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CLINICAL PROFILE AND MANAGEMENT OUTCOMES OF ACUTE SEVERE MALNUTRITION IN CHILDREN: A HOSPITAL-BASED DESCRIPTIVE STUDY

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Abstract

Introduction: Severe Acute Malnutrition (SAM) affects approximately 12.2 million children globally, with South Asia bearing a disproportionate burden. In India, 7.4% of children under five suffer from SAM, representing a significant public health challenge. This study aimed to assess the clinical profile and management outcomes of children with SAM in a tertiary care hospital setting.
Methods: A hospital-based descriptive cross-sectional study was conducted at Ananta Institute of Medical Sciences, Rajasthan, from July to December 2024. Using consecutive sampling, 264 children aged 6 months to 5 years with SAM were enrolled. Data on sociodemographic characteristics, clinical presentation, anthropometric parameters, comorbidities, and treatment outcomes were collected using structured questionnaires and analyzed using SPSS version 25.0.
Results: The majority of cases (87.5%) occurred within the first two years of life, with 76.1% from rural areas and 69.7% from lower socioeconomic backgrounds. Marasmus was the predominant clinical form (54.9%). Common comorbidities included diarrhea (59.1%), pneumonia (50.8%), and anemia (75.0%). Treatment success rate was 69.7%, with mortality of 12.9% and defaulter rate of 17.4%. Notably, 52.9% of deaths occurred within 48 hours of admission. Significant predictors of treatment success included younger age, exclusive breastfeeding history, urban residence, and absence of pneumonia.
Conclusion: SAM predominantly affects infants and young children from socioeconomically disadvantaged rural backgrounds, with high comorbidity burden. While treatment outcomes were within acceptable ranges, early mortality remains a critical concern, emphasizing the need for enhanced early recognition and stabilization protocols.

Keywords: Severe acute malnutrition, children, hospital-based study, treatment outcomes, clinical profile

Introduction

Severe Acute Malnutrition (SAM) represents one of the most critical nutritional emergencies affecting children worldwide, with profound implications for child survival, development, and long-term health outcomes. According to the World Health Organization (WHO), SAM is defined as the presence of bilateral pitting edema or severe wasting characterized by weight-for-height/length less than -3 standard deviations (SD) below the median or mid-upper arm circumference (MUAC) less than 115 mm in children aged 6-59 months. This condition affects approximately 12.2 million children globally, with the highest prevalence concentrated in South Asia and Sub-Saharan Africa, making it a significant public health concern that demands urgent attention and evidence-based interventions.

The global burden of SAM has remained persistently high despite numerous international efforts to combat malnutrition. Recent estimates indicate that 1.9% of children under five years suffer from severe wasting globally, with South Asia bearing the disproportionate burden of this preventable condition. In India, the scenario is particularly alarming, with the National Family Health Survey (NFHS-5) revealing that approximately 7.4% of children under five suffer from severe acute malnutrition, translating to millions of children at immediate risk of mortality and long-term developmental consequences. The situation in Rajasthan, where this study was conducted, mirrors the national trends with significant regional variations in malnutrition prevalence, highlighting the need for localized research to inform targeted interventions.

The clinical presentation of SAM is characterized by a complex interplay of nutritional deficiencies, metabolic disturbances, and associated comorbidities that significantly complicate management protocols. Children with SAM typically present with severe growth retardation, immune system compromise, altered body composition, and increased susceptibility to infections. The clinical spectrum ranges from marasmus, characterized by severe wasting and loss of muscle mass and subcutaneous fat, to kwashiorkor, distinguished by bilateral pitting edema, dermatological changes, and hair alterations. Mixed forms presenting features of both conditions are commonly observed in clinical practice, requiring nuanced diagnostic and therapeutic approaches.

Hospital-based management of SAM involves a systematic approach encompassing stabilization, rehabilitation, and follow-up phases, each demanding specific clinical expertise and resources. The stabilization phase focuses on managing life-threatening complications including dehydration, electrolyte imbalances, hypoglycemia, hypothermia, and severe infections. The rehabilitation phase emphasizes nutritional recovery through carefully monitored feeding protocols using therapeutic foods such as F-75 and F-100 formulations, while the follow-up phase ensures sustained recovery and prevention of relapse. However, the complexity of managing SAM is compounded by the high prevalence of associated medical complications, which significantly influence treatment outcomes and prognosis.

Research evidence consistently demonstrates that children with SAM have substantially higher mortality rates compared to well-nourished children, with case fatality rates ranging from 10-40% in hospital settings depending on the severity of presentation and associated complications. The presence of complications such as severe pneumonia, diarrhea, sepsis, tuberculosis, and HIV co-infection further increases the risk of poor outcomes, necessitating comprehensive clinical assessment and individualized treatment protocols. Studies from various Indian hospitals have reported cure rates ranging from 48-70%, with defaulting rates of 15-43%, highlighting significant variations in treatment outcomes across different healthcare settings.

The sociodemographic profile of children with SAM reveals critical insights into the underlying determinants of malnutrition. Research indicates that children from rural areas, lower socioeconomic backgrounds, and those born to mothers with limited education are disproportionately affected by SAM. Additionally, factors such as inadequate breastfeeding practices, inappropriate complementary feeding, recurrent infections, and poor access to healthcare services contribute significantly to the development and persistence of severe malnutrition. Understanding these demographic patterns is crucial for developing targeted prevention strategies and optimizing resource allocation within healthcare systems.

The economic implications of SAM extend beyond immediate healthcare costs to encompass long-term societal burdens including reduced cognitive development, decreased educational attainment, and diminished economic productivity in adulthood. Studies from developed countries have estimated that disease-related malnutrition in hospitalized children accounts for additional healthcare costs of approximately €80 million annually, with acute malnutrition contributing the largest proportion of these expenses. These findings underscore the importance of investing in effective prevention and treatment programs for SAM as both a humanitarian imperative and an economic necessity.

