

A Cross-Sectional Study on Nutritional Status and Complementary Feeding Pattern of Children Under Two Years of Age in Selected Area of Dhaka City

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ABSTRACT

Inadequate nutrition during the first two years of life may lead to childhood morbidity and mortality, as well as increased risk of malnutrition causing developmental retardation. Feeding practices could play a pivotal role in determining the optimal development of infants. However, this study aims to investigate the nutritional status of children under the age of two in Dhaka, Bangladesh. A cross-sectional study was carried out among 104 children of under two years of age, dwelling in Badda, Dhaka during the month of September 2014 to June 2015. All the data were collected through semi structured questionnaire using face to face interview technique and anthropometric data were collected using standard procedure. Among all the children, 16.3% were suffering from severe form of stunting, and 27.9% from moderate form. Whereas only 56.3% were exclusively breastfed while 43.7% were fed with prelacteal feeding. On the other hand, there was no significant association observed between nutritional status of children and breastfeeding practices and complementary feeding pattern. Though there was no significant association, lower rate of exclusive breastfeeding, higher rate of prelacteal feeding practice and higher rate of disease occurrence could act as contributing factors to form malnutrition among children of under two years of age. The identified associated or contributing factors could be used for designing and planning preventive programs for the target group.

Keywords: Nutritional status, Complementary feeding, Malnutrition, Prelacteal feeding.

INTRODUCTION

Nutritional Status is the condition of health of an individual as influenced by the utilization of nutrients in his body. This can be found by careful medical and dietary history, a thorough physical examination and appropriate laboratory investigations (Khan et al., 2022). Though malnutrition is referred to the under-nutrition and over nutrition, in Bangladesh under-nutrition is more common (National Institute of Population Research and Training (NIPORT), 2020). Malnutrition can however cause children to be underweight, stunted, wasted, or vitamin/mineral deficient, and it can transfer from mother to uterus, eventually giving birth to a malnourished baby who struggles to develop and survive (Hyman, 2008). Globally, children under two years of age, 51 million suffer from stunting and 23 million from wasting (*Fed to Fail_ UNICEF Report Shows Global Crisis in Children's Diets _ UNICEF USA*, n.d.). Evidence suggests that, globally, 70 percent of the shortfall in height

accumulated by the age of five is due to growth faltering occurring before the age of two (Leroy et al., 2014). Child Malnutrition and infectious diseases are found to be the prime reasons for 45% of the 5.9 million child death throughout the world (Sheikh et al., 2020). The Southern Asia sub region experiences a significantly higher level of stunting and wasting compared to global malnutrition (WHO, 2020).

World Bank and the World Disaster Report have identified the core factors that contribute to malnutrition in infants or children to be: foods used; infant and young child feeding practices; barriers faced by caregivers; and availability of support resources (Racine, 2011). Exclusive breastfeeding and complementary feeding practice could help the optimal growth and development of infant and young children and improve nutritional status (National Institute of Population Research and Training (NIPORT), 2020).

Breast milk is the most nutritious food for infants. It contains all of the nutrients that the infant requires throughout the first week of life. Recognized indicators of successful breast feeding are: to initiate breastfeeding within 1 hour of birth, exclusive breastfeeding for 6 months, continued breastfeeding for 2 years and to start home based complementary feeding immediately after 180 days (Beauregard et al., 2022). WHO recommends that a newborn be breastfed as soon as possible, preferably within first hour after birth, because colostrum is essential for healthy immune system development and the decrease of infant mortality. (Eidelman & Schanler, 2012; Ekubay et al., 2018; WHO, 2017). In Bangladesh, 60% of children are breastfed within one hour of birth, but the remaining 40% are given water, other milk, and other liquids in addition to breast milk, with 29% receiving prelacteal feeding (National Institute of Population Research and Training (NIPORT), 2020).

Human milk is the preferred feeding for all infants, including premature and sick newborns, with rare exceptions. When direct breastfeeding is not possible, expressed human milk, fortified when necessary for the premature infant, should be provided (Arslanoglu et al., 2019). Breastfeeding should begin as soon as possible after birth, usually within the first hour. Except under special circumstances, the newborn infant should remain with the mother throughout the recovery period (Kroeger, 2003). Optimal breastfeeding practices should be followed, which include exclusive breastfeeding (breast milk with no other foods or liquids) for the first six months of life, followed by breast milk and complementary foods (solid or semi-solid foods) from completion of six months of age on, and continued breastfeeding for up to at least two years of age and beyond, while receiving appropriate complementary foods (Bhandari & Chowdhury, 2016).

