



Feeding Pattern of Children Under 2 Years of Age with Severe Malnutrition Presenting in Hayatabad Medical Complex

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ARTICLE INFO

Keywords: Exclusive Breastfeeding, Artificial Feeding, Infant Nutrition, Severe Malnutrition, Vaccination Status, Feeding Practices.

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Declaration

Authors' Contribution

All authors equally contributed to the study and approved the final manuscript

Conflict of Interest: No conflict of interest.

Funding: No funding received by the authors.

Article History

Received: 13-04-2025 Revised: 18-06-2025
Accepted: 02-07-2025 Published: 15-07-2025

ABSTRACT

Background: To determine the frequency and distribution of various feeding patterns among children under two years of age diagnosed with severe malnutrition presenting at Hayatabad Medical Complex, Peshawar. **Methods:** A cross-sectional study was conducted over a period of six months (16 September, 2024 to 15 March, 2025) in the Department of Pediatrics, MTI-Hayatabad Medical Complex, Peshawar, Pakistan. A total of 118 malnourished children aged 2 to 12 months were enrolled using non-probability consecutive sampling. Data on age, gender, vaccination status, residence, and feeding practices were collected through caregiver interviews and clinical assessments. Feeding patterns were categorized as exclusive breastfeeding, predominant breastfeeding, formula feeding, or fresh cow's milk feeding. Data were analyzed using SPSS version 22.0. Chi-square tests were applied to assess associations, with $p \leq 0.05$ considered significant. **Results:** Exclusive breastfeeding was reported in 32.2% of participants, while 28.0% received formula, and 22.0% were fed fresh cow's milk. Age group, vaccination status, and duration of malnutrition were significantly associated with feeding practices. Younger infants, vaccinated children, and those with shorter durations of malnutrition were more likely to be exclusively breastfed. **Conclusion:** The study highlights low rates of exclusive breastfeeding among malnourished infants and emphasizes the need for improved maternal education and support programs to encourage optimal feeding practices. Integration of nutritional counseling into routine immunization and child health services may offer a practical strategy for reducing malnutrition.

INTRODUCTION

Malnutrition in early childhood is a critical public health issue, particularly in developing countries where access to nutritious food, healthcare, and maternal education remains limited. In children under five years of age, malnutrition contributes to nearly half of all deaths, largely due to weakened immunity and increased susceptibility to infectious diseases. The nutritional status of infants and young children is closely linked to feeding practices during the first two years of life, a period often referred to as the "critical window" for growth and development [1-3]

Breastfeeding, especially when practiced exclusively for the first six months, provides essential nutrients and immune protection, and plays a key role in preventing undernutrition. Despite widespread recommendations from global health authorities, exclusive breastfeeding rates remain suboptimal in many low-income settings. In Pakistan, early cessation of breastfeeding and the early introduction of formula or cow's milk are common, often influenced by cultural beliefs, family pressures, or lack of support from the healthcare system [4-6].

Several regional and national studies have shown that inadequate feeding practices significantly increase the risk of protein-energy malnutrition, especially in vulnerable populations. However, limited data exists on the specific feeding patterns among infants who are already severely malnourished. Most prior research focuses on the general population, leaving a gap in understanding the specific dietary behaviors and risk profiles within this high-risk group [7-9].

This study aims to bridge that gap by evaluating the frequency and types of feeding patterns among children under two years of age who present with severe malnutrition. The findings are expected to support targeted interventions that address early-life nutrition and help reduce the burden of child malnutrition in Pakistan.

METHODOLOGY

This was a cross-sectional observational study conducted in the Department of Pediatrics at Hayatabad Medical Complex, Peshawar. The study aimed to assess the feeding patterns of children under two years of age presenting with severe malnutrition.

The research was carried out over a minimum period of six months from 16th September, 2024 to 15th March, 2025, following the approval of the synopsis by CPSP and the hospital's ethical review board.

