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Research Article

MORBIDITY PATTERNS OF SEVERELY MALNOURISHED CHILDREN AT TERTIARY CARE HOSPITAL¹Dr Muhammad Ahmad Khan, ²Dr Omar Asghar, ³Dr Qurrat ul Ain¹Nishtar Medical University and Hospital, Multan²Rahbar Medical & Dental College, Lahore Cantt.³Muhammad Medical College, Mirpurkhas, Sindh

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Abstract:**Aim:** To determine morbidity patterns in children with severe acute malnutrition.**Methods:** This cross-sectional study has been conducted at the Pediatric unit II of Nishtar Hospital Multan for one year duration from April 2019 to April 2020. Children aged 1-59 months with severe acute malnutrition (WHZ < -3 SD and / or bilateral pitting edema) were included. All patients were evaluated for clinical signs, various diseases such as infections, metabolic disorders, congenital / hereditary disorders and the result as stabilization, contrary to medical recommendations (LAMA) or expired at exit. Data was collected and analyzed using SPSS version 17 descriptive statistics.**Results:** One hundred and thirty children with an average age of patients - 16.8 months were examined. Serious cachexia was observed in 80.8%, while edema malnutrition occurred in 19.2% of cases. Anemia was found in 88% and 65.4% were feverish during the presentation. Diarrhea (50.8%), pneumonia (20%) and sepsis (16.2%) were the most common infections; while hyponatraemia (22.6%), hypokalemia (13.7%) and hypoglycemia (10.7%) were the most common metabolic disorders. Rickets (7.7%) and congenital / hereditary diseases (14.6%) were associated with this disorder. The result was stabilization in 83.1%, LAMA in 10.8% and death in 6.2% of cases.**Conclusion:** The spectrum of illness in severely malnourished children admitted to hospital includes both infections and congenital or hereditary disorders. Diarrhea and sepsis with metabolic disorders were the main contributors to death.**Key words:** morbidity, exhaustion, edema malnutrition, infections, metabolic disorders.**Corresponding author:****Dr. Muhammad Ahmad Khan,**

Nishtar Medical University and Hospital, Multan

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INTRODUCTION:

Malnutrition, a widespread problem worldwide and globally 20 million children suffer from severe malnutrition (SAM), with major burdens affecting South Asia and Sub-Saharan Africa. In Southeast Asia, the mortality rate ranges from 5 to 40%, and in the case of complicated SAMs, the mortality rate is over 30% in some series, even if the WHO recommendation is followed. In developing countries such as Pakistan, this is often due to socioeconomic, political, environmental or natural disasters. SAM also has a significant proportion of sick children admitted to hospital. The disease associated with this may further contribute to poor nutrition, resulting in poor results. Malnourished hospitalized children have a higher rate of complications, increased mortality, longer hospital stays and higher hospital costs. The lack of infrastructure to monitor growth and regular institutional assessments is responsible for the persistence and delayed detection of malnutrition in these children. Better nutritional status is associated with better survival and better results. After clinical improvement, aggressive nutrition management is the foundation of caring for these children and is a more promising strategy for improving results. This prospective study was conducted using WHO guidelines and basic principles for dealing with severe acute malnutrition. All children with SAM with good appetite are treated in OTC, while patients with anorexia or poor appetite and complications (SAM) were hospitalized for stabilization. We planned to establish morbidity patterns in children with SAM. This study can help control and early detection of complications requiring hospitalization to prevent mortality associated with these complications. This study aims to determine the morbidity patterns of hospitalized children with severe acute malnutrition

PATIENTS AND METHODS:

This cross-sectional study has been conducted at the Pediatric unit II of Nishter Hospital Multan for one year duration from April 2019 to April 2020. The study included children aged 1-59 months with SAM defined as body weight for height Z-score (WHZ) < -3 SD) with or without bilateral pitting edema and any of the following: anorexia, severe anemia, high fever, severe dehydration and systemic infection. Children > 60 months of age with severe birth defects or severe neurological disorders or medical / surgical diseases impeding oral or nasogastric feeding were excluded. All children underwent a detailed clinical and laboratory assessment, with particular emphasis on nutritional status and associated diseases by sex, height, weight,

