



MORBIDITY PATTERNS AND OUTCOME IN CHILDREN WITH SEVERE ACUTE MALNUTRITION AT A TERTIARY CARE HOSPITAL.

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ABSTRACT... Objectives: We planned this study to find out morbidity patterns as well as outcome of admitted children aged less than 5 years of age with severe acute malnutrition (SAM). **Study Design:** Cross Sectional study. **Setting:** Department of Pediatrics Medicine, Ghurki Trust Teaching Hospital, Lahore. **Period:** From 1st January 2018 to 30th June 2018. **Material & Methods:** A total of 80 children aged 1 to 59 months, of both genders, having SAM were considered. Physical examination, detailed clinical as well as laboratory findings related to nutritional status and comorbidities were noted. Outcome in terms of recovery/discharge, left against medical advice (LAMA) or death during the stay was noted in all the children. **Results:** Out of a total of 80 children, 20 (25.0%) were aged 1 to 6 months, 39 (48.8%) from 7 to 24 months and 21 (26.2%) from 25 to 59 months. Most of the patients, 39 (48.8%) were from 7 to 24 months of age, 62 (77.5%) were admitted through emergency, 52 (65.0%) had WHZ score-4SD and 27 (33.8%) using bottle feeding. Severe wasting without having edema was reported in 67 (83.8%) children. Diarrhea was the commonest comorbidity, found in 43 (53.8%) children, followed by sepsis 17 (21.3%) and pneumonia 15 (18.8%). There were 69 (86.3%) children noted having anemia. Hyponatremia was the commonest metabolic abnormality seen in 40 (25.0%) children. In terms of outcome, 71 (88.7%) children recovered well and got discharged while mortality was reported in 5 (6.3%) children. **Conclusion:** Diarrhea along with sepsis and pneumonia along with metabolic abnormalities were found to be more prevalent amongst children having SAM. Early identification of anemia as well as infections in children with SAM can contribute to better outcome.

Key words: Anemia, Diarrhea, Pneumonia, Severe Acute Malnutrition, Sepsis.

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INTRODUCTION

Child malnutrition is a global problem and posing serious problems to children especially under the age of 5 years. In Asia, wasting is noted to be prevalent around 4% in children having age of less than 5 years while in low or middle income countries, this prevalence is around 3%.^{1,2}

It is estimated that almost half of the deaths in children aged less than 5 years are due to the underlying malnutrition as more than 3.5 million deaths are being reported annually from around the world due to malnutrition.²⁻⁴ Not only it is major factor contributing to child mortality but it also damages cognitive as well as physical development, leave alone the economic side of

it contributing to the whole society.⁵ It has been documented that around 80% of children who have malnutrition hail from countries which are lower or middle income ones. Severe Acute malnutrition (SAM) indicates an emergency condition that needs earliest attention while United Nations has estimated acute malnutrition to affect around 8% of children across the globe.⁶

In a country like Pakistan, malnutrition in children is attributed factors which are of socio-economic, environmental as well as political nature. It has been observed regularly in local studies that significant ratio of children admitting in healthcare facilities are found to have SAM while presenting illness may go on to develop nutritional deterioration

which may result in poor outcomes.⁷ Rise in need of identifying morbidity patterns early in such neonates are bound to provide us ways for early diagnosis and management of children affected with SAM so this study was planned to find out morbidity patterns and outcome of admitted children aged less than 5 years with SAM.

MATERIAL & METHODS

This was a cross sectional study conducted at the Department of Pediatrics Medicine, Ghurki Trust Teaching Hospital, Lahore from 1st January 2018 to 30th June 2018. Approval from the ethical committee of the institution was taken for this study. Consent from parents/guardians of all study participants was also acquired.

A total of 80 children aged 1 to 59 months, of both genders, having SAM described in terms of either weight for height Z score (WHZ) less than -3 with or without bilateral pitting edema and any of the these: anorexia, severe anemia, high grade fever, severely dehydrated and with systemic infection.⁷ Children with congenital malformation, neurological impairment or any medical as well as surgical illness obstructing oral / nasogastric feeding were not included in this study.

Physical examination was done while detailed clinical as well as laboratory findings related to nutritional status and comorbidities were also done. Demographics like age, gender, WHZ score, weight, height, duration of hospital stay and presenting complaints of all the participants were noted. Evaluation for identification of any morbidity as well as associated congenital or hereditary disorders was done on daily basis during the hospital stay of all the children.