A total of 118 children were enrolled in the study. The sample size was calculated using the WHO sample size calculator, keeping a confidence level of 95%, margin of error at 6%, and an expected frequency of 12.2% for formula feeding based on previous literature. A non-probability consecutive sampling method was employed to recruit participants who met the inclusion criteria.

Inclusion Criteria

Children fulfilling the following criteria were included aged between 2 to 12 months. Of either gender. Diagnosed with severe malnutrition, as defined by the Gomez classification (<60% of expected weight-for-age).

Exclusion Criteria

Children were excluded if they had any chronic illness lasting more than three months, as reported by the parent or guardian.

Known congenital anomalies documented in their medical records. Preterm birth (gestational age <37 weeks) as per antenatal documentation.

Data Collection Procedure

After obtaining ethical clearance from the Institutional Review and Ethical Board (IREB), children presenting at the Pediatric OPD were screened for eligibility. Informed written consent was obtained from the parents or legal guardians after explaining the purpose and procedures of the study.

A structured data collection proforma was used to record relevant information, including Demographic details: age, gender, vaccination status, residence (urban/rural). Anthropometric measurements: weight and height were measured using calibrated pediatric scales and stadiometers. Feeding patterns: gathered through maternal interview and categorized based on WHO definitions Exclusive breastfeeding: child receives only breast milk (direct or expressed), with the exception of vitamins or medications. Predominant breastfeeding: breast milk plus water or other non-nutritive liquids. Artificial feeding: formula or animal milk (fresh or powdered), with or without solids. Each child's duration of malnutrition was also recorded based on caregiver recall and clinical documentation.

Data were entered and analyzed using SPSS version 22.0. Descriptive statistics were applied: means and standard deviations for quantitative variables (age, duration of malnutrition); frequencies and percentages for categorical variables (gender, residence, vaccination status, feeding patterns). To evaluate associations between feeding practices and demographic variables, the Chi-square test was used. A p-value ≤ 0.05 was considered statistically significant. Stratification was performed to assess the effect of confounding variables such as age, gender, residence, vaccination status, and duration of illness.

RESULTS

A total of 118 malnourished children under the age of two years were enrolled in the study. The demographic profile

of the participants is detailed in Table 1. Slightly more than half of the children (52.5%) were aged between 2 and 6 months, while 47.5% were between 7 and 12 months. The gender distribution showed a male predominance (55.9%) compared to females (44.1%). In terms of vaccination status, 62.7% of the children were vaccinated, whereas 37.3% were unvaccinated. Regarding their place of residence, 58.5% belonged to urban areas and 41.5% were from rural settings.

Table 1

Demographic Characteristics of Children with Severe Malnutrition (n = 118)

Variable	Frequency (n)	Percentage (%)
Age Group		
2-6 months	62	52.5%
7-12 months	56	47.5%
Gender		
Male	66	55.9%
Female	52	44.1%
Vaccination Status		
Vaccinated	74	62.7%
Unvaccinated	44	37.3%
Residence		
Urban	69	58.5%
Rural	49	41.5%

The feeding practices among the enrolled children are presented in Table 2. Exclusive breastfeeding was observed in 32.2% of the children. A smaller proportion (17.8%) were predominantly breastfed, receiving additional liquids like tea or juices. Formula milk feeding was practiced in 28.0% of cases, and 22.0% of children were fed fresh cow's milk. This reflects a considerable reliance on artificial feeding methods in malnourished infants.

Table 2

Distribution of Feeding Practices (n = 118)

Feeding Practice	Frequency (n)	Percentage (%)
Exclusive Breastfeeding	38	32.2%
Predominant Breastfeeding	21	17.8%
Formula Milk Feeding	33	28.0%
Fresh Cow's Milk Feeding	26	22.0%

To further explore relationships, feeding practices were analyzed against demographic characteristics using chi-square testing (Table 3). Age showed a significant association with exclusive breastfeeding ($p = 0.041$). Children aged 2-6 months were more likely to be exclusively breastfed compared to those aged 7-12 months. Vaccination status also had a statistically significant link with feeding pattern ($p = 0.031$); vaccinated children were more frequently breastfed than unvaccinated ones. However, no significant associations were observed for gender ($p = 0.273$) or residence ($p = 0.086$).

