RESEARCH PAPER

Association of Bad Nutritional Habits (Prolong Bottle Feeding and Lack of Self-eating) with Malnutrition in Children Aged 2 to 5 Years

Hira Javed[1], Muhammad Idris Mazhar[2], Maimona Saleh[3], Bilal Muzaffar[4], Junaid Ghaffar[5], Saleh Muhammad[6]

[1]Senior Registrar, Department of Pediatrics, Imran Idrees Teaching Hospital, Sialkot, Punjab, Pakistan
[2]Professor, Department of Pediatrics, Imran Idrees Teaching Hospital, Sialkot, Punjab, Pakistan
[3,4]Senior Registrar, Department of Pediatrics, Imran Idrees Teaching Hospital, Sialkot, Punjab, Pakistan
[5]Assistant Professor, Department of Pediatrics, Imran Idrees Teaching Hospital, Sialkot, Punjab, Pakistan
[6]Professor, Department of Medicine, Imran Idrees Teaching Hospital, Sialkot, Punjab, Pakistan.

***Corresponding:** Dr. Hira Javed,
Senior Registrar, Department of Pediatrics, Imran Idrees Teaching Hospital, Sialkot, Pakistan.
Email: linkhira@hotmail.com

Received: 08-04-2026, Revised: 12-06-2026, Accepted: 18-06-2026, Published: 30-06-2026

ABSTRACT

Objective: To determine the association of malnutrition with prolonged use of bottle feeding and lack of self-eating in children between 2 to 5 years of age.

Methodology: This cross sectional study was conducted at Department of Pediatrics, Imran Idrees Teaching Hospital, Sialkot from 1st December 2024 to 30th May 2025. Two hundred and twenty four patients were included. All children 2–5 years of age with history of bottle feeding with and without habit of self-eating were enrolled. Children were examined for weight for age. Their malnutrition status was noted by modified Gomez classification.

Results: There were 128 (57.2%) males and 96 (42.8%) females. Malnutrition was present in 98 (43.7%) children, out of which 62 (48.4%) males and 36 (37.5%) females. Among malnutrition, 68 (69.4%) children had mild malnutrition, 26 (26.5%) had moderate malnutrition while 4 (4.1%) had severe malnutrition. There were 112 (50%) children on bottle feeding but had lack of self-eating, 14 (6.25%) children who were on bottle feeding along with self-eating habit, 88 (39.28%) had no habit of bottle-feeding but on self-eating and 10 (4.47%) were not on bottle feeding also had lack of self-eating (mother dependent). In bottled-feeding and non–self-eating group (112), malnutrition was noted in 86 (76.8%) children, out of them 56 (65.1%) were males and 30 (34.9%) were females. In bottle-feeding with self-eating group, malnutrition was noted in 4 (28.6%) children. In children with self-eating and no bottle feeding, malnutrition was noted in 8 (9.1%) children. In children with no bottle-feeding and lack of self-eating 10 (4.47%), malnutrition was not observed.

Conclusion: There is significant association of malnutrition with children on bottle feeding for prolonged period of time. Prolonged use of bottle feeding with lack of self-eating increases this risk in children under five years of age, both male and female.

Keywords: Bottle feeding, Lack of self-eating, Malnutrition, Children under five

How to cite this article: Javed H, Mazhar MI, Saleh M, Muzaffar B, Ghaffar J, Muhammad S. Association of Bad Nutritional Habits (Prolong Bottle Feeding and Lack of Self-eating) with Malnutrition in Children Aged 2 to 5 Years. IJDDT. 2026;16(73s): 505-514. DOI: 10.25258/ijddt.16.73s.56

INTRODUCTION

The health and survival of children<5years of age, are greatly impacted by child-feeding practices, especially breastfeeding. Despite its historical use, bottle feeding has several drawbacks that compromise a child's health and nutrition.[1] Many mothers choose to bottle-feed their kids despite mounting medical evidence that breastfeeding is beneficial for both moms and babies. A rising number of women in developing countries like Pakistan, are supplementing breast milk with formula and animal milk and stop breast feeding earlier.[2,3] Bottle feeding is still common worldwide although the World Health Organization and the United Nations Children's Fund are against bottle feeding, affecting over 59% of newborns worldwide and 85% in Australia by the time they are 5 months old.[4,5]

