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Frequency of Bottle Feed in Severe Acute Malnutrition Children Under 2 Years

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ABSTRACT

OBJECTIVE

To determine the frequency of bottle feed in severe acute malnutrition children under two years.

METHODOLOGY

A descriptive cross-sectional study was conducted at the Nutrition Stabilization Centre, Paediatric Unit-3, Shaikh Zayed Children Hospital, Larkana, from February 2023 to December 2024. A total of 172 infants aged 0–24 months, diagnosed with Severe Acute Malnutrition (SAM) according to the World Health Organization (WHO) criteria, were included through non-probability purposive sampling. Children with chronic medical conditions contributing to malnutrition were excluded. Data on demographic characteristics, feeding practices, and socioeconomic factors were collected using a structured proforma. Statistical analysis was performed using SPSS version 26, applying the Chi-square test, with a p-value ≤ 0.05 considered statistically significant.

RESULTS

A total of 172 children with SAM were enrolled (mean age 12.7 ± 7.5 months); 38.4% were male and 61.6% female. Bottle feeding was reported in 33.7% of cases. Significant associations were observed with child's younger age (p=0.003), higher maternal age (p=0.000), female gender (p=0.038), first birth order (p=0.008), parental illiteracy (p=0.000), and family income Rs. 21,000–50,000 (p=0.018).

CONCLUSION

Bottle feeding was prevalent among one-third of children under two years with SAM and showed significant associations with sociodemographic factors, including child age, maternal age, gender, birth order, parental education, and socioeconomic status. These findings highlight the urgent need for targeted health education and counseling programs to discourage bottle feeding and promote safer, WHO-recommended feeding practices in vulnerable populations.

KEYWORDS

Bottle Feeding, Feeding Methods, Infants, Nutritional Support, Severe Acute Malnutrition

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INTRODUCTION

Severe acute malnutrition (SAM) is one of the most significant public health challenges worldwide, affecting approximately 13.6 million children under the age of five in low- and middle-income countries (LMICs) each year [1]. Among under-fives, SAM contributes substantially to mortality and is associated with long-term neurodevelopmental impairment when it occurs within the first 1,000 days of life, a critical period for growth, cognitive development, and immune system maturation [2,3].

Appropriate infant and young child feeding practices are essential for the prevention and management of SAM. However, despite international recommendations discouraging the use of feeding bottles, particularly in therapeutic feeding contexts, bottle feeding remains a common practice [4,5]. This is of concern because bottle-fed children with SAM face higher risks of infection, particularly diarrhoea and pneumonia, both of which are leading causes of mortality in this vulnerable group [6,7]. The World Health Organization (WHO) recommends cup feeding over bottle feeding in both health facilities and community settings as a safer alternative to reduce microbial contamination and encourage appropriate feeding practices [8]. The risk of pathogen transmission is further heightened in LMICs, where sanitation facilities are inadequate and sterilization of feeding equipment is often inconsistent [9]. Beyond infection risk, bottle feeding may disrupt breastfeeding, which plays a crucial role in the nutritional rehabilitation of malnourished children and provides vital immunological protection during early life [10,11]. Nevertheless, entrenched cultural beliefs, misconceptions about the adequacy of breast milk during illness, and widespread myths continue to encourage bottle feeding [12]. Some caregivers even perceive bottle feeding as a modern or convenient feeding method, particularly when facing feeding challenges during episodes of SAM [13]. Within institutional settings, systemic issues—including low staffing levels, lack of educational resources, and inadequate support for mothers—may further perpetuate bottle-feeding practices [14].

Although research has documented general feeding practices and their impact on malnutrition, there remains a scarcity of evidence specifically addressing the prevalence and determinants of bottle feeding among children under two years with SAM in settings where standardized management protocols are applied. Understanding these practices, their frequency, and their health consequences is essential to guide targeted health education, strengthen caregiver counselling, and promote adherence to WHO-recommended feeding guidelines [15].