Infants should be exclusively breastfed for the first six months of life, and thereafter should receive nutritionally-adequate and safe complementary foods while breastfeeding continues up to two years and beyond (American Academy of Pediatrics, 2012). Complementary foods are often introduced either too early or too late and are often nutritionally inadequate and unsafe (Heird, 2012; Puspitorini et al., 2021). Appropriate feeding practices are essential for the nutrition, growth, development, and survival of infants and young children, whereas an inappropriate feeding practice may cause various diseases and may result in malnutrition (MHFW, 2017).

Though there has been slight improvement in child nutritional status over the last decade, the Second National Plan of Action for Nutrition (NPAN-2) has been implemented to reduce stunting among under-5 children by 25%, wasting by 5%, underweight by 15%, and improve IYCF practices by 2025 (MHFW, 2017). Therefore, the current study aims to investigate the nutritional status of children under the age of two In Dhaka, Bangladesh.

MATERIALS & METHODS

Research design: This is a cross-sectional study to assess the nutritional status as well as feeding pattern of children under two years of age in Dhaka city.

Study location: The study was conducted during September 2014 to June 2015. Badda Thana was selected purposively as the study area. Ward no. 9 was selected as a study area among 9 Wards of Badda Thana using simple random sampling method.

Study sample: A study frame was constructed including all children under two years of age of the selected area. Only 104 children were found as sample among the selected 110 children. Data were collected from mothers of the children.

Research instrument: A semi structured questionnaire was used to collect data using face to face interviewing technique. Information regarding nutritional status, socio-demographic and economic characteristics including mothers' education, mothers and fathers' occupation, monthly family income, housing condition, source of water, hygienic and sanitation related issues, breastfeeding and complementary feeding practices were collected for the study. To determine validity of the data collected, the initially drafted questionnaires were pre-tested. The drawbacks found in questionnaire and recommendations from pretesting were included in the final questionnaire.

Dependent Variables:

Nutritional status assessment

The children's age was confirmed by the Child Health Cards. In cases where there was no documentation of the birth dates, the mother's self-reported information was used to establish the ages of their children.

Anthropometric data for the children (0-24 months) was collated using standard procedures. The weight was measured in Kilograms using digital scale. The respondents were bare footed, minimum clothing and empty bladder and stomach. Edema was checked before taking weight. The height/length of the babies was measured by using locally manufactured recumbent measuring board.

Wasting (emaciation), stunting (growth retardation) and underweight were termed as weight-for-height, height-for-age and weight-for-age respectively and classified according to standard deviation units (z-scores), based on the WHO criteria (NHANES, 2007). Stunting represented by low height-for-age z-score (HAZ) and it is usually resulted from inadequate food intake for an extended period, Weight for-age z-score (WAZ) or underweight indicates the presence of both acute and chronic malnutrition. All the three indicators are defined as Z-scores of -2 standard deviations (Baperman Abdel Aziz et al., 2019). A z-score of <-3 defines severe levels of each of the indices. The WHO Anthro software (version 3.2.2) was used to analyze the nutritional status of children ("WHO Child Growth Standards," 2009).

Breastfeeding and complementary feeding

Breastfeeding practice was assessed considering their feedback on early initiation of breastfeeding and exclusive breastfeeding was considered by asking whether they have given only breastfeeding (mother's milk only, with the exclusion of all other food or drink) and non-exclusive breastfeeding and colostrum feeding practice. Data on initiation, diversity, and feeding frequency of complementary feeding were taken.

Independent variables:

Demographic and Socioeconomic Characteristics

Questions regarding socio-demographic variables included age of the children where age group sex, educational qualification of mother and occupation of father and mother and monthly family income were assessed in this study.

The monthly income of the respondents was categorized into three economic groups using quintile method. Low income (first quintile); Middle income (second to fourth quintile); and High income (fifth quintile).

Data analysis

Anthropometry data was analyzed using ENA for SMART (2008). The indices of interest were Weight for Height, Height for Age, Weight for Age. The frequency distributions of the entire variables were checked by using SPSS 18.0 window program.

Anthropometry were then transferred software, after which it was exported to SPSS. This was for cross analysis with variable like nutrition status, feeding and hygiene practices. Descriptive statistics (mean, standard deviation, frequencies and percentages) were used to describe data on nutritional status, feeding practices, socio-demographic characteristics

RESULT & DISCUSSION

Socio-demographic and economic characteristics of the respondent mothers having under-two children

Table 1: Socio- demographic and economic characteristics (N=104)