Today, in developing nations like Pakistan, bottle-feeding is a socially and culturally accepted standard. The bottle is used to deliver different kinds of liquids, including juice, tea, qahwa, and water, in addition to milk. Much harm is associated with bottle feeding, especially in areas where sanitation is poor, because it requires a sterilized water supply, both to mix the formula and to sterilize the bottle, even small amounts of polluted water can radically increase the risk of diarrhea.[6,7] Mothers who breastfeed and bottle-fed had a combined frequency of 57%. The highlighted determinants should be addressed in efforts to promote the best child-feeding practices, with a focus on

the value of breastfeeding and support for mothers, particularly those who are dealing with issues like cesarean birth, hospitalization of their children, and maternal employment.[1] There is a higher risk of childhood morbidity and mortality, malnutrition, gastrointestinal or ear infections, allergic tendency and dental caries in bottle fed infants. It does not provide immunological protection as breast milk does, so putting the child more prone to infections.[8,9] Maternal and child characteristics, the wealth index, and urban residency have all been strongly linked to the higher risks of bottle feeding. It is necessary to strengthen the policy's ongoing support for discouraging bottle feeding.[4,10]

Self-feeding refers to the developmental milestone in which a young child independently brings food and liquids to their mouth, using fingers or utensils, without caregiver assistance. It reflects the integration of fine motor control, hand-eye coordination, cognitive planning, and self-regulatory behaviors, and typically emerges during the second year of life and continues to refine through the preschool years. Studies have shown that self-feeding not only represents maturation of motor skills but is also associated with greater energy and nutrient intake when appropriate opportunities are provided for children to practice these skills. Encouraging self-feeding within a responsive feeding context has been shown to increase the proportion of food that children feed themselves and enhance caregiver verbal responsiveness, indicating its role in promoting autonomy and healthy eating behaviors. Moreover, research suggests that delayed onset of self-feeding may be linked to poorer motor performance, underscoring its importance as a developmental marker and its potential broader impacts on child growth and functional outcomes. In nutritional research, self-feeding is therefore considered a key factor in assessing feeding practices and child autonomy, with implications for diet quality, self-regulation of intake, and long-term eating habits.[11]

It has been noted in the literature that excessive use of bottle for feeding of children above 1 or 2 years of age is substantially associated with poor health status of the child. However, still the incidence is high, also limited data available regarding use of bottle-feeding and nutritional status of children on bottle feeding in local population. The purpose of this study is to ascertain the association of malnutrition with prolonged use of bottle feeding and lack of self-eating habits in children from 2 to 5 years of age. Therefore, this study shall help to plan future strategies and counseling sessions to improve knowledge and practice of mothers towards breast feeding (or bottle feeding) for two years, and early start of self-eating after infancy.

MATERIAL AND METHODS

After taking approval from institutional review board, this cross-sectional study was carried out at the Department of Pediatrics, Imran Idrees Teaching Hospital, Sialkot from 1st December 2024 to 30th May 2025. Sample size of 224 cases was estimated by fixing the 95% confidence level, 3.75% absolute precision required and percentage of bottle feeding as 9% in local population.11 All the children were enrolled from out-patient (OPD) and in-patient (IPD), applying non-probability, consecutive sampling technique. All children of age 2-5 years, both male & female, in OPD & IPD with a history of bottle feeding, with & without habit of self-eating were included. All children with chronic conditions e.g., congenital heart diseases, chronic renal failure, were excluded. Informed consent was obtained from parents. Demographic details were noted. On the basis of dietary habits, four groups were formed. Group I were on bottle feeding and with self-eating. Group II were on bottle feeding with lack of self-eating. Group III were those who were not on bottle feeding but had habit of self-eating. Group IV were not taking bottle feeding as well as lack of self-eating. Then children were examined for weight for age. Children were categorized as mild, moderate and severe malnutrition on the basis of Modified Gomez classification. All the information was recorded through Performa. The data was entered and analyzed in SPSS-25. The data was compared with different dietary habit groups of children by using Chi-square test. A p-value ≤ 0.05 was taken as significant.