Therefore, this study was conducted to determine the frequency of bottle feeding and its associated factors among children under two years of age with SAM in a tertiary care hospital setting.

MATERIAL & METHODS

A descriptive cross-sectional study was carried out at the Nutrition Stabilization Centre (NSC), Paediatric Unit-3, Shaikh Zayed Children Hospital, Larkana, from February 2023 to December 2024. The study population comprised children aged 0–60 months who fulfilled the World Health Organization (WHO) criteria for Severe Acute Malnutrition (SAM), defined as weight-for-height below −3 standard deviations or less than 70%, mid-upper arm

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circumference (MUAC) <11 cm, or bilateral pedal oedema. A total of 172 participants were enrolled using consecutive non-probability sampling. The sample size was calculated using OpenEpi software, with a prevalence of (32.2%)[16] from a previous study, 95% confidence level, and a 7% margin of error. Children with chronic medical conditions associated with malnutrition, such as congenital heart disease, chronic renal insufficiency, liver disorders, or sickle cell anaemia, were excluded. Bottle feeding was operationally defined as the use of a feeding bottle at least once daily for any liquid or semi-solid, including breast milk substitutes or other fluids. Informed consent was obtained from caregivers prior to enrolment. Data were collected systematically using a pre-tested structured proforma, which documented demographic variables (child's age, sex, maternal age, birth order, and birth interval), socioeconomic characteristics (parental education, occupation, monthly income, and household size), and feeding practices. All information was recorded directly by the researcher to ensure consistency and accuracy. The primary outcome was the frequency of bottle feeding among children with SAM, while secondary outcomes included its associations with demographic and socioeconomic determinants. Statistical analysis was performed using SPSS version 26. Descriptive statistics were calculated for baseline characteristics, and associations between bottle feeding and study variables were tested using the Chi-square test. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

The study included 172 paediatric participants with a mean age of 12.70 ± 7.54 months; 58.7% were aged 0–12 months, while 41.3% were older than 12 months. Mothers had a mean age of 26.63 ± 6.75 years (range: 18–45 years); the majority (68.6%) were between 19–30 years, and 31.4% were above 30 years. Among the children, 38.4% were male and 61.6% were female. With respect to birth order, 39.5% were first-born, whereas 60.5% were of higher birth order. Birth intervals showed that 43.6% of children had intervals less than 24 months, 47.1% between 24–47 months, and 9.3% more than 47 months. Socioeconomic assessment revealed that 43.0% of families reported a monthly income ≤ Rs. 20,000, another 43.0% earned between Rs. 21,000–50,000, and 14.0% reported income above Rs. 50,000. Regarding education, 22.1% of fathers and 20.9% of mothers were illiterate; 39.0% of fathers and 40.1% of mothers had primary education, while 30.2% from both groups had completed secondary education. Only a small proportion of fathers (8.7%) and mothers (8.7%) had attained intermediate or higher qualifications. Occupational analysis showed that most fathers were day labourers (59.9%), followed by businesspersons (24.4%), while 15.7% were unemployed. Among mothers, half (50.0%) were unemployed, 48.3% were day labourers, and only 1.7% reported being engaged in business activities (Table 1).

Table II presents the associations between bottle feeding and various demographic and

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socioeconomic determinants among the 172 study participants. Children who were bottle-fed had a significantly lower mean age (10.31 ± 7.25 months) compared to those who were not bottle-fed (13.92 ± 7.42 months; p=0.003). In contrast, the mothers of bottle-fed children were significantly older (mean age 34.17 ± 3.61 years) than those of non-bottle-fed children (22.79± 4.29 years; p=0.000). Female children were more likely to be bottle-fed compared to males (p=0.038). Birth interval was also associated with bottle feeding, with fewer bottle-fed children having an interval greater than 47 months between births (p=0.045). First-born children had a significantly higher likelihood of being bottle-fed compared to later-born children (p=0.008). Socioeconomic indicators demonstrated notable disparities. Bottle feeding was more common in households with monthly incomes between Rs. 21,000 and 50,000 (p=0.018). Parental education also showed a strong association, with a higher proportion of illiterate fathers and mothers among the bottle-feeding group (p=0.000 for both). Parental occupation further highlighted significant variations. Unemployed fathers and mothers were more frequently observed among bottle-feeding families, whereas day labourers were more common in the non-bottle-feeding group (p=0.000 for both).