WHZ score and length of stay, reporting complaints and related physical examination, on a previously developed profile. Patients were followed and evaluated daily during hospital stay to identify various diseases and any congenital or hereditary disorders associated with them. Clinical and nutritional care: The children were managed by a team of two medical officers supervised by one senior registrar, a consultant along with three nurses and one permanent trained staff. The children were managed using the WHO standard management guidelines for SAM6. Feeding through the nasogastric tube was selected in children who were too sick with oral feeding. Oral vitamin A (200,000 IU for patients > 12 months or 100,000 IU if < 12 months) was given to all patients receiving, people with clinical signs of vitamin A deficiency received subsequent doses on days 2 and 14. Children with diarrheal dehydration managed by Rehydration Solution for Severe Malnutrition (RESOMAL). In the first phase of treatment (3-4 days), F-75 medicated milk (prepared in hospital kitchen from powdered milk) was used, followed by F-100 therapeutic milk in the second phase or RUTF (ready-to-use therapeutic food) depending on the test appetite result. Infants less than 6 months of age used infant formula and diluted F-100. All children had complete blood counts, blood sugar levels, serum electrolytes and urine analysis. Further laboratory tests were performed based on the patient's clinical status, such as chest X-rays, blood culture, urine culture and sensitivity, blood gas measurement and ultrasound. Almost all patients started antibiotic therapy with penicillin and gentamicin, except for 12 young infants who received a combination of ceftriaxone and amikacin. After stabilization, patients were discharged according to one of the following criteria: Stabilization (if they were able to consume RUTF) and discharged. The statistical package for social sciences (SPSS) for windows version 17 was used for data analysis. Quantitative variables are expressed as mean Standard Deviation and qualitative variables were expressed as frequencies and percentages.

RESULTS:

A total of 130 children were admitted to the IPC as per admission criteria. Male were 78 (60%) and female were 52 (40%) with male to female ratio of 1.5:1. Severe wasting without edema was present in 105 (80.8%) whereas 25 (19.2%) had edematous malnutrition. Mean duration of stay at IPC was $9 + 4.57$ days. Table -1 describes the baseline characteristics of children with SAM.

TABLE1: Baseline Characteristics of Children with Severe Acute Malnutrition n=130

Characteristics	Overall n=130 (%)	1-6 months n=34	7-24 months n=66	25-59 months n=30
Gender				
Male	78(60.0)	19(55.90)	44(66.70)	15(50.00)
Female	52(40.0)	15(44.10)	22(33.30)	15(50.00)
Mode of Admission				
OTC	28 (21.5)	0	20(30.00)	08(26.70)
ER*	102(78.5)	34(100.0)	46(70.00)	22(73.30)
WHZ Scores				
	45 (34.6)	13(38.20)	22(33.30)	10(66.70)
3 SD	85(65.4)	21(61.80)	44(66.70)	10(33.30)
4 SD				
Edema				
Yes	25 (19.2)	03(8.80)	15(22.72)	7(23.30)
No	105(88.8)	31(91.20)	51(77.27)	23(76.70)
Feeding at the time of admission:				
Breast Feeding	30 (23.1)	16(47.10)	14(21.00)	0
Bottle Feeding	44 (33.8)	15(44.10)	22(33.30)	7(23.30)
Semi-solids only	29 (22.3)	0	10(15.00)	19(63.30)
Breast Feeding & Semi-Solids	27 (20.8)	03(8.80)	20(30.00)	4(13.30)
Mean Height (cm)	67.2	55.2	67.0	81.0
Mean Weight (Kg)	5.1	3.13	5.14	7.43

Table -2 shows the morbidity scheme, and the main diseases in children with SAM were diarrhea (50.8%), pneumonia (20%), sepsis (16.2%) and other diseases such as meningitis (3.8 %), severe skin infections (4.6%) gastrointestinal infections (3.8%) and eye changes with vitamin A deficiency (2.3%). Eleven (8.5%) patients had measles along with diarrhea and pneumonia. Three patients had tuberculosis (TB), two pulmonary TB and one tuberculous meningitis. Ten (7.7%) children showed rickets along with biochemical and radiological changes. One patient had malaria.

TABLE 2: Pattern of Morbidity in Children with Severe Acute Malnutrition (n=130)

Morbidity	Number	Percentage
Diarrhea	66	50.8
Pneumonia	26	20.0
Sepsis	21	16.2
Measles	11	08.5
Rickets	10	07.7
Metabolic Abnormalities		
Hyponatremia	28	22.6
Hypokalemia	17	13.7
Hypoglycemia	14	10.7

Among cases with diarrhea, acute watery diarrhea was observed in 48.5%, with only three experiencing persistent diarrhea. Fifty-seven patients had severe dehydration, while others had dehydration or no dehydration. Pneumonia, including measles and tuberculosis, was the second most common type of incidence. Of the 21 cases (16.2%) with sepsis, 17 had leukocytosis and 2 had leukopenia as a sepsis marker. Blood culture was positive in 4 patients, Klebsiella pneumonia 2, Enterobacter 1 and streptococcus pyogens 1. The two pathogens identified in urinary tract infections

were Klebsiella 2 and E. Coli 3. Anemia was found in 115 (88%) severely malnourished children. Seven patients had a hemoglobin concentration <4 gm / dl, 29 between 4.1 - 7 gm / dl, and 79 had a hemoglobin level between 7.1 - 10 gm / dl.

Eighty-five (65.3%) children were febrile after admission, with temperatures ranging from 100 ° F to 104 ° F. None of them had hypothermia (<95 ° F); only one child had an abnormal temperature of 97 ° F.

One or more metabolic abnormalities were observed in patients with SAM on admission or during hospitalization.