Current treatment protocols for SAM have evolved significantly over the past decades, incorporating evidence-based guidelines developed by WHO and other international organizations. The implementation of these protocols in resource-limited settings, however, faces numerous challenges including inadequate infrastructure, limited trained personnel, inconsistent supply of therapeutic foods, and weak health systems. Research evaluating the effectiveness of SAM management programs has revealed significant variations in treatment outcomes, with factors such as early recognition, appropriate clinical management, and continuity of care playing crucial roles in determining success rates.

The role of comorbidities in influencing SAM outcomes cannot be overstated, with studies consistently demonstrating that children with associated medical conditions have poorer prognosis and prolonged recovery periods. Common comorbidities include respiratory tract infections, diarrheal diseases, anemia, tuberculosis, and in some regions, HIV infection. The management of these conditions alongside nutritional rehabilitation requires specialized expertise and integrated care approaches that address both immediate nutritional needs and underlying medical conditions.

Recent advances in SAM management have emphasized the importance of comprehensive clinical profiling to identify high-risk children and tailor treatment approaches accordingly. This includes detailed assessment of anthropometric parameters, clinical signs and symptoms, laboratory investigations, and sociodemographic factors that may influence treatment response. Such profiling enables healthcare providers to predict treatment outcomes, identify children requiring intensive interventions, and optimize resource utilization within healthcare facilities.

The significance of hospital-based descriptive studies in advancing our understanding of SAM cannot be underestimated, as they provide valuable insights into local disease patterns, treatment responses, and healthcare system performance. These studies serve as essential foundations for developing evidence-based policies, training healthcare personnel, and advocating for improved resources and infrastructure for malnutrition management. Furthermore, they contribute to the global knowledge base on SAM management and facilitate comparative analyses across different healthcare settings and populations.

The aim of the study is to assess the clinical profile and management outcomes of children with acute severe malnutrition admitted to the pediatric department and evaluate the factors associated with treatment success and failure in a tertiary care hospital setting.

Methodology

Study Design

This research was conducted using a hospital-based descriptive cross-sectional study design.

Study Site

The study was conducted at **Ananta Institute of Medical Sciences & Research Centre**, Rajsamand, Rajasthan, a tertiary care teaching hospital providing comprehensive pediatric services to the population of Rajasthan and neighboring regions.

Study Duration

The study was conducted over a period of six months, from July 2024 to December 2024.

Sampling and Sample Size

The study employed consecutive sampling methodology, wherein all eligible children with severe acute malnutrition admitted to the pediatric department during the study period were included until the required sample size was achieved. This non-probability sampling technique was chosen to minimize selection bias and ensure representativeness of the SAM population presenting to the hospital. The sample size was calculated using the formula for descriptive studies with finite population correction, considering an expected prevalence of treatment success of 70% based on previous studies, with a precision of 5% and confidence level of 95%. Accounting for a 10% non-response rate and potential incomplete records, the calculated sample size was 264 children. The consecutive sampling approach ensured systematic inclusion of all eligible cases, thereby enhancing the external validity of study findings and reducing potential temporal bias in case selection.

Inclusion and Exclusion Criteria

Children aged 6 months to 5 years admitted with severe acute malnutrition, defined as weight-for-height z-score less than -3 SD or presence of bilateral pitting edema or MUAC less than 115 mm according to WHO growth standards, were included in the study. Only children whose parents or guardians provided informed consent for participation were enrolled. Children who were discharged within 24 hours of admission due to wrong diagnosis or other administrative reasons were excluded from the study, as were children with major congenital anomalies, chronic systemic diseases unrelated to malnutrition (such as congenital heart disease, chronic kidney disease), and those whose medical records were incomplete or inaccessible. Children who had been previously enrolled in the study during a prior admission were also excluded to prevent duplication of data and ensure independence of observations.

Data Collection Tools and Techniques

Data collection was conducted using a pre-designed, structured questionnaire that was developed based on WHO guidelines for SAM management and validated instruments used in previous malnutrition studies. The questionnaire comprised sections on sociodemographic characteristics, clinical presentation, anthropometric measurements, laboratory investigations, treatment interventions, complications, and outcomes. Anthropometric measurements including weight, height/length, and MUAC were obtained using standardized equipment and techniques by trained personnel. Weight was measured using calibrated digital scales, height/length using standard infantometers and stadiometers, and MUAC using non-stretchable measuring tapes. Clinical data were extracted from medical records, nursing notes, and laboratory reports, while information on sociodemographic factors was obtained through structured interviews with parents or caregivers. All data collectors were trained in standardized measurement techniques and questionnaire administration to ensure consistency and reliability of data collection.

Data Management and Statistical Analysis

Data were entered into a Microsoft Excel spreadsheet and subsequently imported into SPSS version 25.0 for statistical analysis. Data cleaning procedures included checking for completeness, consistency, and logical errors, with appropriate corrections made through verification with source documents. Descriptive statistics were used to summarize categorical variables as frequencies and percentages, while continuous variables were described using means and standard deviations or medians and interquartile ranges depending on data distribution. The primary outcome variable was treatment success, defined as achieving discharge criteria including clinical stability, appropriate weight gain, and resolution of edema. Secondary outcomes included length of hospital stay, complications developed during treatment, and in-hospital mortality. Bivariate analysis was performed using chi-square tests for categorical variables and independent t-tests or Mann-Whitney U tests for continuous variables. Multivariable logistic regression analysis was conducted to identify independent predictors of treatment outcomes, with variables having p-value less than 0.25 in bivariate analysis being included in the multivariable model. Statistical significance was set at $p<0.05$ for all analyses.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee of Ananta Institute of Medical Sciences & Research Centre prior to initiation of data collection activities. The study was conducted in accordance with the principles outlined in the Declaration of Helsinki and Good Clinical Practice guidelines. Written informed consent was obtained from parents or legal guardians of all participating children after providing detailed information about the study objectives, procedures, potential risks and benefits, and their rights as research participants.

