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Original Research

Influence of Feeding Patterns on Nutritional Status of Children upto 2 Years

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ABSTRACT

Background: Proper nutrition during the first two years of life is crucial for optimal physical and cognitive development. Malnutrition in early childhood can lead to long-term health consequences, including stunted growth and increased susceptibility to infections. This study examines the impact of feeding practices, including breastfeeding, complementary feeding, and bottle feeding, on the nutritional status of children up to two years of age.

Methods: This prospective, non-randomized study was conducted at the Department of Pediatrics, Sree Balaji Medical College & Hospital, from August 2016 to July 2017. The study included 450 children under two years of age attending outpatient, ward, immunization, and well-baby clinics. Data were collected using a pre-designed questionnaire, and anthropometric measurements were taken to assess nutritional status using WHO growth standards. Statistical analysis was performed using SPSS Version 21.

Results: The study found that exclusive breastfeeding rates were suboptimal, with only 24.6% of children receiving exclusive breastfeeding for the first six months. Bottle feeding was prevalent among 5.3% of children, while 70% received both breast and bottle feeding. The prevalence of malnutrition was notable, with 24.6% of children underweight, 5.3% stunted, and 42.6% wasted. Severe wasting was significantly associated with bottle feeding ($P<0.05$). Continued breastfeeding beyond six months and appropriate complementary feeding practices were linked to better nutritional outcomes. A significant correlation was observed between family pot feeding and reduced malnutrition rates ($P<0.0001$).

Conclusion: Feeding practices play a crucial role in determining the nutritional status of children under two years of age. Exclusive breastfeeding for the first six months and the timely introduction of appropriate complementary foods significantly contribute to improved nutritional outcomes. Emphasizing traditional feeding practices, such as family pot feeding and reducing reliance on bottle feeding can help mitigate malnutrition in young children.

Keywords: Breastfeeding, Complementary Feeding, Malnutrition, Nutritional Status, Infant Nutrition, Child Growth, Feeding Practices.

INTRODUCTION

Optimum nutrition is essential for child survival and quality of life. The term "nutrition" originates from *nutricus*, meaning "to suckle at the breast".[1] Breast milk, being species-specific, is the ideal food for infants, and successful breastfeeding is a crucial child-rearing skill. Nutrition is defined as “the process by which the organism utilizes food,” signifying its role in nourishing the body.[2]

Nutritional factors, such as breastfeeding and weaning practices, along with diet during illness, significantly influence children's growth and development. Recurrent infections further contribute to malnutrition.[3] Proper nutrition during the first two years of life is critical for optimal physical and mental development, reducing the risk of growth retardation, micronutrient deficiencies, and common childhood illnesses like diarrhea and respiratory infections.[4,5] Adequate nutrition strengthens immunity and lowers the risk of diet-related non-communicable diseases throughout life.

Complementary feeding, introduced at six months, is essential to meet nutritional needs and help infants adapt to new food textures and flavors.[4,6] Cultural influences, including food habits, traditions, and superstitions, often lead to poor dietary choices despite food availability. Thus, malnutrition is not solely due to food scarcity but also to inappropriate feeding practices.Premature discontinuation of breastfeeding, bottle feeding, and replacing locally available foods with commercial options negatively impacts child nutrition.[7] Traditional hand-feeding methods should not be discouraged but should be practiced with proper hygiene. Infant and young child

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feeding practices are crucial in maintaining children's nutritional status between 0-24 months, significantly influencing malnutrition and child survival rates.[8] Poor nutrition and infections during the first two years can adversely affect brain development and growth potential.

Breastfeeding is a fundamental human activity crucial for infant and maternal health and holds significant economic value.[9] It reduces mortality linked to diarrhea and offers protection for up to three months post-weaning.[10] While breastfeeding provides essential benefits in the first six months, complementary feeding is necessary for continued growth. The WHO recommends exclusive breastfeeding for the first six months, followed by complementary foods alongside breastfeeding up to two years.[11,12]

AIMS AND OBJECTIVES

This study aims to assess breastfeeding practices in children up to six months and examine the continuation of breastfeeding beyond this period. It also evaluates complementary feeding patterns in young children up to two years and analyses the impact of feeding practices on their nutritional status using the recent WHO growth standards. Additionally, the study seeks to establish a correlation between feeding practices and nutritional status across different age groups up to two years of age.

MATERIAL & METHODS

Study Design; This non-randomized prospective study was conducted at the Department of Pediatric Medicine, Sree Balaji Medical College & Hospital, from August 2016 to July 2017. Using pretested, predesigned questionnaires, the study aimed to determine the influence of feeding patterns on the nutritional status of children up to two years. The study population consisted of 450 infants and young children attending the outpatient department, wards, and well-baby clinic, who met the inclusion criteria.