DISCUSSION

This study evaluated the prevalence of bottle feeding and its associated factors among children under two years of age diagnosed with Severe Acute Malnutrition (SAM). The findings revealed that 33.72% of these children were bottle-fed, which is concerning given the established association between bottle feeding and adverse outcomes, including diarrhoea, pneumonia, and poor nutritional recovery in malnourished paediatric populations [6,7]. This prevalence is similar to that reported by Pravana et al., who documented a 32.2% rate of bottle feeding among malnourished children in Nepal [16]. Such a resemblance suggests that common socioeconomic challenges and gaps in caregiver education persist across South Asian contexts. In contrast, Tette et al. found a lower prevalence of 16.3% in Ghana, which may reflect better adherence to infant and young child feeding (IYCF) practices and stronger institutional nutrition support systems [17]. Furthermore, Garti et al. observed that bottle feeding, particularly when coupled with delayed breastfeeding initiation and feeding challenges, was significantly associated with malnutrition [18], further supporting the findings of this study.

In our cohort, bottle feeding was significantly linked with younger child age, higher maternal age, female gender, first birth order, low parental education, and low socioeconomic status. These determinants are consistent with previous research, which has emphasized the role of cultural norms, maternal misconceptions, employment-related constraints, and limited breastfeeding support in driving bottle feeding practices [10,12,13]. Nguyen et al. demonstrated that nutrition interventions integrated into maternal and child health programs improved exclusive breastfeeding practices and reduced bottle feeding [10]. Similarly, North et al. highlighted the protective role of breastfeeding in reducing infection-related morbidity and mortality in infants [11]. These findings collectively suggest that feeding behaviours are shaped not only by individual caregiver choices but also by broader socioeconomic and health system factors.

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Despite strong recommendations by the World Health Organization (WHO) against bottle feeding in both clinical and community settings [4,5,8], the practice remains widespread, especially in resource-limited environments. In such contexts, poor sanitation and inadequate sterilization of feeding equipment increase the risk of microbial contamination, exposing children with SAM to serious infections [9]. Institutional barriers, including insufficient staffing, limited caregiver counselling, and lack of educational resources, further contribute to the persistence of bottle feeding [14]. Another concern is that bottle feeding may hinder the re-establishment of breastfeeding, which is critical for SAM recovery as breast milk provides essential nutrients, immunological protection, and supports gastrointestinal integrity [11].

The findings of this study have important implications for both clinical practice and public health. Clinically, healthcare providers should prioritize caregiver education and ensure adherence to WHO guidelines, including promoting safer alternatives such as cup feeding. Public health strategies should address structural barriers by enhancing maternal literacy, improving community-based breastfeeding support, and dispelling cultural misconceptions about breast milk during illness [12,13].

This study is not without limitations. Its cross-sectional design prevents causal inferences, while reliance on caregiver recall may introduce bias. The study was conducted in a single institution, which limits the generalizability of the results. Additionally, variables such as maternal nutritional status, mental health, and lactation support were not examined, though these may have provided further context to feeding behaviours. Despite these limitations, the study has notable strengths, including the use of standardized WHO diagnostic criteria for SAM [4], a clinically high-risk population, and structured data collection methods that enhance reliability.

CONCLUSION

Bottle feeding was prevalent among one-third of children under two years with SAM and showed significant associations with sociodemographic factors, including child age, maternal age, gender, birth order, parental education, and socioeconomic status. These findings highlight the urgent need for targeted health education and counselling programs to discourage bottle feeding and promote safer, WHO-recommended feeding practices in vulnerable populations.