Results

Table 1: Sociodemographic Characteristics of Study Participants (N=264)

Variable	Category	Frequency (n)	Percentage (%)
Age Groups	6-12 months	142	53.8
	13-24 months	89	33.7
	25-36 months	23	8.7
	37-60 months	10	3.8
Gender	Male	138	52.3
	Female	126	47.7
Residence	Rural	201	76.1
	Urban	63	23.9
Socioeconomic Status	Lower	184	69.7
	Middle	68	25.8
	Upper	12	4.5
Maternal Education	Illiterate	156	59.1
	Primary	74	28.0
	Secondary and above	34	12.9
Exclusive Breastfeeding	Yes (≥6 months)	98	37.1
	No	166	62.9

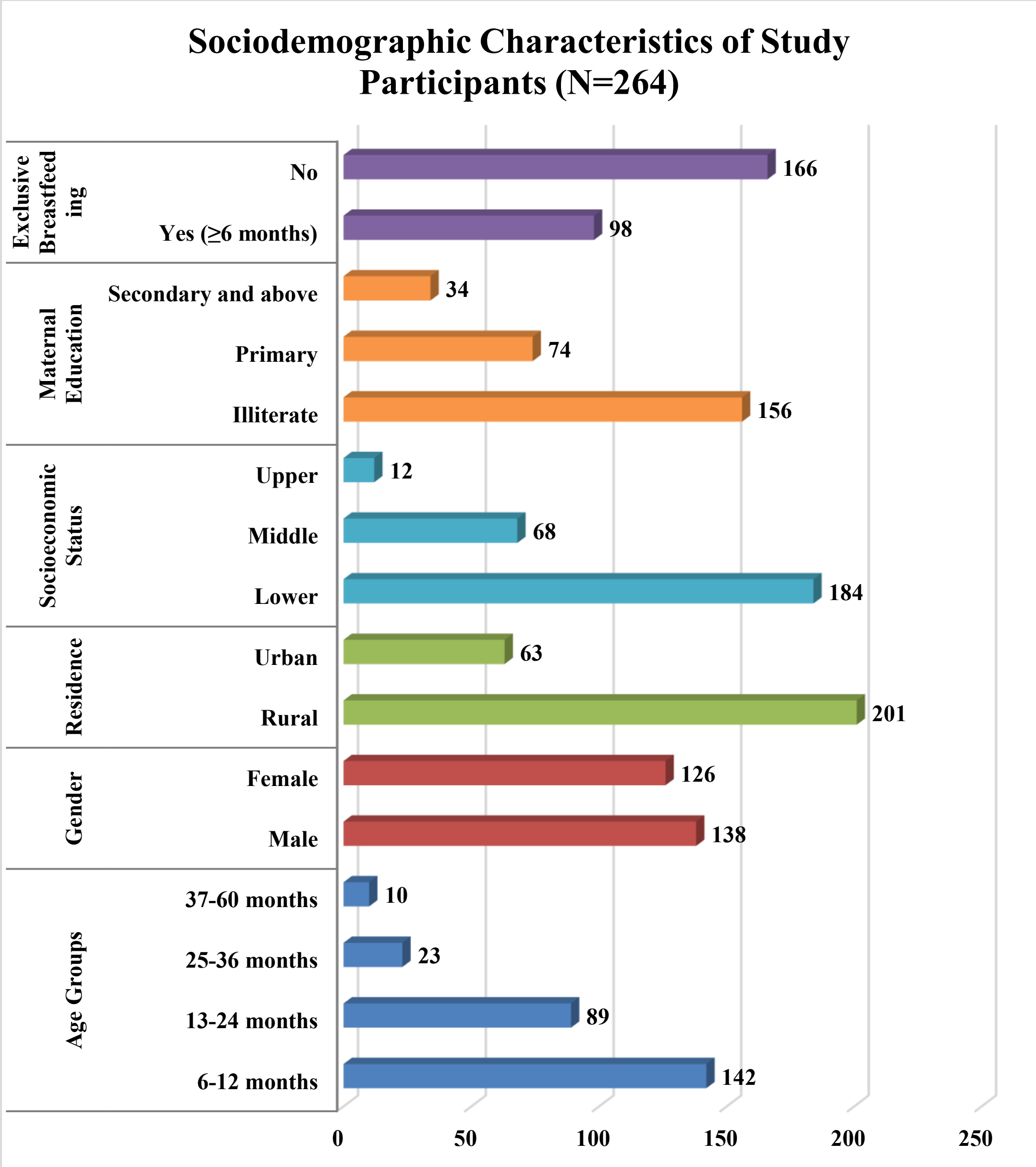

Fig: 1

Table 2: Clinical Presentation and Anthropometric Parameters (N=264)

Variable	Category	Frequency (n)	Percentage (%)
Type of SAM	Marasmus	145	54.9
	Kwashiorkor	76	28.8
	Marasmic-kwashiorkor	43	16.3
Edema	Present	119	45.1
	Absent	145	54.9
MUAC Categories	<11.0 cm	89	33.7
	11.0-11.4 cm	128	48.5
	≥11.5 cm (with edema)	47	17.8
Weight-for-Height Z-score	<-4 SD	98	37.1
	-4 to -3 SD	123	46.6
	≥-3 SD (with edema)	43	16.3
Appetite Test	Passed	187	70.8
	Failed	77	29.2

