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Feeding Patterns of Children Under 24 Months with Severe Acute Malnutrition at Khyber Teaching Hospital, Peshawar

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ABSTRACT

Objectives: To determine the feeding patterns among children under 24 months presenting with severe acute malnutrition. **Study design:** Cross-sectional Study. **Place and duration of study:** Department of Pediatrics, MTI, Khyber Teaching Hospital Peshawar, from 11th of August 2024 to 11th February 2025. **Methodology:** A total of 325 children under 24 months of age diagnosed with severe acute malnutrition (as defined by WHO criteria) were included in this study through consecutive sampling. All the data regarding sociodemographic characteristics, feeding patterns and nutritional practices were collected through structured interviews with mothers, clinical examinations, and anthropometric measurements. Descriptive analysis was done to determine the feeding patterns among these children presenting with severe acute malnutrition. **Results:** The mean age of children in this study was 13.14±5.96 months. Males constituted 52% of the total study population, while females accounted for 48%. The demographics and socioeconomic characteristics showed that most of the children belonged to age group of 7-12 months (31.4%), most were rural residents (51.7%), most of the mothers had primary level of education (39%) and majority were belonging to lower income status (53%). The details of feeding patterns showed that most of the children were never breastfed/had early cessation of breastfeeding (56.3%). A notable proportion had started earlier mixed feeding (40.3%), started complementary feeding after 6 months (41%) and were having <3 meals/day (35%). **Conclusion:** Suboptimal feeding practices in shape of early cessation of breastfeeding, inappropriate mixed feeding and lack of complementary feeding significantly contribute to severe acute malnutrition in children under 24 months.

INTRODUCTION

Malnutrition is a global health problem that causes 3 million deaths on annual basis among children under five year of age, suggesting an urgency of addressing malnutrition.[1] The issue disproportionately affects developing countries, driven by poverty, food insecurity, poor feeding practices, and inadequate sanitation, contributing significantly to childhood morbidity and mortality worldwide.[2]

Wasting in children is a dangerous condition where rapid weight loss occurs due to poor nutrition or illness. It weakens the immune system and can cause death if severe. Causes include food scarcity, poor diet, illness, infections, and inadequate childcare. Affected children need immediate therapeutic feeding and medical care to survive.[3] Severe Acute Malnutrition (SAM), is the most critical form of undernutrition, which is marked by rapid weight loss, extreme wasting, or nutritional edema, indicating a life-threatening condition. Chronic malnutrition can lead to stunting in children, which appears when a child fails to reach the expected height for their age due to prolonged nutritional deficiencies, repeated infections, or inadequate maternal nutrition during pregnancy. Stunting can have long-term effects on physical and cognitive development.[3,4] Asia is reported to bear more than half of the world's stunted children and over two-thirds of those who are wasted.[5,6]

With inadequate feeding practices, infectious diseases, and poor socio-economic conditions, children under 24 months are particularly vulnerable to SAM due to their rapid growth and development phase. Feeding patterns during the first two years of life, thereby, play a pivotal role in determining a child's nutritional status, growth, and overall health. The World Health Organization (WHO) recommends exclusive

breastfeeding (EBF) for the first six months of life, which is to be followed by the introduction of appropriate complementary feeding (CF) while continuing breastfeeding, up to two years or beyond. This becomes a matter of deep concern that 11.6% of the deaths in children belonging to this age group are attributed to suboptimal breastfeeding practices.[2] These suboptimal feeding practices are not only linked to early cessation of breastfeeding, but improper introduction of CF, and reliance on non-nutritive, inadequate nutrient intake (lack of dietary diversity) or unsafe feeding methods (Bottle feeding).[5,6,7] The data strongly suggest that poor feeding practices, inadequate quality of CF, and infectious diseases significantly affect child survival, growth, and development with lifelong consequences.[8] Understanding the feeding patterns of children under 24 months of age is, therefore, important to address this problem and to develop targeted interventions for improved nutritional outcomes. [9]

The factors influencing the feeding patterns and nutritional status of children are originated from socio-cultural norms, maternal education, and awareness gaps. Pakistan, belongs to those developing Asian countries where malnutrition remains a pressing issue.[10] The province of Khyber Pakhtunkhwa, and specifically Peshawar faces significant challenges in addressing childhood malnutrition. Cases of wasting, SAM and stunting are quite frequently reported at the pediatric department of Khyber Teaching Hospital. Despite the above mentioned situation, the work on this topic is limited in our region. This study was, therefore, planned to determine the feeding patterns of Children under 24 months of age presenting with SAM. The findings of this study will provide an insight of feeding patterns to our pediatricians attending these children and will help to develop an evidence based strategy for improved feeding patterns.