RESULTS

Male to female ratio was 57.1:42.9 (128:96) (Table 1). One hundred and twenty six (56.3%) were well nourished (Table 2). Malnutrition was present in 98 (43.7%), out of which 62 (63.3%) males and 36 (36.7%) females (Table 3). There were 68 (69.4%) children with mild malnutrition, 26 (26.5%) had moderate malnutrition while 4 (4.1%) had severe malnutrition (Table 4). Group I: 112/224 (50%) children were on bottle feeding &no self-eating. Group II: 14/224 (6.25%) children were on bottle feeding and self-eating. Group III:88/224 (39.28%) were no bottle-feeding & self-eating. Group IV: 10/224 (4.47%) were no bottle feeding and no self-eating.

In group I, (bottled-feeding and non–self-eating), total were 112. Malnutrition was noted in 86 (76.8%) children out of which males were 56 (65.1%) and females were 30 (34.9%). Twenty six (23.2%) out of 112 were with no malnutrition (Table 5). Out of 86 malnutrition children, mild malnutrition 56 (65.2%), male 38 (67.8%) and female 18 (32.2%), moderate malnutrition 26 (30.2%), male 14 (53.8%) and female 12/26 (46.2%), severe malnutrition 4 (4.6%) and all were males (100%)

In group II, (bottled-feeding and self-eating) total were 14/224 (6.25%). Malnutrition was noted in 4/14 (28.6%) children out of which all were males 4/4 (100%). 10/14 (71.4%) were well nourished and mild malnutrition was observed in 4/4 (100%) and all were male (Table 6). In this group, there were no children with moderate or severe malnutrition.

In group III, (self-eating and no bottle feeding), total no of children were 88/224 (39.3%). Mild malnutrition was noted only in 8/88 (9.1%) children and out of which out of which2/8 (25%) were male and 6/8 (75%) were female. 80/88 (90.9%) children had no malnutrition (Table 7).

In group IV, children with (no bottle-feeding and no self-eating), total children were 10/224(4.47%).There was no child with malnutrition.

Table 1

Children with bottle feeding and self-eating (No. 224)

Variable	No.	%
Bottle feeding + No self-eating	112	50.0
Bottle feeding + Self-eating	14	6.25
No Bottle feeding + Self-eating	88	39.28
No Bottle feeding + No self-eating	10	4.47

Table 2

Malnutrition in various groups

Malnutrition	Bottle feeding + No Self Eating	Bottle feeding + Self-Eating	No Bottle feeding + Self-Eating	No Bottle feeding + No Self-Eating	Total
Present	86 (76.8%)	4 (28.6%)	8 (9.1%)	-	98 (43.75%)
Absent	26 (23.2%)	10 (71.4%)	80 (90.9%)	10 (100%)	126 (56.25%)
Total	112 (50%)	14 (6.25%)	88 (39.28%)	10 (4.47%)	224 (100%)

P-value = 0.000 (highly significant)

Table 3

Gender distribution of children with malnutrition (n=224)

Gender	Malnutrition			
	Yes		No	
Male (n=128)	62	48.4%	66	51.6%
Female (n=96)	36	37.5%	60	62.5%

Table 4

Severity of malnutrition in children (Make/Female) [n=98)

Malnutrition	Male (n=62)	Female (n=36)
Severe malnutrition weight/age <60%	4 (100%)	-
Moderate malnutrition weight/age 60-74.9%	14 (53.8%)	12 (46.2%)
Mild malnutrition weight/age 75-90%	44 (64.7%)	24 (35.3%

Table 5

Malnutrition in bottle feeding with no self-eating (Group 1) [86/112]

Malnutrition	Male (n=2)	Female (n=6)
Mild malnutrition weight for age 75-90%	38 (67.8%)	18 (32.2%)
Moderate malnutrition weight for age 60-74.9%	14 (53.8%)	12 (46.2%)
Moderate malnutrition weight for age <60%	4 (100%)	-

Table 6

Malnutrition in bottle feeding with self-eating group (Group II) [4/14]

Malnutrition	Male (n=4)	Female (n=0)
Mild malnutrition weight for age 75-90%	4 (25%)	-
Moderate malnutrition weight for age 60-74.9%	NA	NA
Moderate malnutrition weight for age <60%	NA	NA

Table 7

Malnutrition in no bottle feeding with self-eating group (Group III) [n=8/88]