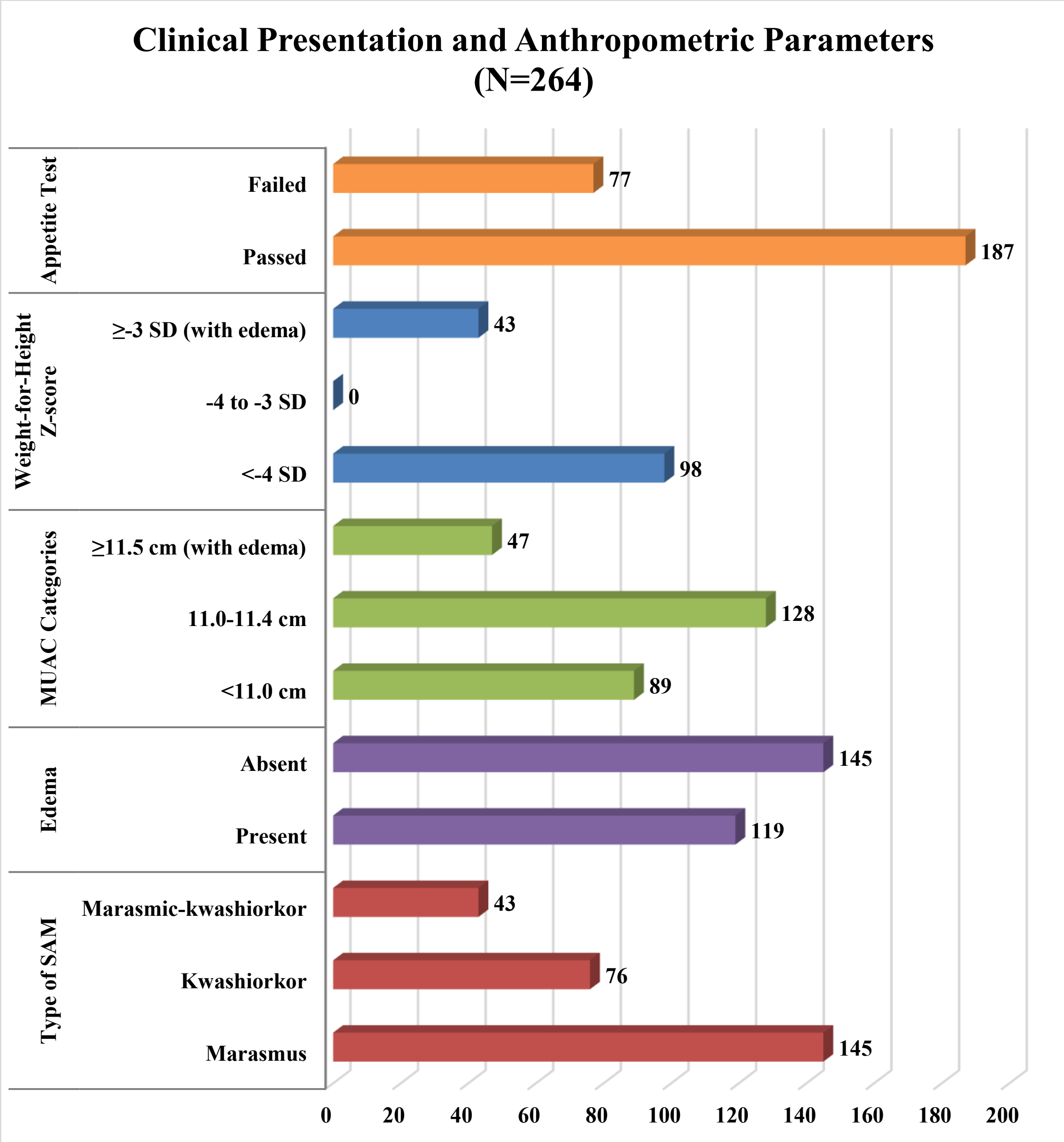

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Table 3: Associated Comorbidities and Medical Complications (N=264)

Comorbidity	Present, n (%)	Absent, n (%)
Diarrhea	156 (59.1)	108 (40.9)
Pneumonia/ARI	134 (50.8)	130 (49.2)
Anemia	198 (75.0)	66 (25.0)
Fever	142 (53.8)	122 (46.2)
Skin Changes	89 (33.7)	175 (66.3)
Tuberculosis	23 (8.7)	241 (91.3)
Sepsis	34 (12.9)	230 (87.1)
Dehydration	123 (46.6)	141 (53.4)
Hypoglycemia	45 (17.0)	219 (83.0)
Hypothermia	67 (25.4)	197 (74.6)

