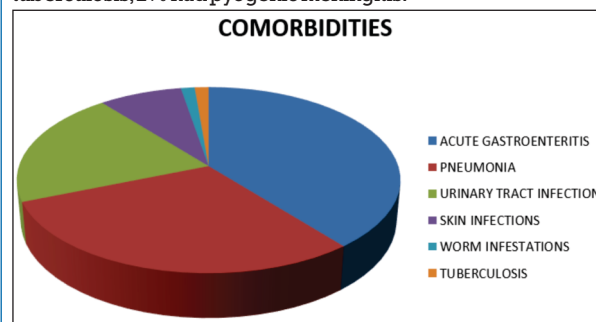
In anthropometric measurements, 98.5% had visible severe wasting, 24% children were severely stunted and 18% were moderately stunted while 58% had mild stunting. All 50 children had weight less than 3rd centile for the age and Mid upper arm circumference less than 11.5cm. 87% of the children had normal head circumference while 13% had microcephaly. All 50 children had chest circumference less than head circumference.

Organic disease were present in 18% of the patients. 12% of the children presenting with severe acute malnutrition had developed Cardiac morbidity in form of decreased interventricular wall thickness, decreased left ventricular posterior wall thickness, reduced left ventricular ejection fraction and left ventricular diastolic dysfunction as evidenced by echocardiography. 2% of patients had developed neurodegenerative disease while 4% of the patients had developed gastrointestinal reflux disease.

72% of the patients admitted for severe acute malnutrition had developed anemia. Out of which 78.5% had developed dimorphic anemia and 21.5% had iron deficiency anemia.

14% of the children had presented with feature of sepsis. 10% of the children had culture proven sepsis while 4% had clinical features of sepsis only.

58% of the patients had acute gastroenteritis, 44% patients had pneumonia (ARI), 30% children had urinary tract infection, 12% children had skin infections, 2% had worm infestations, 2% had tuberculosis, 2% had pyogenic meningitis.



Among 50 hospitalized severely acute malnourished children, 48 (96%) were discharged while 2 (4%) children died due to sepsis and cardiovascular morbidity (reduced left ventricular ejection fraction). Other risk factors which were associated with mortality were acute gastroenteritis, dyselectrolytemia, hypothermia, hypoglycemia, cardiac failure.

DISCUSSION

In our study mean age of presentation is 18 months. It is consistent with Mukesh Choudry et al study (15 months).

The average age of presentation is less than 24 months. This could be explained because rapid growth occurs in first 2-3 yrs, requirement of nutrition for energy and body building increases. Hence deficiency of protein and energy and other micronutrients will lead to SAM in this age group. These are the reasons for the most common age group being less than 24 months.

In our study, introduction of complementary feeding was started very early (<6 months) in 20% of children and 62% had delayed introduction of complementary feeding (>1year). Singh et al study reported that in 24.7% of children introduction of complementary feeding was started before 6 months of age.

Mukesh Choudry et al study registered that in 25% of children complementary feeding was started early and 9.86% children were started on complementary feeding after 1yr. Early introduction of complementary feeding and delayed introduction of complementary feeding is also important contributory factor for development of SAM. Prevalence of SAM was also more in children who were exclusively breast fed for prolonged duration because breast milk is nutritionally inadequate as age advances.

In our study, Among 50 children, 24 (48%) children were developmentally normal, 3 (6%) had global developmental delay, 21 (42%) had motor delay and 2 (4%) had speech delay. This is similar to the study done by Rajendra K Gupta et al in which 62.5% children had developmental delay. This delay in development could be explained by inadequate nutritional intake, improper feeding practices, early cessation of breast feeding, low cheerful environment and chronic disease. All these factors lead to defective neurological outcome of SAM children.

In our study, 29 (58%) had acute gastroenteritis, 22 (44%) children had pneumonia (ARI), 15 (30%) children had urinary tract infection, 6 (12%) children had skin infections, 1 (2%) had worm infestations, 1 (2%) had tuberculosis, 1 (2%) had meningitis.

In Indian study done by Rakesh Kumar et al reported that most associated comorbidities were acute gastroenteritis (33%), ARTI (27.9%), TB (22.1%), sepsis (10%), measles and malaria (3.8% each), UTI (1%). In another Indian study done by Mukesh Choudry et al the comorbidities were AGE (60%), ARTI (52%), UTI (4%), TB (9.3%).

Sepsis is the most common and life threatening comorbidity in SAM children. In our study 14% of children had sepsis. This is not similar to Sarada et al study in which prevalence was 44.1%. High prevalence of sepsis in SAM children could be explained by defective humoral immunity and cell mediated immunity, defective skin barrier, defective mucosal defense mechanism, defective phagocytic and free radical scavenging function and poor hygiene and handling of caretakers.

In our study 12% of hospitalized SAM children had UTI in our study which is higher than Rakesh Kumar et al study (1%) UTI in SAM could be explained by decreased fluid intake, prolonged hospital stay, iatrogenic causes and decreased immunity.

In our study, among 50 children, 36 (72%) had anemia and 14 (28%) did not have anemia. Among children with Anemia, 39 (78.5%) had dimorphic anemia and 11 (21.5%) had iron deficiency anemia. This is consistent with Mukesh Choudry study in which 85.3% of children had anemia, Soni et al study in which 60% had anemia; Neha Thakur et al study done in North India in which 81.1% had anemia. Among this the most common type of anemia was microcytic hypochromic anemia (38.6%) followed by megaloblastic anemia 30.6%. These results do not correlate with our study results. In our study the most common type of anemia was dimorphic anemia. Anemia in SAM children is due to infections, blood loss due to worm infestations, nutritional inadequacy, malabsorption, hemolysis, erythroid hypoplasia, ineffective erythropoiesis due to folic and vitamin B 12 deficiency and anemia of chronic disease.

Case fatality rate of our study is 4%, it is in contrast with Nigerian study done by Agozie C Ubesie et al in which it was 40.1%. Syed Tariq et al study also shows mortality to be 23.5%. In our study sepsis and organic disease were the two most important contributory factors deciding case fatality rate.

The reason for the low mortality in our study compared to other study is improved hospital care and nutritional rehabilitation, timely detection and management of Comorbid conditions like acute watery diarrhea and pneumonia. Hence appropriate management of co infections is of paramount importance in reducing case fatality rate.

Demographic factors like age, sex, locality and socio economic status, medical factors like birth weight, hospitalization during newborn period, developmental delay and non immunization did not have any effect on outcome. Sepsis and presence of organic disease are factors affecting outcome. Presence of organic disease and sepsis had a significant effect on mortality.

CONCLUSION

- Acute gastroenteritis(58%), acute respiratory infections/ pneumonia (44%) are the major comorbid conditions in hospitalized
- SAM children followed by anemia and urinary tract infection(30%), skin infection(12%), worm infestations(2%).
- Presence of underlying organic disease and sepsis and were significant risk factors for mortality.
- If these conditions are taken care of then outcomes can be improved to a great extent.

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