Table 3

Association between Feeding Practices and Demographic Variables

Variable	Exclusive BF	Artificial Feeding*	p-value
Age Group			0.041*
2-6 months	27 (43.5%)	35 (56.5%)	
7-12 months	11 (19.6%)	45 (80.4%)	
Gender			0.273
Male	21 (31.8%)	45 (68.2%)	
Female	17 (32.7%)	35 (67.3%)	

Vaccination			0.031*
Vaccinated	30 (40.5%)	44 (59.5%)	
Unvaccinated	8 (18.2%)	36 (81.8%)	
Residence			0.086
Urban	25 (36.2%)	44 (63.8%)	
Rural	13 (26.5%)	36 (73.5%)	

*Artificial Feeding = Formula Milk + Fresh Milk

*Statistical significance considered at $p \leq 0.05$

The effect of duration of malnutrition on feeding practices was also assessed (Table 4). A significant association was found ($p = 0.027$). Children who had been malnourished for four weeks or less were more likely to have been exclusively breastfed, whereas those with longer durations of malnutrition (> 4 weeks) were more likely to have been given artificial feeds. This trend highlights the protective role of early and continued exclusive breastfeeding against prolonged nutritional deterioration.

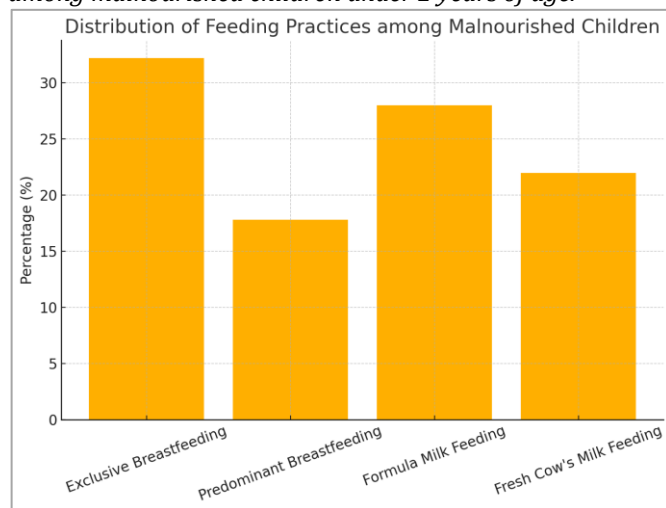
Table 4

Stratification of Feeding Practice by Duration of Malnutrition

Duration of Malnutrition	Exclusive BF	Artificial Feeding	p-value
≤ 4 weeks	24 (41.4%)	34 (58.6%)	0.027*
> 4 weeks	14 (22.2%)	49 (77.8%)	

Figure 1

bar graph showing the distribution of feeding practices among malnourished children under 2 years of age.



DISCUSSION

This study assessed the feeding patterns of children under two years of age who were diagnosed with severe malnutrition and presented to a tertiary care facility in Peshawar. The findings offer important insights into early childhood nutrition practices in this population and highlight critical gaps that may contribute to malnutrition during infancy.

In our study, exclusive breastfeeding was practiced in only 32.2% of children, which is substantially below the global recommendation of at least 50% by six months of age set by the World Health Organization. This figure is consistent with previous studies from Pakistan, where suboptimal exclusive breastfeeding rates have been reported, particularly among low-income populations [10-12]. The most commonly observed alternative feeding methods in our sample were formula feeding (28%) and

fresh cow's milk feeding (22%), both of which can increase the risk of gastrointestinal infections, allergic responses, and nutritional imbalances in infants [13-15].

Our findings showed a significant association between age and feeding pattern, with younger infants (2-6 months) more likely to be exclusively breastfed than older infants (7-12 months). This aligns with the studies, who noted a sharp decline in exclusive breastfeeding rates as infants approached the complementary feeding age, often due to misconceptions about breast milk sufficiency or social pressures to introduce other feeds [16, 17].