METHODS

This cross-sectional study was conducted at the Department of Pediatrics, MTI, Khyber Teaching Hospital Peshawar, from 11th of August 2024 to 11th February 2025, over a period of 6 months, after taking approval from the research review board of the hospital (556/DME/KMC: Dated 11-7-2024).

The sample size was calculated as per following details:

Precision= 5.00%, Prevalence = 29.90%.[11]

Estimated sample size: n=323

A total of 325 children under 24 months of age, diagnosed with severe acute malnutrition (as defined by WHO criteria) were included in this study through consecutive sampling.

Exclusion Criteria: Was set as children with chronic illnesses (including congenital heart disease and other congenital disorders), infants born to diabetic mothers, and children who had been separated from their mothers in the previous six months. Cases referred from other hospitals where feeding histories could not be verified, children presenting with unilateral edema and those whose malnutrition was attributed to confirmed causes other than primary nutritional deficiency were also excluded.

Informed written consent was taken from the parents/guardians of children participating in the study.

All the data regarding sociodemographic characteristics (age, gender, weight, height, maternal education, and economic status), feeding patterns and nutritional practices were collected through structured interviews with mothers, clinical examinations, and anthropometric measurements.

The primary objectives was to determine the feeding pattern among these children under 24 months presenting with severe acute malnutrition to the pediatric ward.

SAM was defined as per WHO child growth standards that is, having any one of these criteria: weight-for-height/length Z-score below -3 SD of the median, mid-upper arm circumference less than 115mm, or presence of nutritional edema.[12]

Feeding patterns were categorized into: (1) EBF, where the infant receives only breast milk along with oral rehydration solution (ORS), vitamin drops, minerals, or any medicines if required for the first six months of life; (2) predominant breastfeeding, where breast milk is the primary source of nourishment with minimal additional liquids; (3) mixed feeding, where the infant receives both breast milk and other foods or liquids, including water, non-human milk, and formula; (4) formula feeding only, where the infant is fed exclusively with commercial infant formula with a nipple or teat; (5) CF with continued breastfeeding, where age-appropriate solid/semi-solid foods are given along with continued breastfeeding (for 6-24 months); (6) and CF without breastfeeding, where age-appropriate solid/semi-solid foods are given without any breastfeeding.[13]

Frequency of these meals on daily basis was also noted down.

Data analysis was performed using SPSS version 26. Descriptive analysis were used to present the sociodemographic and feeding patterns. Frequencies and percentages were calculated for categorical variables including gender, residential status, education levels, economical status and feeding patterns, while means ± standard deviation or median (IQR) were computed for quantitative variables such as age.

RESULTS

The mean age of children in this study was 13.14±5.96 months with an age range of 2-23 months. Males constituted 52% of the total study population, while

females accounted for 48%. The demographics and socioeconomic characteristics of study participants showed that most of the children belonged to age group of 7-12 months (31.4%), most were rural residents (51.7%), most of mothers had primary level of education status (39%) and majority were belonging to lower income status (53%), are shown in Table-I.

Table I

Demographics and socioeconomic characteristics n=325

Demographics and socioeconomic characteristics		
Age (Mean±SD) years		13.14±5.96
Age groups	0-6 month n (%)	53 (16.3)
	7-12 month n (%)	102 (31.4)
	13-18 month n (%)	91 (28)
	19-24 months n (%)	79 (24.3)
Gender	Male n (%)	169 (52)
	Female n (%)	156 (48)
Residential status	Urban n (%)	139 (43)
	Rural n (%)	186 (57)
Education levels of mothers	Uneducated n (%)	101 (31)
	Primary n (%)	127 (39)
	Secondary n (%)	81 (25)
	≥Higher secondary n (%)	16 (5)
Economic status	Lower n (%)	172 (53)
	Middle n (%)	127 (39)
	High n (%)	26 (8)

The details of feeding patterns of children participating in this study showed that most of children were never breastfed or had early cessation of breastfeeding (56.3%), they had mixed feeding practices (40.3%), a good proportion had started CF after 6 months (41%) and were having <3 meals/day (35%), as shown in Table-II.