Eight patients were transferred to other antibiotics such as cyproxin 4, vancomycin 3 and imipenem 1. With a result of 108 (83.1%), children were stabilized and discharged to continue nutritional rehabilitation and follow-up. Fourteen (0.8%) patients discontinued medical advice. Eight (6.2%) patients died of diarrhea, sepsis in 3 and measles in one.

DISCUSSION:

In our study, most children had severe weakness (60.6%) and 19.2% had edema malnutrition. Positive data have also been reported in Asian studies where up to 75% of cases have serious waste and up to 25% of edema is malnourished. Studies in Africa have shown that the rate of edema malnutrition is higher (48.2% -70%). Many studies have shown that SAM is more common in boys than girls. The explanation for apparent male superiority is unknown. According to the agreement, our study documented the male domain (60%); however, no reason can be attributed to it. However, other studies from Pakistan showed that the dominance of women was 15 years. In this study, the average age of patients was 16.8 months, and 50.7% of children were between 6.1 and 24 months of age. Many studies have shown a high incidence of malnutrition and concomitant infections at the age of 7 and 24 months. Although it is believed that children with SAM do not generally show a fever in the presence of infection, this is a sign of infection in our study. 65.3% of children in the presentation in our study are above 46%, as reported in Zambia. Acute gastrointestinal and respiratory infections are more common in severely malnourished children with high morbidity and mortality. The incidence of diarrhea reported in Zambia is 67%, which is higher than the current study in which gastroenteritis was observed in 50.8% of cases. Among them, acute watery diarrhea and dehydration occurred in 48.5% of cases, and in this study they are responsible for 50% of mortality.

In 20% of cases, although secondary to measles and tuberculosis, Ejaz *et al*. It is similar to that reported by Hossain *et al*. TB lungs in 9% of cases. SAM boxes. Lactation deficiency, insufficient immunization, poor SAM hygiene and sanitation probably contribute to a high percentage of these infections in this study. The presence of SAM increases the risk of death in cases of severe pneumonia that may not occur with typical clinical symptoms and may require strong suspicion, blood culture or chest radiography in hospitalized children. In Asian studies, bacteraemia and / or sepsis were reported in 16% of cases. Most sepsis patients had

leukocytosis (80%) in our study, as did the study in Pakistan. In this study, blood culture was only positive in 4 cases with *Klebsiella pneumoniae*, *Enterobacter* and *Streptococcus pyogenes*. Whereas studies from Africa showed a high incidence of Gram-positive bacteria (68.6-71%), a study from Uganda showed that staph, streptococcus and H-flu are common bacterial causes of pneumonia. Urine culture reports showed *E. coli* and *Klebsiella* species, and Gambia's study showed *E. coli* in 55.6% of urine culture isolates. This is quite common in hospitalized children with chronic chronic diseases such as malnutrition, chronic renal failure, heart failure or neurological disorders. In 14.6% of children, we observed SAM cases associated with congenital heart disease, urolithiasis, neurological, metabolic and chromosomal disorders, but other studies excluded these disorders. Micronutrient deficiencies, especially vitamin A, zinc and iron deficiency, are important risk factors for high mortality in children with SAM and infection. Ejaz *et al*. The most common micronutrient deficiency was reported followed by iron deficiency anemia (80%), vitamin D deficiency (35.7% rickets), and vitamin A deficiency (18.7%). We also found a high incidence of anemia (iron deficiency, folic acid, vitamin B12) and 88%, but low rickets (7.7%) and vitamin A deficiency (2%). The current case series shows that infant SAM is associated with an estimated mortality rate of 6%, which contrasts with the high mortality rate of 24% and 40.5% recorded in Uganda and Zambia. Blood transfusions, intravenous infusions, hypokalemia and sepsis are major risk factors for death. This high mortality rate indicates critical and advanced stages of patients being treated in higher hospitals. However, the strength of our study is the fairly good sample size with clinical, laboratory and radiological assessment of patients who may contribute to the local source of SAM-related data in Pakistan, because the study is a third-line hospital in Karachi, the frequency of the disease cannot be estimated for the population of the country.

CONCLUSIONS AND RECOMMENDATIONS:

The spectrum of illness in severely malnourished children admitted to the hospital included anemia, infections, and congenital / hereditary disorders. Metabolic abnormalities, together with diarrhea and sepsis, primarily contributed to death. We recommend training in personal hygiene, hand washing, mother and baby nutrition, and vaccinations to prevent infection and malnutrition. Community management of women's education, drinking water supply, health services, integrated management of neonatal and children's diseases as well as vaccination programs and acute malnutrition at primary health care should be prevented. Morbidity and mortality. The spectrum of morbidity

in severely malnourished children admitted to hospital was anemia, infections and congenital/hereditary disorders. Diarrhoea and sepsis along with metabolic abnormalities were the major contributors to mortality. We recommend education regarding personal hygiene, hand washing, mother and child nutrition and immunization for prevention of infection and malnutrition. Female education, provision of safe drinking water, toilet facilities, vaccines with implementation of integrated management of neonatal and childhood illness and community management of acute malnutrition programs at primary health care levels are essential for prevention of morbidity and mortality.

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