We also found that vaccinated children were more likely to be exclusively breastfed compared to unvaccinated children ($p = 0.031$). This suggests that mothers who follow immunization schedules may also be more receptive to health education regarding appropriate feeding practices. Studies supports this notion, indicating that maternal awareness and health-seeking behavior are strong predictors of improved child nutrition and care [18, 19].

Interestingly, while residence (urban vs. rural) and gender did not show statistically significant associations with feeding practices in our study, earlier studies suggest that rural residency is often linked to lower health literacy and reduced access to breastfeeding support services (Aiga et al., 2019). The lack of significance in our setting may reflect growing urbanization or improved outreach health services in rural areas surrounding Peshawar.

Furthermore, we observed that children with a shorter duration of malnutrition (≤ 4 weeks) were more likely to have been exclusively breastfed. This finding supports the protective role of breast milk in preventing prolonged nutritional deterioration, as emphasized by studies and WHO reports, which identify exclusive breastfeeding as a critical intervention to prevent both acute and chronic malnutrition [20].

Overall, the study underscores the need for strengthened breastfeeding promotion, especially during the first six months of life. Despite efforts by healthcare programs, artificial feeding practices remain prevalent, potentially driven by social norms, inadequate maternal education, and aggressive marketing of formula products.

CONCLUSION

The study reveals that a significant proportion of children under two years presenting with severe malnutrition were not exclusively breastfed. Artificial feeding methods, including formula and cow's milk, were commonly used and may have contributed to early onset of nutritional deficits. Exclusive breastfeeding was significantly associated with younger age, shorter duration of malnutrition, and vaccination status, suggesting that integrated maternal education and child health programs could help improve feeding practices.

Improving awareness, especially among caregivers of infants aged 6-12 months, and reinforcing breastfeeding support at the community and facility level are vital steps toward reducing the burden of malnutrition in Pakistan. Targeted interventions addressing both nutritional and immunization behaviors may yield synergistic benefits in early child health.