WHO standards were applied for the management of SAM in all children.⁸ Nasogastric tube feeding was adopted for children who could not feed orally or appeared too sick. Vitamin A orally as 200,000 IU for children who were more than 12 months of age or 100,000 IU for children who were less than 12 months of age was administered at the time of admission to all the children who were presented with signs of deficiency of Vitamin A whereas further doses of same strength were repeated

on day 2 and 14. Dehydration was managed with Rehydration Solution for Severe malnutrition (RESOMAL). First phase of management (3 to 4 days) involved therapeutic milk F-75 while continuation had F-100 milk or ready to use therapeutic food (RUTF) in the second phase based on the appetite. For infants who were less than 6 months of age, breast feeding, infant formula milk as well as diluted F-100 was utilized. Investigations like complete blood count along with blood glucose, complete urinalysis as well as electrolytes were ordered for all the participants. Further investigations like chest x-ray, blood culture, urine culture along with sensitivity, arterial blood gases or ultrasonography of the abdomen was ordered if needed depending upon the clinical situation of the children.

Penicillin along with gentamicin or ceftriaxone and amikacin were used as antibiotic in almost all the participants of this study. Outcome in terms of recovery/discharge, left against medical advice (LAMA) or death during the stay was noted in all the children.

SPSS version 21 was used for data handling and analysis. Quantitative variable were represented in terms of means and standard deviation while qualitative variables were presented as frequency and percentages.

RESULTS

Out of a total of 80 children, 20 (25.0%) were aged 1 to 6 months, 39 (48.8%) from 7 to 24 months and 21 (26.2%) from 25 to 59 months. Most of the patients, 62 (77.5%) were admitted through emergency, 52 (65.0%) had WHZ score-4SD and 27 (33.8%) using bottle feeding. Severe wasting without having edema was reported in 67 (83.8%) children while 13 (16.2%) were having edematous malnutrition. All the baseline characteristics are detailed in Table-I.

There 48 (60.0%) children who were febrile (100 to 104 °F) at the time of admission. As far as major morbidities amongst children with SAM were concerned, diarrhea was the commonest as found in 43 (53.8%) children, followed by sepsis 17 (21.3%) and pneumonia 15 (18.8%).

Eight (10.0%) children with SAM had measles along with diarrhea and pneumonia. Tuberculosis was diagnosed in two cases while one case was having TB meningitis. Rickets confirmed by biochemical as well as radiological changes was found in 4 (5.0%) cases.

There were 42 (52.5%) children with SAM who were noted to have severe dehydration whereas remaining had some or no dehydration. In 17 cases with Sepsis, most (14) were having leucocytosis. Blood culture was seen 3 patients where klebsiella pneumonia was found in 2 and streptococcus pyogenes in 1 case.

There were 69 (86.3%) children noted having anemia, amongst which, 6 (7.5%) were having hemoglobin less than 4 gm/dl, 21 (30.4%) between 4.4 to 7 gm/dl and 42 (60.9%) with 7.1 to 10 gm/dl.

Hyponatremia was the commonest metabolic abnormality seen in 40 (25.0%) children with SAM while hypokalemia was reported in 13 (16.2%) and hypoglycemia in 7 (8.8%).

We noted 7 (8.8%) children to have central nervous system disorder like hydrocephalus (n=1), porencephalic cyst (n=1) and seizure disorders (n=5). Three children were noted having congenital heart disease, out of which, 1 had ventricular septal defect while 2 were having pulmonary hypertension. Nephrocalcinosis (n=1) and urolithiasis (n=1) were found in 2 patients.

Mean duration of hospital stay was recorded as 8.3 days with standard deviation of 3.87 days. In terms of outcome, 71 (88.7%) children recovered well and got discharged (advised outpatient follow up) while 4 (5.0%) LAMA. Mortality was reported in 5 (6.3%) children, mainly due to diarrhea (n=2), sepsis (n=2) and measles pneumonia (n=1).