Inclusion and Exclusion Criteria: The infants and young children under two years of age attending the outpatient department, ward, immunization clinic, or well-baby clinic are included in the study. The children with moderate to severe illnesses were excluded from the study.

Data Collection Method: This study was approved by the Ethical Committee, and only children meeting the inclusion criteria, with parental consent, were enrolled. A structured questionnaire was used to collect background information and feeding practices. Caregivers were provided explanations in the local language, ensuring privacy and confidentiality. Literate caregivers filled out the proforma independently, while illiterate caregivers were assisted. Responses were cross-checked for accuracy, and caregivers unable to respond appropriately were excluded.

Nutritional status was assessed using WHO standards. Weight was measured with a digital weighing machine, using minimal clothing and the double-weighing method if needed. Length was recorded with an infantometer in a lying-down position, requiring two individuals for accuracy. All measurements were taken by a single observer. The collected data were analyzed, and nutritional status was classified using WHO Z-scores, categorizing children into underweight, stunting, wasting, overweight, and obesity.

Statistical Analysis: Data collection was carried out using a pre-designed, pre-tested proforma for each individual case. The primary objective analysis was conducted using WHO ANTHRO software, which generated Z-scores for weight-for-age, height-for-age, and weight-for-height. The collected data were entered into MS Excel and further analyzed using statistical software, SPSS Version 21.

RESULTS

Table 1 summarizes feeding practices (exclusive breastfeeding, bottle feeding, and mixed feeding) across three age groups (0-6 months, 7-12 months, and 13-24 months).

Age Group	Exclusive Breastfeeding (%)	Bottle Feeding (%)	Both (%)
0-6 months	24.6 (37)	5.3 (8)	70 (105)
7-12 months	42.6 (64)	30 (45)	27.3 (41)
13-24 months	34 (51)	45.3 (68)	20.6 (31)

Table 1: Feeding Practices among Different Age Groups

Table 2 presents malnutrition prevalence among boys and girls in the 0-6 month age group based on WHO Z-score classifications.

Malnutrition Category	Total (%)	Boys (%)	Girls (%)
Underweight	24.6 (37)	26.5 (21)	22.5 (16)
Severe Underweight	13.6 (19)	18.3 (13)	7.5 (6)
Wasting	42.6 (64)	40.8 (29)	44.3 (35)
Severe Wasting	30.6 (46)	38 (27)	24.1 (19)
Stunting	5.3 (8)	7.04 (5)	3.79 (3)

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Severe Stunting	3.3 (5)	4.2 (3)	2.5 (2)
Overweight	2.66 (4)	2.81 (2)	2.53 (2)
Obesity	1.33 (2)	1.40 (1)	1.26 (1)

Table 2: Prevalence of Malnutrition by Sex (0-6 Months)

Table 3 shows the relationship between feeding methods and underweight prevalence among infants under 6 months.

Feeding Type	Normal (%)	Underweight (%)	Severe Underweight(%)
Exclusive Breastfeeding (n=37)	89.1 (33)	10.8 (4)	2.7 (1)
Bottle Feeding + Both (n=113)	70.8 (80)	29.2 (33)	15.9 (18)
P-value	**0.162 (> 0.05)**	**No significant association**	

Table 3: Association of Feeding Practices with Underweight (0-6 Months)

Table 4examines the impact of different feeding practices on malnutrition indicators in children aged 7-12 months.

Feeding Practice	Normal (%)	Underweight (%)	Severe Underweight (%)	Wasting (%)	Severe Wasting (%)	Overweight (%)	Obesity (%)
Breastfeeding (n=64)	81.33 (52)	18.6 (12)	2 (3)	25.3 (16)	3.3 (2)	4.66 (3)	2 (2)
Bottle Feeding (n=45)	92.18 (59)	7.8 (5)	0	24.6 (18)	4.1 (3)	5.63 (4)	2.73 (2)
Both (n=41)	68.88 (31)	31.1 (14)	4.4 (2)	25.9 (20)	2.59 (2)	3.79 (3)	1.26 (1)

Table 4: Nutritional Status by Feeding Practices (7-12 Months)

Table 5 analyzes the effect of animal protein (egg consumption) and family pot feeding on malnutrition indicators among children aged 13-24 months.

Nutritional Status	Animal Protein Given (%)	Animal Protein Not Given (%)	Family Pot Feeding (%)	No Family Pot Feeding (%)
Normal	82.3 (65)	59.2 (42)	84.2 (85)	44.9 (22)
Underweight	17.7 (14)	40.8 (29)	15.8 (16)	55.1 (27)
Severe Underweight	6.3 (5)	16.9 (12)	3.96 (4)	26.5 (13)
P-Value	0.0205 (Significant)	0.0000164 (Very Highly Significant)		

Table 5: Impact of Animal Protein and Family Pot Feeding on Nutritional Status (13-24 Months)

Table 6 highlights statistically significant findings on the relationship between feeding practices and malnutrition across different age groups.