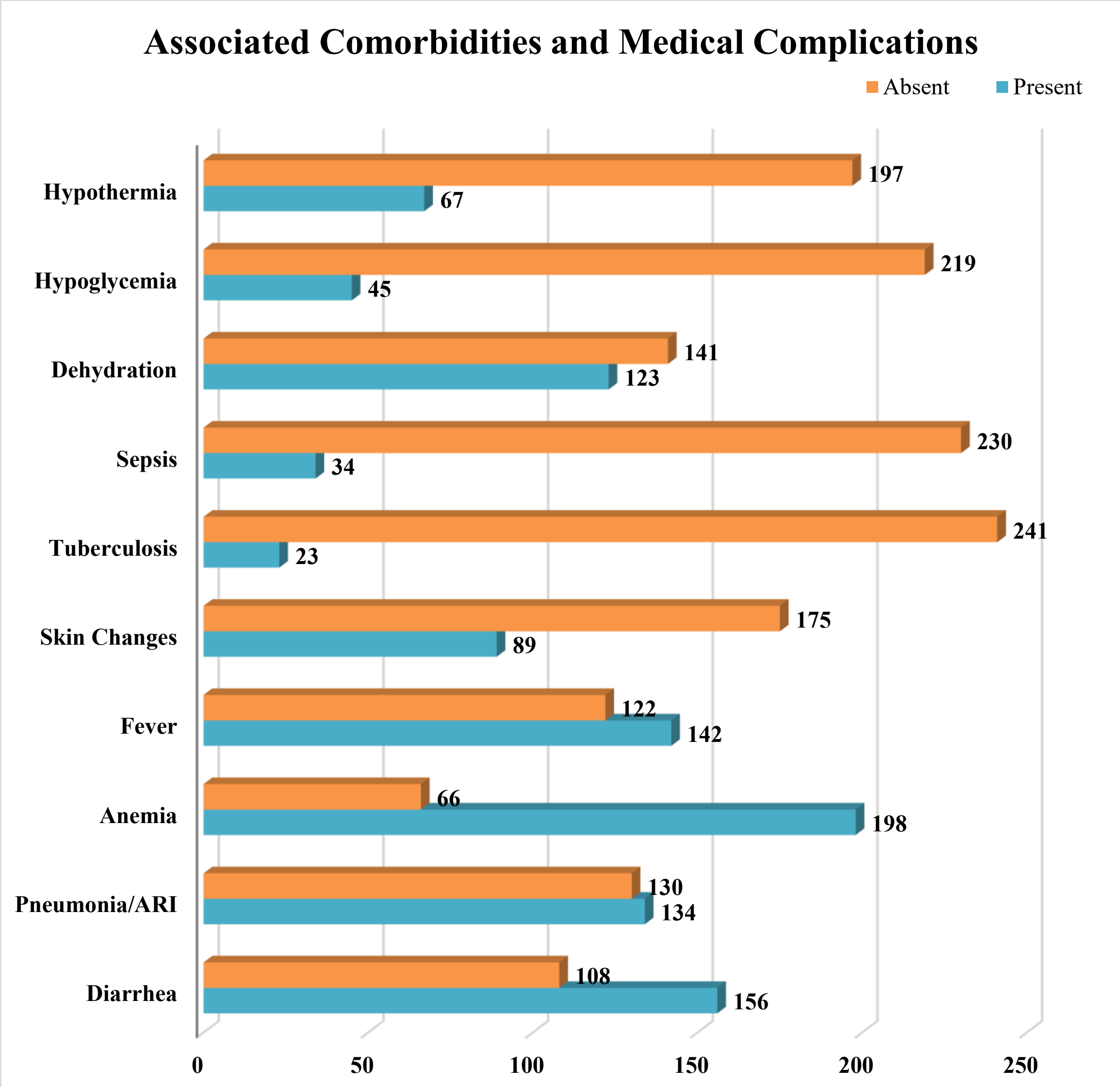

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Table 4: Treatment Outcomes and Clinical Progress (N=264)

Outcome	Category	Frequency (n)	Percentage (%)
Final Outcome	Cured/Discharged	184	69.7
	Death	34	12.9
	Defaulted/LAMA	46	17.4
Weight Gain	Adequate (≥8g/kg/day)	156	59.1
	Inadequate (<8g/kg/day)	108	40.9
Edema Resolution	Complete (n=119)	89	74.8
	Partial/None	30	25.2
Appetite Improvement	Yes	203	76.9
	No	61	23.1
Complications During Treatment	Developed	78	29.5
	None	186	70.5

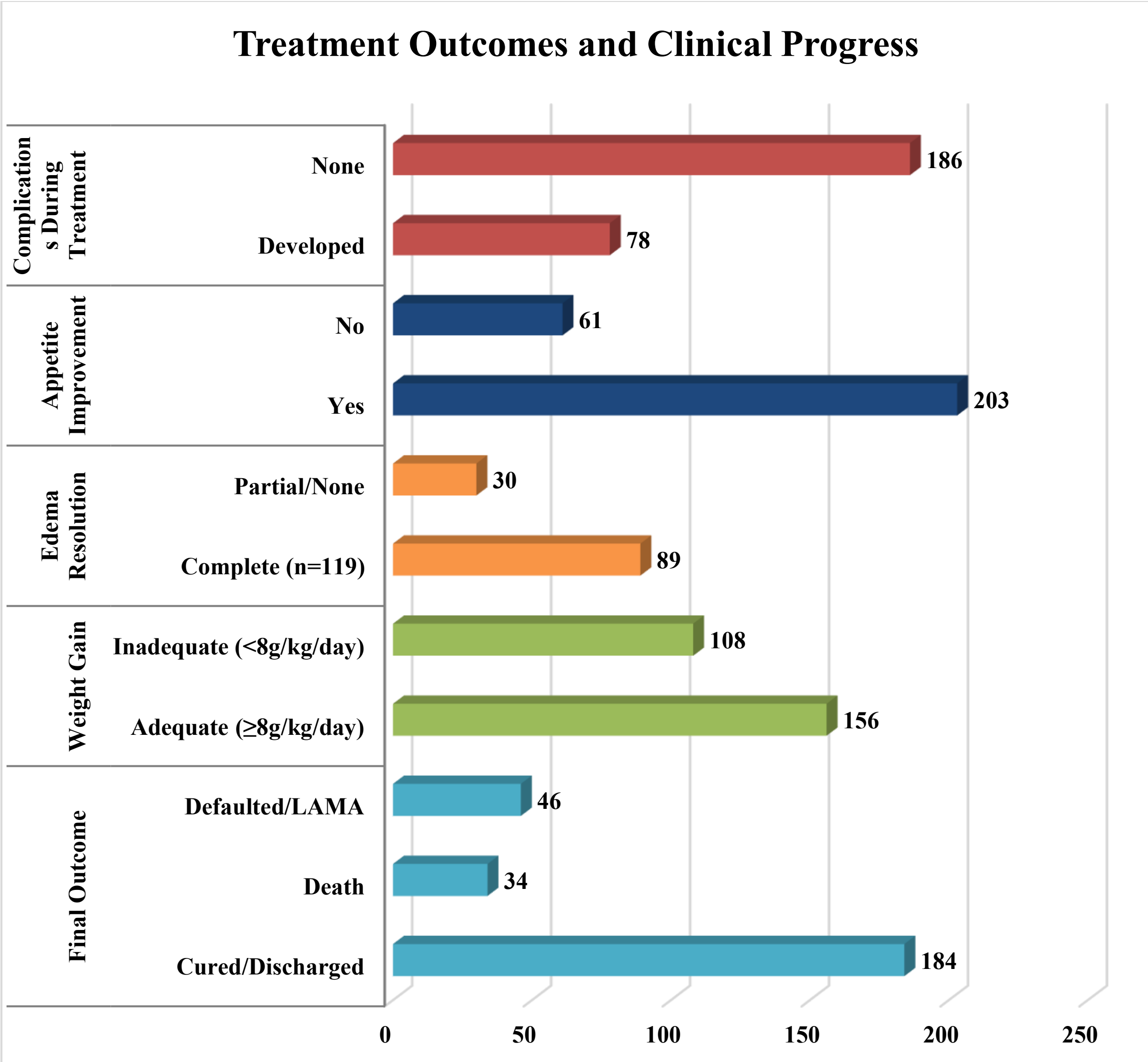

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Table 5: Factors Associated with Treatment Success - Bivariate Analysis (N=264)