Characteristics	Age (Months)			Total (n=80)
	1-6 (n=20)	7-24 (n=39)	25-59 (n=21)	
Gender				
Male	12 (60.0%)	26 (66.7%)	12 (57.1%)	50 (62.5%)
Female	8 (40.0%)	13 (33.3%)	9 (42.9%)	30 (37.5%)
Mode of Admission				
Outpatient	1 (5.0%)	10 (25.6%)	7 (33.3%)	18 (22.5%)
Emergency	19 (95.0%)	29 (74.4%)	14 (66.7%)	62 (77.5%)
WHZ Score				
3 SD	8	12	8	28 (35.0%)
4 SD	12	27	13	52 (65.0%)
Edema				
Yes	2	7	4	13 (16.2%)
No	18	32	17	67 (83.8%)
Feeding At the Time of Admission				
Breast Feeding	10	7	0	17 (21.2%)
Bottle Feeding	10	13	4	27 (33.8%)
Semi-Solids Only	0	5	13	18 (22.5%)
Breast Feeding & Semi Solids	1	14	3	18 (22.5%)
Mean Height (cm)	53.7	64.9	78.5	65.4
Mean Weight (kg)	3.8	5.2	6.4	4.9

Table-I. Baseline Characteristics amongst Children with SAM.

Morbidity	Number (%)
Diarrhea	43 (53.8)
Sepsis	17 (21.3%)
Pneumonia	15 (18.8%)
Measles	8 (10.0%)
Rickets	4 (5.0%)

Table-II. Pattern of Morbidity amongst children with SAM.

DISCUSSION

In the present study, we noted, children having severe wasting as 83.8% while 16.2% were having edematous malnutrition. These figures correlates well with other studies conducted in Asia where most have recorded severe wasting around 75% cases while edematous malnutrition ranges around 25%.^{9,10} Some studies from African countries noted an even higher proportion of edematous malnutrition ranging from 50 to 70%.^{11,12}

SAM has been found to be more prevalent among boys in comparison to girls around the world.^{7,11,12} The reason is unknown for this male predominance but some studies from Pakistan also reported higher proportion of females with SAM as well.^{13,14}

We noted 39 (48.8%) children in age range of 7 to 24 months, children of this age range are more prone have SAM as has been depicted in various other findings.^{11,12} It has also been recorded that children of age 6 to 24 months are more likely to be presenting with malnutrition and a combo of likely co-infection.⁷ Fever is not always accompanied with SAM as study conducted from Zambia showed that 48% of children were febrile. We noted 48 (60.0%) of the children having fever at the time of admission.^{12,15}

Our results were consistent in relation to many other studies where diarrhea turned out to be the commonest morbidity accompanying children with SAM.^{7,12,16} Diarrhea is considered to be the commonest cause of mortality in children having SAM as well. This was again proved in the present study as 2 out of 5 deaths were attributed to diarrhea.

Ejaz and coworkers¹⁰ as well as Hossain and Colleagues⁹ found Pneumonia to be another major morbidity found in children with SAM. In the present study, 18.8% were having pneumonia. Breast feeding is not always practiced in our area as was found that only (21.2%) children were breastfeeding at the time of admission, which could be a reason contributing to low immunity as well as overall physical and neurodevelopment

growth of the child. Lack of proper immunization and bad hygienic as well as sanitary practices also contribute to infections in these children.

Sepsis was found to be another major comorbidity in the present study as 21.3% children were noted with it. Figures around 15% are documented in children having sepsis with SAM.^{7,9} Leucocytosis is reported in around 80% of children with sepsis in SAM by other researchers from Pakistan^{7,10} as was found to be the case in the present study.

As far as limitations of the present study are concerned, comparatively small sample size could be a reason that studies with bigger sample size as well as conducted at multiple centers will further verify our findings. We did not have any controls to compare our cases that could potentially indicate some risk factors of SAM in the studied population as well.

Education and awareness related to overall hygienic practices, breastfeeding and adequate immunization should be the way forward for population of our area. Community programs, especially involving women should also be organized where the important risk factors as well as the preventive measures to defend against malnutrition amongst pediatric population can provide good basis to reduce morbidity as well as mortality related to malnutrition.

CONCLUSION

Diarrhea along with sepsis and pneumonia along with metabolic abnormalities were found to be more prevalent amongst children having SAM. Early identification of anemia as well as infections in children with SAM can contribute to better outcome.




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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
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2	Asif Ali Khuhro	Methodology, Literature Review.	
3	Sanam Bano Rajper	Study concept, Supervision, Proof reading.	
4	Fazal Ur Rehman	Discussion, Data interpretation.	