Table I: Baseline Sociodemographic Characteristics of Study Participant (n=172)

Baseline Characteristics	**n (%)**
Age of child (Mean ± SD) = 12.70 ± 7.54 months	
0 - 12 months	101 (58.7)
>12 months	71 (41.3)
Age of Mother (Mean ± SD) = 26.63 ± 6.75 years	

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19 - 30 years	118 (68.6)
>30 years	54 (31.4)
Gender of Child	
Male	66 (38.4)
Female	106 (61.6)
Birth Order	
First Child	68 (39.5)
Not First Child	104 (60.5)
Birth Interval	
<24 months	75 (43.6)
24 – 47 months	81 (47.1)
>47 months	16 (9.3)
Family Income	
Less than or equal to Rs. 20,000	74 (43.0)
Between Rs. 21,000 – Rs. 50,000	74 (43.0)
Greater than Rs. 50,000	24 (14.0)
Educational Status of Father	
Illiterate	38 (22.1)
Primary	67 (39.0)
Secondary	52 (30.2)
Intermediate	9 (5.2)
Graduate or above	6 (3.5)
Educational Status of Mother	
Illiterate	36 (20.9)
Primary	69 (40.1)
Secondary	52 (30.2)
Intermediate	11 (6.4)
Graduate or above	4 (2.3)
Occupation Status of Father	
Businessperson	42 (24.4)
Day Laborer	103 (59.9)
Unemployed	27 (15.7)
Occupation Status of Mother	
Businessperson	3 (1.7)
Day Laborer	83 (48.3)
Unemployed	86 (50.0)

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Table II:Association of Bottle Feeding with Determinants of Severe Acute Malnutrition (n = 172)

Determinants of Bottle Feeding		Bottle Feeding		P-Value
		Yes (n=58)	No (n=114)	
Age of Child (months)		10.31 ± 7.25	13.92 ± 7.42	0.003*
Age of Mother (years)		34.17 ± 3.61	22.79 ± 4.29	0.000*
Gender of Child	Male	16 (27.6)	50 (43.9)	0.038*
	Female	42 (72.4)	64 (56.1)	
Birth Interval	<24 months	26 (44.8)	49 (43.0)	0.045*
	24 – 47 months	31 (53.4)	50 (43.9)	
	>47 months	1 (1.7)	15 (13.2)	
Birth Order	First Child	31 (53.4)	37 (32.5)	0.008*
	Not First Child	27 (46.6)	77 (67.5)	
Family Income	≤ Rs. 20,000	21 (36.2)	53 (46.5)	0.018*
	Rs. 21,000 – Rs. 50,000	33 (56.9)	41 (36.0)	
	> Rs. 50,000	4 (6.9)	20 (17.5)	
Educational Status of Father	Illiterate	24 (41.4)	14 (12.3)	0.000*
	Primary	3 (5.2)	64 (56.1)	
	Secondary	25 (43.1)	27 (23.7)	
	Intermediate	3 (5.2)	6 (5.3)	
	Graduate or above	3 (5.2)	3 (2.6)	
Educational Status of Mother	Illiterate	23 (39.7)	13 (11.4)	0.000*
	Primary	4 (6.9)	65 (57.0)	
	Secondary	25 (43.1)	27 (23.7)	
	Intermediate	5 (8.6)	6 (5.3)	
	Graduate or above	1 (1.7)	3 (2.6)	
Occupation Status of Father	Businessperson	8 (13.8)	34 (29.8)	0.000*
	Day Labourer	26 (44.8)	77 (67.5)	
	Unemployed	24 (41.4)	3 (2.6)	
Occupation	Businessperson	0 (0.0)	3 (2.6)	0.000*

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Status of Mother	Day Labourer	11 (19.0)	72 (63.2)	
	Unemployed	47 (81.0)	39 (34.2)	

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