Age Group	Parameter	P-Value	Significance
0-6 months	Severe Wasting & Exclusive Breastfeeding	0.0378	Significant
7-12 months	Underweight & Exclusive Bottle Feeding	0.0402	Significant
13-24 months	Underweight & Animal Protein Intake	0.0205	Significant
13-24 months	Underweight & Family Pot Feeding	<0.0001	Very Highly Significant
13-24 months	Wasting & Family Pot Feeding	0.0016	Highly Significant
13-24 months	Stunting & Animal Protein Intake	0.0142	Significant
13-24 months	Stunting & Family Pot Feeding	<0.001	Very Highly Significant

Table 6: Significant Associations of Feeding Practices with Malnutrition Indicators

DISCUSSION

Compared to other studies, exclusive breastfeeding rates varied widely. Swati Mohan Gadappa et al. (2016) reported a 36.8% exclusive breastfeeding rate in Patna.[13] While Gandhi SJ et al., (2014) in Gujarat found 34.5% of mothers practiced exclusive breastfeeding.[14] Higher rates were noted in Andhra Pradesh (41%),[15] Maharashtra (62%),[16] and South India (49.1%).[17] These findings highlight regional differences in breastfeeding practices.

Nutritional assessment revealed higher rates of malnutrition in older children. Among 0-6-month-

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olds, 24.6% were underweight, 5.3% stunted, and 42.6% wasted. In 7-12-month-olds, underweight (18.6%), stunting (6.6%), and wasting (25.3%) were observed. In 13-24-month-olds, underweight (28.6%) and stunting (18.6%) were more prevalent. Other studies showed similar findings; Gandhi SJ et al., (2014) found 11.5% underweight, 15.6% stunting, and 8.6% wasting in 12-23-month-olds,[14] and Singh V et al., (2017) reported 58.5% underweight at 12 months.[18]

Colostrum feeding was given by 82.6% of mothers, similar to rates reported in studies by Arya et al., (2015, 75%)[19]Gadappa et al., (2016, 83.2%)[13] Gandhi SJ et al., (2014, 90.9%)[14]and Meshram et al., (2012, 85%).[15] The significance of colostrum as the first source of immunity and nutrition was emphasized.

Timely initiation of breastfeeding was suboptimal, with only 25.8% of normal deliveries and 47.6% of operative deliveries initiating breastfeeding within recommended times. In comparison, Gadappa et al., (2016) found that 52% initiated within the first hour,[13] Gandhi SJ et al., (2014) reported 56.4% within one hour,[14] and Akhtar et al., (2012) found 45% did so.[21] Late initiation may be due to a lack of awareness and traditional beliefs.

Prelacteal feeding was observed in 29.3% of cases. Studies by Arya RK et al., (2015)[19]Gadappa SM et al., (2016)[13] Gandhi SJ et al., (2014)[14] and Meshram et al., (2012)[15] reported prelacteal feeding rates ranging from 32% to 54.4%.

Complementary feeding practices were delayed, with the mean age of introduction being nine months, exceeding the WHO-recommended six months. UNICEF stresses that early complementary feeding reduces infection risks.[20] Protein-rich foods, including eggs, were introduced in 43.3% of 7-12-month-olds and 52.7% of 13-24-month-olds, with a significant association with underweight and stunting ($p < 0.05$). Similar findings were reported by Kumar S et al., in New Delhi.[22]

Obesity and overweight prevalence in this study were 4.2% and 1.98%, respectively. Comparatively, Kumar et al., (2014) reported 4.5% overweight and 1.4% obesity in pre-schoolers[23] while Maiti et al., (2014) found 14.4% overweight among pre-schoolers.[24]

LIMITATIONS

The primary limitation of this study is its small sample size, which may affect the generalizability of the findings. Larger studies are needed to better understand the influence of feeding patterns on the nutritional status of children up to two years. Additionally, the study lacks long-term follow-up of children with malnutrition in infancy, making it difficult to assess its impact on future health outcomes. Longitudinal studies in this area would help identify children at risk of long-term complications, enabling the development of early screening and intervention strategies to improve long-term health outcomes.

CONCLUSION

Many mothers lack awareness or have concerns about food quantity, quality, and cultural beliefs, leading to suboptimal feeding practices. In this study, females constituted 52.9% of the participants. While 94.6% of mothers practiced breastfeeding up to six months, only 24.6% practiced exclusive breastfeeding. Complementary feeding was introduced before six months in 30% of cases, whereas 56% delayed it until eight months, contrary to recommendations. Bottle-feeding prevalence increased with age, and obesity incidence was higher among bottle-fed infants aged 13-24 months. Although continuous efforts have been made, infant and young child feeding practices in India remain unsatisfactory. Exclusive breastfeeding should be strongly promoted for its significant benefits on infant growth and development, alongside proper weaning practices to prevent malnutrition.

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