Variable	Treatment Success	Treatment Failure	p-value	OR (95% CI)
	n=184 (%)	n=80 (%)		
Age Group			0.034	
6-24 months	165 (71.4)	66 (28.6)		2.34 (1.12-4.89)
25-60 months	19 (57.6)	14 (42.4)		Reference
Gender			0.423	
Male	94 (68.1)	44 (31.9)		0.84 (0.51-1.38)
Female	90 (71.4)	36 (28.6)		Reference
Residence			0.012	
Rural	133 (66.2)	68 (33.8)		0.45 (0.24-0.84)
Urban	51 (81.0)	12 (19.0)		Reference
Exclusive Breastfeeding			0.001	
Yes	78 (79.6)	20 (20.4)		2.67 (1.48-4.81)
No	106 (63.9)	60 (36.1)		Reference
Pneumonia			<0.001	
Present	83 (61.9)	51 (38.1)		0.41 (0.25-0.68)
Absent	101 (77.7)	29 (22.3)		Reference
Severe Edema			0.045	

Present	78 (65.5)	41 (34.5)		0.62 (0.37-1.02)
Absent	106 (73.1)	39 (26.9)		Reference

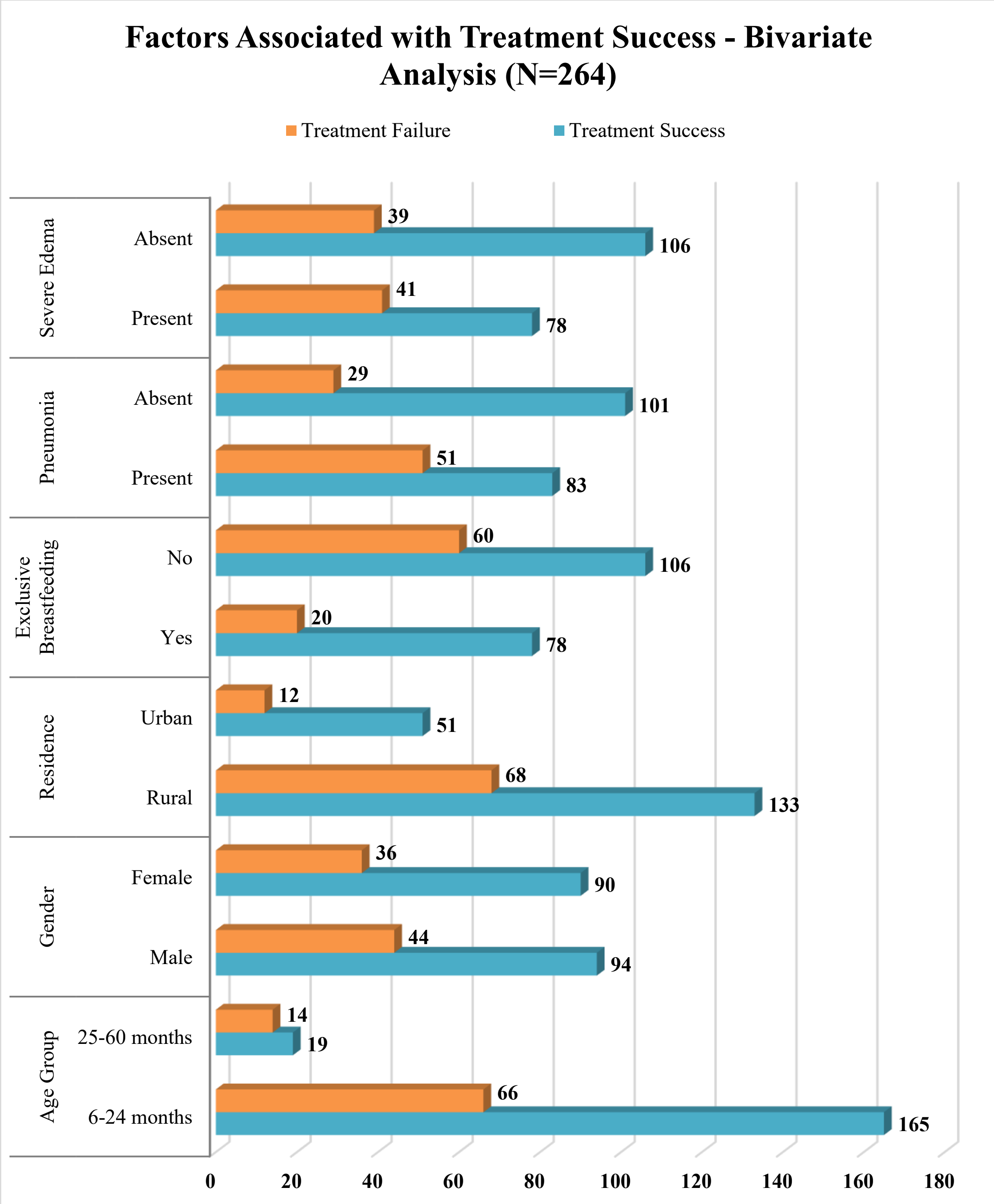


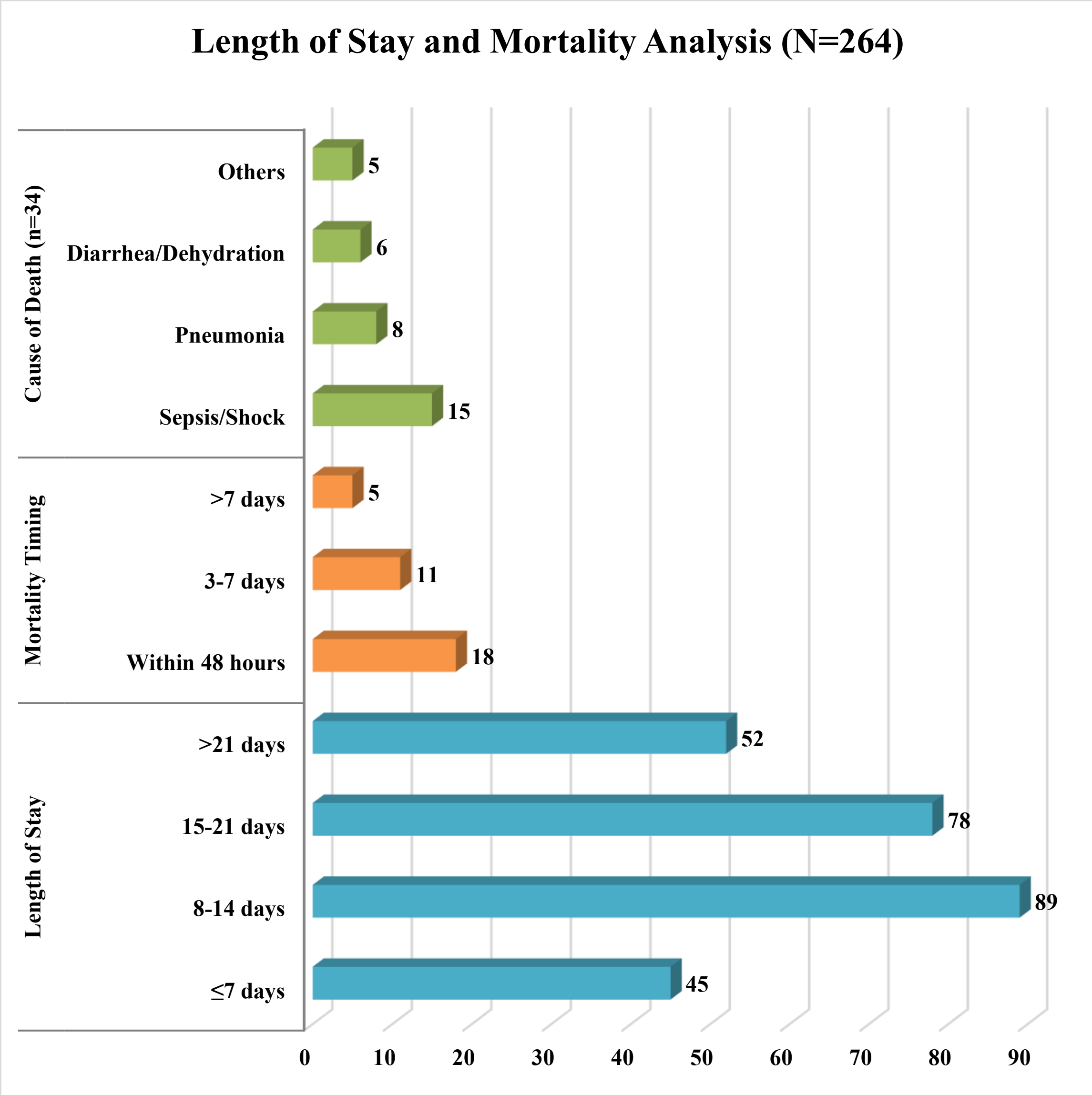
Fig: 5

Table 6: Length of Stay and Mortality Analysis (N=264)

Parameter	Category	Frequency (n)	Percentage (%)
Length of Stay	≤7 days	45	17.0
	8-14 days	89	33.7
	15-21 days	78	29.5
	>21 days	52	19.7
Mean LOS ± SD	14.8 ± 8.6 days		
Mortality Timing	Within 48 hours	18	52.9*

	3-7 days	11	32.4*
	>7 days	5	14.7*
Cause of Death (n=34)	Sepsis/Shock	15	44.1
	Pneumonia	8	23.5
	Diarrhea/Dehydration	6	17.6
	Others	5	14.7

*Percentages calculated from total deaths (n=34)



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Discussion

The present study revealed that the majority of children with severe acute malnutrition were in the 6-12 months age group (53.8%), followed by 13-24 months (33.7%), indicating that 87.5% of cases occurred within the first two years of life. This finding aligns with previous research by Sharma et al. (2023), who reported that 86% of SAM children were below 2 years of age, and Devi et al. (2015), who found 81% of cases in the same age group. The predominance of SAM in infancy and early childhood reflects the critical vulnerability period when children transition from exclusive breastfeeding to complementary feeding, often coinciding with weaning practices and increased exposure to infections.

The gender distribution showed a slight male predominance (52.3% vs 47.7%), which is consistent with findings from multiple Indian studies including those by Kumar et al. (2013) and David et al. (2020), who reported similar gender ratios. This pattern may reflect cultural preferences in healthcare-seeking behavior and nutritional allocation within households, though the difference was not statistically significant in treatment outcomes.