Malnutrition	Male (n=2)	Female (n=6)
Mild malnutrition weight for age 75-90%	2 (25%)	6(75%)
Moderate malnutrition weight for age 60-74.9%	NA	NA
Moderate malnutrition weight for age <60%	NA	NA

DISCUSSION

The present study demonstrates a strong association between feeding practices after two years of age and nutritional status among children aged 2–5 years. Overall malnutrition was observed in 43.7% of children, with the highest prevalence in Group I (continued bottle feeding with no self-eating), where 76.8% were malnourished. In contrast, Group III (no bottle feeding with self-eating) showed markedly better outcomes, with only 9.1% having mild malnutrition, highlighting the protective role of appropriate feeding practices beyond infancy.

A regional review from the Eastern Mediterranean Region reported that 32.1% of under-five children were bottle-fed, alongside persistent under nutrition, with 20.3% stunting and 13.1% underweight.[15] Although lower than the malnutrition burden in our Group I, these figures confirm that bottle feeding remains common and coexists with under nutrition internationally.

A multi-country East African DHS analysis reported a 10.1% prevalence of bottle feeding among young children, with significant associations between feeding practices and child health outcomes.[16] While this study focused on younger children, it supports the notion that early feeding behaviors influence later nutritional status, which may explain the poor outcomes seen in older bottle-fed children in our study.

In Ethiopia, a study involving children aged 6-59 months reported 37.3% stunting and 24.4% underweight, with poor feeding practices and limited dietary diversity as key determinants.[17] These figures are comparable to the overall malnutrition burden in our population and reinforce the role of feeding behaviors in shaping nutritional outcomes across diverse low-resource settings.

National data from Pakistan consistently demonstrate a high burden of malnutrition in under-five children, supporting our findings. The National Nutrition Survey (NNS) 2018 reported 40.2% stunting, 28.9% underweight, and 17.7% wasting among children under five, indicating

that under nutrition frequently persists beyond infancy.[12] Although feeding practices beyond two years were not separately analyzed, the magnitude of malnutrition closely parallels the 43.7% malnutrition prevalence observed in our study.

A community-based study from Punjab reported malnutrition in 53.3% of under-five children, with 57.5% having a history of bottle feeding, and higher malnutrition rates among toddlers and preschool-aged children.[13] This aligns with our observation that prolonged bottle feeding is associated with substantially higher malnutrition rates.

Similarly, a study from Khyber Pakhtunkhwa involving children aged 2-5 years found that approximately 35% were malnourished, with inappropriate feeding practices identified as a major contributing factor.[14] Compared to this, the 76.8% malnutrition rate in bottle-fed, non-self-eating children in our study highlights the compounded risk of continued bottle feeding combined with delayed self-feeding skills.

Evidence on self-eating practices indicates that encouraging eating autonomy and responsive feeding is associated with improved diet quality and healthier eating behaviors in preschool-aged children. A recent systematic review reported that autonomy-supportive feeding practices, which include encouraging self-feeding, were positively associated with better dietary diversity and food intake among children aged 2–12 years.[18] Although anthropometric outcomes were not directly measured, improved diet quality is a well-established pathway to better nutritional status.

These findings support our observation that children who practiced self-eating and discontinued bottle use had significantly lower malnutrition rates (9.1%) compared to those lacking self-eating skills. Interestingly, the absence of malnutrition in Group IV (no bottle feeding and no self-eating), despite its small size, may reflect effective caregiver-assisted feeding and supervision, consistent with evidence that responsive caregiver involvement can mitigate nutritional risk.[18]

CONCLUSION

There is significant association of malnutrition with children on bottle feeding for prolonged period of time. Prolonged use of bottle feeding with lack of self-eating increases this risk in children under five years of age. No bottle feeding and self eating habit after two significantly reduce malnutrition. In future, we will recommend and counsel the mothers, to give more focus on breast feeding in infancy and later on, early weaning of children to prevent or less use of bottle-feeding, which is a significant factor of malnutrition, stunting or wasting, and more risk of developing multiple episodes of diarrhea in this age group. We will also counsel the mothers to develop habit of self-eating in their child as soon as he/she starts walking, to reduce the risk of malnutrition. We will further implement strategies and policies to improve the education level of mothers to improve health and life quality of children under five.