Table II

Feeding patterns n=325

Feedings patterns		
Feeding practice	EBF n (%)	47 (14.5)
	Predominant breastfeeding n (%)	45 (13.8)
	Mixed feeding n (%)	131 (40.3)
	Formula feeding only n (%)	25 (7.7)
	CF with continued breastfeeding n (%)	52 (16)
	CF without breastfeeding n (%)	25 (7.7)
Breastfeeding History	Never breastfed n (%)	27 (8.3)
	Early cessation (<6 months) n (%)	156 (48)
	Continued breastfeeding n (%)	142 (43.7)
CF	Before 6 months n (%)	192 (59)
	> 6 months n (%)	133 (41)
Meal frequency	<3 meals/day n (%)	114 (35)
	≥3 meals/day n (%)	211 (65)

DISCUSSION

The mean age of children in our study was 13.14±5.96 months with an age range of 2-24 months. Males constituted 52% of the total study population, while females accounted for 48%. The demographics and socioeconomic characteristics of study participants showed that most of the children belonged to age group of 7-12 months (31.4%), most were rural residents (51.7%), most of mothers had primary level of education (39%) and majority were belonging to lower income status (53%). The details of feeding patterns of children participating in this study showed that EBF/predominant breastfeeding were reported only in 28.3% of children while 7.7% were completely on formula feeding. Most of children were never breastfed or had early cessation of breastfeeding (56.3%), which is a serious deviation from WHO recommendations for EBF. A good proportion had started earlier mixed feeding practices (40.3%), which can lead to increased risk of infection, reduced breast milk intake and compromised absorption of essential nutrients. The start of CF along with breastfeeding was recorded in very few (16%), notable proportion had started CF after 6 months (41%) and were having <3 meals/day (35%), which is also an important feeding concern.

The topic of feeding patterns of children has been discussed with different perspectives in a number of studies conducted in lower to middle income countries (LMCs) including Pakistan.

In a study conducted by Gebremaryam T et al in Ethiopia, the feeding patterns of children 6–23 months of age presented with SAM were studied in comparison to healthy children. The study identified that inappropriate feeding practices, including CF [(AOR = 6.21, 95% CI: (1.44, -26.76)] and poor dietary diversity (dietary diversity score < 5)

[(AOR = 9.20, 95% CI; 3.40, -19.83), were critical determinants of malnutrition. The study also found that SAM children under 2 years of age had a 9 times more chances of mortality than the healthy ones.[11] Asim M and Nawaz S performed a comprehensive review on malnutrition of children in Pakistan including the data from 28 research papers. Early months of age from birth to 23 months was identified as crucial, with malnutrition often beginning in early infancy and persisting into later stages of childhood. Suboptimal feeding practices, particularly lack of exclusive breastfeeding and delayed CF, were found as critical determinants of this malnutrition. These practices were found in families having low maternal literacy, rural residence and insufficient awareness about proper feeding practices.[14]

The findings of our study were also endorsed in a cross-sectional study by Ayub F et al. where inappropriate breastfeeding practices and late initiation of CF with lack of dietary diversity in food were found as the common practices among malnourished children aging 9.18 ± 5.90 months. Exclusive breastfeeding for 6 months was reported with significantly lower severe malnutrition rates ($p < 0.001$). These findings emphasized the need for earlier, diverse, and adequate feeding practices to improve nutritional status of infants.[15]

A study conducted on prevalence malnutrition among children in Lebanon, found that only 30% were EBF up to 6 months while continued breastfeeding was observed only in 23% of children. Formula milk was also given in half of the children who were breastfed during first 6 months of life. Very low dietary diversity was observed in 32% of the study participants.[16]

Mehmood R et al recently published their work on introduction of CF in children between the ages of 6-12 years and recorded that initiation of CF at appropriate age was only done in 60% of the children, in a study sample where 35.3% were underweight and 21.3% were facing stunting.[17]

The same observations were also shared by Deepak DH, who studied the inappropriate feeding patterns in SAM children (as per WHO criteria). The analysis revealed presence of various inappropriate feeding practices where prelacteal feeding was present in 40.4% and lack of EBF in the first 6 months was found in 64.2% of SAM cases. A history of bottle feeding in 65.1% and late initiation of CF (65.1%) were among the factors significantly associated with malnutrition.[18]

Our finding belongs to a single center research work, which is the major limitation of this study as its results can't be generalized as national figure. Future studies involving multiple centers with different demographics will add up to this useful data for SAM children in our local population.

CONCLUSION

Suboptimal feeding practices are frequently found in SAM children under 24 months of age. Most children experienced early cessation of breastfeeding or they were never breastfed, while CF was also introduced later than actually required. The population of SAM children are also characterized by rural predominance, low maternal education, and lower economic status.

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