Rural residence was significantly more common among SAM children (76.1%), reflecting the higher burden of malnutrition in rural areas due to limited access to healthcare services, poor sanitation, food insecurity, and lower socioeconomic status. This finding corroborates the work of Burza et al. (2015) in their Bihar study, where rural children constituted the majority of SAM cases. The urban-rural disparity in malnutrition prevalence highlights the need for strengthened community-based interventions and improved healthcare infrastructure in rural areas.

The socioeconomic profile demonstrated a strong association between poverty and severe malnutrition, with 69.7% of children belonging to lower socioeconomic status families. This finding is supported by David et al. (2020), who identified low socioeconomic status as a significant risk factor for SAM. Maternal illiteracy was present in 59.1% of cases, emphasizing the crucial role of maternal education in child nutrition outcomes, as mothers with higher education levels are more likely to adopt appropriate feeding practices and seek timely healthcare.

The clinical presentation analysis revealed that marasmus was the most common form of SAM (54.9%), followed by kwashiorkor (28.8%) and mixed forms (16.3%). This distribution differs from some African studies but is consistent with the typical SAM pattern observed in South Asian populations, where chronic energy deficiency leading to marasmus predominates over protein deficiency causing kwashiorkor. The presence of edema in 45.1% of children indicates a significant proportion with kwashiorkor or mixed forms, requiring careful clinical assessment and appropriate therapeutic approaches.

Mid-upper arm circumference (MUAC) measurements showed that 48.5% of children had MUAC between 11.0-11.4 cm, while 33.7% had MUAC below 11.0 cm, indicating severe wasting. These findings align with studies by Sougaijam et al. (2019), who validated MUAC cut-offs for SAM detection in Indian children. The appetite test results showed that 70.8% of children passed the test, suggesting that the majority could be managed with standard feeding protocols without requiring intensive stabilization measures.