REFERENCES

1. Khaliq, A., Wraith, D., Miller, Y., & Nambiar, S. (2022). Association of infant feeding indicators and infant feeding practices with coexisting forms of malnutrition in children under six months of age. *Nutrients*, *14*(20), 4242. <https://doi.org/10.3390/nu14204242>
2. Medialdea, L., Bogin, B., Thiam, M., Vargas, A., Marrodán, M. D., & Dossou, N. I. (2021). Severe acute malnutrition morphological patterns in children under five. *Scientific Reports*, *11*(1). <https://doi.org/10.1038/s41598-021-82727-x>
3. Abi Khalil, H., Hawi, M., & Hoteit, M. (2022). Feeding patterns, mother-child dietary diversity and prevalence of malnutrition among under-five children in Lebanon: A cross-sectional study based on retrospective recall. *Frontiers in Nutrition*, *9*. <https://doi.org/10.3389/fnut.2022.815000>
4. Feng, J., Gong, Z., Wang, Y., Huo, J., & Zhuo, Q. (2022). Complementary feeding and malnutrition among infants and young children aged 6–23 months in rural areas of China. *Nutrients*, *14*(9), 1807. <https://doi.org/10.3390/nu14091807>
5. Govender, I., Rangiah, S., Kaswa, R., & Nzaumvila, D. (2021). Malnutrition in children under the age of 5 years in a primary health care setting. *South African Family Practice*, *63*(1). <https://doi.org/10.4102/safp.v63i1.5337>
6. Ghimire, U., Aryal, B. K., Gupta, A. K., & Sapkota, S. (2020). Severe acute malnutrition and its associated factors among children under-five years: A facility-based cross-sectional study. *BMC Pediatrics*, *20*(1). <https://doi.org/10.1186/s12887-020-02154-1>
7. Adeomi, A. A., Fatusi, A., & Klipstein-Grobusch, K. (2022). Food security, dietary diversity, dietary patterns and the double burden of malnutrition among school-aged children and adolescents in two Nigerian states. *Nutrients*, *14*(4), 789. <https://doi.org/10.3390/nu14040789>
8. Pomati, M., & Nandy, S. (2019). Assessing progress towards SDG2: Trends and patterns of multiple malnutrition in young children under 5 in west and Central Africa. *Child Indicators Research*, *13*(5), 1847-1873. <https://doi.org/10.1007/s12187-019-09671-1>
9. Anato, A. (2022). Severe acute malnutrition and associated factors among children under-five years: A community based-cross sectional study in Ethiopia. *Heliyon*, *8*(10), e10791. <https://doi.org/10.1016/j.heliyon.2022.e10791>
10. Hossain, A., Niroula, B., Duwal, S., Ahmed, S., & Kibria, M. G. (2020). Maternal profiles and social determinants of severe acute malnutrition among children under-five years of age: A case-control study in Nepal. *Heliyon*, *6*(5), e03849. <https://doi.org/10.1016/j.heliyon.2020.e03849>
11. Mehmood, R., et al., (2023). Complementary feeding pattern and nutritional status of children. *J Coll Physicians Surg Pak*, *33*(07), p. 775-778. <https://doi.org/10.29271/jcpsp.2023.07.775>
12. Ieiri, M. C., Kosaka, S., Tomitsuka, E., & Umezaki, M. (2020). Factors affecting Undernutrition among school children in Cebu, Philippines. *Ecology of Food and Nutrition*, *60*(2), 182-197. <https://doi.org/10.1080/03670244.2020.1813733>
13. Govender, I., Rangiah, S., Kaswa, R., & Nzaumvila, D. (2021). Erratum: Malnutrition in children under the age of 5 years in a primary health care setting. *South African Family Practice*, *63*(1). <https://doi.org/10.4102/safp.v63i1.5416>
14. Lowe, C., Kelly, M., Sarma, H., Richardson, A., Kurscheid, J. M., Laksono, B., Amaral, S., Stewart, D., & Gray, D. J. (2021). The double burden of malnutrition and dietary patterns in rural Central Java, Indonesia. *The Lancet Regional Health - Western Pacific*, *14*, 100205. <https://doi.org/10.1016/j.lanwpc.2021.100205>
15. Adriani, A. (2021). Relationship of feeding patterns and history of TB and diarrhea in children 2-5 years old and stunting in Sukahayu village, Sumedang, West Java, April 2019. *Journal of Drug Delivery and Therapeutics*, *11*(3), 170-176. <https://doi.org/10.22270/jddt.v11i3.4814>
16. Saleem, J., Zakar, R., Bukhari, G. M., Fatima, A., & Fischer, F. (2021). Developmental delay and its predictors among children under five years of age with uncomplicated severe acute malnutrition: A cross-sectional study in rural Pakistan. *BMC Public Health*, *21*(1). <https://doi.org/10.1186/s12889-021-11445-w>
17. Hidayati, T., & Citra Dewi Pratiwi, R. (2022). The correlation between feeding patterns and the incidence of stunting in children aged 0-59 months. *Journal of Health Sciences*, *15*(02), 126-131. <https://doi.org/10.33086/jhs.v15i02.2732>
18. Hussein, M. R., Darwish, A. M., & Abd El Hakim Abdou, R. (2022). Feeding patterns among stunted children under-five years in Dodoma city in Tanzania. *Egyptian Journal of Health Care*, *13*(1), 572-594. <https://doi.org/10.21608/ejhc.2022.220352>
19. Barth-Jaeggi, T., Zandberg, L., Bahrudinov, M., Kiefer, S., Rahmarulloev, S., & Wyss, K. (2019). Nutritional status of Tajik children and women: Transition towards a double burden of malnutrition. *Maternal & Child Nutrition*, *16*(2). <https://doi.org/10.1111/mcn.12886>
20. Umallawala, T., Puwar, T., Pandya, A., Bhavsar, P., Saha, S., & Patil, M. S. (2022). Sociocultural determinants of nutritional status among children under five years of age: An ethnographic study from Gujarat. *Cureus*. <https://doi.org/10.7759/cureus.27377>