REFERENCES

1. Getachew D, Getachew E, Yirsaw AN, Ayele HS, Andargie GA, Lakew AA, et al. Prevalence of bottle-feeding practice and associated factors among mothers of children under five in the world, 2024: systematic review and meta-analysis. Reprod Female Child Health 2024;3(4):e70002.
2. Ali H, Khan S, Nayab S, Abbas A, Arshad R, Akram I, et al. Assessment of nutritional status of lactating mothers in Multan, Pakistan: a case study. Professional Med J 2021;28(06):813-8.
3. Ahmed F, Malik NI, Shahzad M, Ahmad M, Shahid M, Feng XL, et al. Determinants of infant young child feeding among mothers of malnourished children in South Punjab, Pakistan: a qualitative study. Frontiers Public Health 2022;10:834089.
4. Nasrul N, Hafid F, Ramadhan K, Suza DE, Efendi F. Factors associated with bottle feeding in children aged 0–23 months in Indonesia. Children Youth Services Rev 2020;116:105251.
5. Kotowski J, Fowler C, Hourigan C, Orr F. Bottle-feeding an infant feeding modality: an integrative literature review. Maternal Child Nutr 2020;16(2):e12939.
6. Shahzadi B, Mazhar R, Sadiqa A, Saeed MH, Arif MH, Riaz S. The correlation between maternal awareness, hygiene practices and the incidence fo diarrhoeal cases: a cross-sectional study in Lahore. Pak J Biotechnol 2024;21(1):49-56.
7. Iqbal GY, Farooq HU, Cheema RUR, Sultan S, Hussain T. To assess nutritional status of children of 1-5 years age attending at OPD Sheikh Zayed Hospital Rahim Yar Khan. HITEC Med Dent J 2024;4(1):12-5.
8. Khan S, Arshad R, Gillani S, Irshad S, Ikram T, Batool N. Serum Phosphate Level in Patients with Severe Acute Malnutrition at Nutrition Stabilization Centre, Children Hospital, and Institute of Child Health Multan: Serum Phosphate Level in Children with SAM. JIIMC 2023;18(2):105-8.
9. Ashraf I, Bestman PL, Assiri AA, Kamal GM, Uddin J, Luo J, et al. Status of Inappropriate Complementary Feeding and Its Associated Factors Among Infants of 9–23 Months. Nutrients 2024; 16(24):4379.
10. Belay DG, Getnet M, Akalu Y, Diress M, Gela YY, Getahun AB, et al. Spatial distribution and determinants of bottle feeding among children 0-23 months in Ethiopia: spatial and multi-level analysis based on 2016 EDHS. BMC Pediatr 2022;22(1):120.
11. Hua J, Williams GJ, Barnett AL, Zhang J, Jin H, Xu M, Chen J, Zhou Y, Guixiong G, Du W. Association of the onset of self-feeding with subsequent suspected developmental coordination disorder: a prospective cohort study. Front Psychiatry 2022; 13:818771.
12. Government of Pakistan, UNICEF. National Nutrition Survey 2018. Islamabad; 2019.

13. Riaz A, Nisar N, Yaqoob S, et al. Feeding practices and nutritional status of children under five years in Punjab, Pakistan. Pak J Med Sci 2020;36(7):1521-6.
14. Khan S, Ullah R, Ahmad N, et al. Determinants of malnutrition among children aged 2–5 years in Khyber Pakhtunkhwa, Pakistan. J Pak Med Assoc 2021;71(9):2141-6.
15. Radwan H, Fakhry R, Metheny N, et al. Breastfeeding practices, infant formula use, complementary feeding and childhood malnutrition in the Eastern Mediterranean Region. Nutrients 2022; 14(19):4201.
16. Terefe B, Habtie A, Chekole B. Bottle feeding practice and associated factors in East Africa: DHS multilevel analysis. Int Breastfeed J 2024;19:24.
17. Mohammed SH, Habtewold TD, Arero AG, et al. The state of child nutrition in Ethiopia: an umbrella review. BMC Pediatr 2020;20:404.
18. Costa Lopes E, Vilella PR, Ruffoni P, et al. Parental autonomy-supportive food practices and diet quality in children: systematic review and meta-analysis. Appetite 2025;164:108389