The study revealed a high burden of associated medical conditions, with diarrhea being the most common comorbidity (59.1%), followed by pneumonia/acute respiratory infections (50.8%) and anemia (75.0%). These findings are consistent with previous research by Nhampossa et al. (2013), who reported similar comorbidity patterns in hospitalized SAM children. The high prevalence of infectious diseases reflects the compromised immune status of malnourished children and the bidirectional relationship between malnutrition and infection.

The occurrence of anemia in three-quarters of SAM children highlights the complex nutritional deficiencies beyond energy and protein, involving micronutrients such as iron, folate, and vitamin B12. This finding supports the need for comprehensive nutritional rehabilitation including micronutrient supplementation, as emphasized in WHO guidelines for SAM management.

Serious complications such as sepsis (12.9%) and tuberculosis (8.7%) were less common but carried significant mortality risk. The presence of hypothermia in 25.4% of children and hypoglycemia in 17.0% indicates metabolic instability requiring immediate stabilization measures, consistent with the clinical spectrum described by Chiabi et al. (2017) in their Cameroon study.

The overall cure rate of 69.7% in this study falls within the acceptable range according to international standards, though it is at the lower end of the WHO-recommended target of >75% recovery rate. This finding is comparable to studies by Meseret et al. (2024), who reported similar recovery rates in Ethiopian children, and Sharma et al. (2023), who achieved 70% cure rates in their Indian cohort. The mortality rate of 12.9% was within acceptable limits (<10% according to Sphere standards) but indicates room for improvement in clinical management protocols.

The defaulter rate of 17.4% exceeds the recommended threshold of <15%, suggesting challenges in maintaining treatment adherence and follow-up. This pattern has been observed across multiple studies in resource-limited settings and reflects complex socioeconomic factors including opportunity costs of prolonged hospitalization, distance from healthcare facilities, and inadequate family support systems.

Weight gain adequacy, achieved in 59.1% of children, indicates moderate success in nutritional rehabilitation. The target weight gain of ≥8g/kg/day is crucial for successful recovery, and the suboptimal achievement suggests need for closer monitoring of feeding protocols and identification of children requiring modified therapeutic approaches.

The bivariate analysis revealed several significant predictors of treatment success. Younger age (6-24 months) was associated with better outcomes (OR: 2.34, 95% CI: 1.12-4.89), possibly due to higher growth potential and better response to nutritional rehabilitation in younger children. This finding contrasts with some studies that report worse outcomes in very young children due to higher vulnerability to complications.

Exclusive breastfeeding for the first six months emerged as a strong protective factor (OR: 2.67, 95% CI: 1.48-4.81), highlighting the long-term benefits of appropriate early feeding practices. This finding reinforces the importance of breastfeeding promotion as a preventive strategy for severe malnutrition, consistent with recommendations by various international organizations.

Urban residence was associated with better treatment outcomes, likely reflecting better access to healthcare services, higher socioeconomic status, and improved family support systems. The presence of pneumonia significantly reduced the likelihood of treatment success (OR: 0.41, 95% CI: 0.25-0.68), emphasizing the critical role of comorbidity management in SAM treatment protocols.

The mortality analysis revealed that 52.9% of deaths occurred within the first 48 hours of admission, indicating that children with SAM often present in critical condition requiring immediate stabilization. This pattern is consistent with findings from multiple studies including those by Laghari et al. (2013), who reported similar early mortality patterns. The high early mortality rate underscores the importance of early recognition, prompt referral, and effective emergency management protocols for SAM children.

Sepsis emerged as the leading cause of death (44.1%), followed by pneumonia (23.5%) and severe dehydration (17.6%). These findings highlight the critical importance of infection prevention and management in SAM treatment protocols. The mean length of stay of 14.8 ± 8.6 days was comparable to international standards and previous studies, though children with complications had significantly longer hospital stays.

The study findings have important implications for healthcare system planning and resource allocation. The high burden of comorbidities and complex clinical presentations require well-trained healthcare personnel, adequate diagnostic facilities, and consistent supply of therapeutic foods and medications. The cost implications, as highlighted by studies on disease-related malnutrition in hospitalized children, emphasize the economic burden on healthcare systems and families.

The seasonal variation in SAM presentations, though not specifically analyzed in this study, has been documented in previous research and requires healthcare systems to maintain surge capacity during peak seasons. The integration of community-based screening and referral systems with hospital-based treatment facilities is crucial for improving early detection and reducing the burden of complicated SAM requiring hospitalization.

Conclusion

This hospital-based descriptive study of 264 children with severe acute malnutrition revealed that the majority of cases occurred in infants and young children under 24 months from rural, socioeconomically disadvantaged families. The predominant clinical presentation was marasmus, with high prevalence of associated comorbidities including diarrhea, pneumonia, and anemia. The overall treatment success rate of 69.7% was acceptable but below optimal standards, with mortality occurring primarily within the first 48 hours of admission. Factors significantly associated with better outcomes included younger age, exclusive breastfeeding history, urban residence, and absence of pneumonia. The study findings highlight the complex interplay between socioeconomic factors, clinical presentation, and treatment outcomes in severe acute malnutrition management. Early mortality patterns emphasize the critical importance of prompt recognition, immediate stabilization, and comprehensive management of medical complications in improving survival outcomes for children with severe acute malnutrition.

Recommendations

Healthcare facilities managing severe acute malnutrition should implement enhanced early recognition and rapid stabilization protocols to reduce the high mortality observed within the first 48 hours of admission. Strengthened community-based screening programs focusing on rural areas and high-risk populations are essential for early identification and referral of SAM cases. Integration of infection prevention and management protocols, particularly for pneumonia and sepsis, should be prioritized given their significant impact on treatment outcomes. Comprehensive training programs for healthcare personnel on standardized SAM management protocols, including proper anthropometric assessment and therapeutic feeding techniques, are crucial for improving cure rates. Establishment of robust follow-up systems to reduce defaulter rates and ensure sustained recovery should be implemented. Furthermore, development of targeted interventions addressing maternal education, exclusive breastfeeding promotion, and socioeconomic determinants of malnutrition through multisectoral collaboration is essential for long-term prevention strategies. Regular monitoring and evaluation systems should be established to track treatment outcomes and identify areas for quality improvement in SAM management programs.

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