Characteristics	Frequency	Percentage (%)
<i>Age (in month) of the children</i>		
0 - <6	36	34.6
6-11	30	28.8
12-17	23	21.1
18-23	15	14.4
Total	104	100.0
<i>Sex of children</i>		
Male	51	49.0
Female	53	51.0
Total	104	100.0
<i>Family size</i>		
>=4	65	62.5
5-8	38	36.5
>8	1	1.0
Total	104	100
<i>Religion</i>		
Muslim	100	96.2
Hindu	3	2.9
Christian	1	1.0
Total	104	100.0
<i>Type of housing</i>		
Building	30	28.8
Only Tin	6	5.8
Roof (Tin) + Wall	68	65.4
Total	104	100.0
<i>Mothers' education</i>		

Primary	39	37.5
Secondary incomplete	24	23.1
S.S.C	30	28.8
H.S.C and above	11	10.6
Father's Occupation		
Service	66	63.5
Business	26	25
Others	12	11.5
Mother's Occupation		
Service	100	97.1
Others	4	2.9
Monthly income		
Low (7500-12000)	19	18.3
Middle (12001-30000)	63	60.6
High (30001-90000)	22	21.2

The table of socio-demographic variables included the age of the children where the age group resembles to the study conducted in Northern Ghana (Anin et al., 2020). In terms of gender prevalence, the ratio of males to females is slightly different from the national data 2014 and 62.5% households had a family size of less than 4 members which is similar to national mean family size (et al., 2016). On the other hand, majority of the respondents (60.6%) belong to middle income family ranging from Tk.12,000 to <Tk.30,000 followed by 18.3% and 21.2% of the respondents belong to low income family (from Tk. 7,500 to <Tk.12,000) respectively that resembles per capita national income in 2014 (The World Bank, 2019).

Nutritional status of children of under two years of age

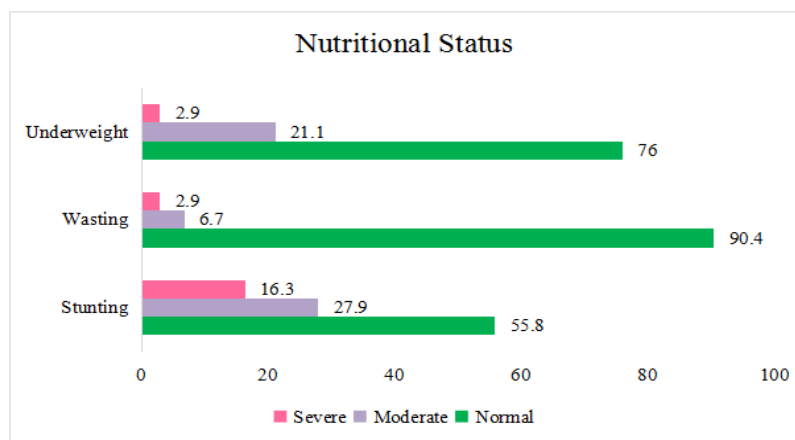


Figure 1: Nutritional status

The prevalence of malnutrition of the study children was slightly different to the national findings in 2014. The prevalence of underweight was 21.1% while 2.9% were severely underweight. The prevalence is much lower now a days (National Institute of Population Research and Training (NIPORT), 2020). The possible explanation

for the improvement in weight for age could be due to current efforts of the health sector to improve health intervention through health extension workers at the community level. In contrast to 9.6% were wasted followed by 2.9% were severely wasted. Wasting is an indicator of acute malnutrition that can occur due to recent infection or weight loss due to periodical variation of food supply. Unfortunately, 44.2% of the studied children were stunted while 16.3% were severely stunted. Stunting showed a failure to get adequate food over long period and affected through infections. The current prevalence of stunting is still a public health problem though it has reduced in 2017. The possible explanation for this difference in prevalence could be due to an improvement in the socioeconomic, agricultural productivity, food insecurity at household level, and nomadic nature of the population.

Frequency of food consumption (daily, weekly, quarterly)

The above figure revealed that rice is the most frequently consumed food compared to ruti which is similar to the result that toddlers consuming more rice and tubers (Wirda Hayati et al., 2012). Alternatively another research showed that the sources of carbohydrates consumed by toddlers are rice, potato, sweet potato, cassava, flour, bread, and instant noodle (Kusumawardani & Ashar, 2022). Majority of the children were taking animal protein as fish and more than two third of the respondents were consuming egg which relates that fact that protein intake to the toddlers usually comes from complementary food mainly fish and cereal, meanwhile, breastmilk is slightly contributed (Hautvast et al., 1999). Other studies explained that inappropriate food consumption pattern of protein and fat affected the high prevalence of stunting (Aramico et al., 2016). Unfortunately, the vegetable and fruits consumption were found poor among the studied children which resembles the fact that toddlers consumed vegetables and fruits. Different from other research, a study in Deli Serdang reported that there were no toddlers consuming vegetables daily (Medan & Instirusi, n.d.). Vegetable consumption like spinach to children can decrease stunting prevalence because of the high iron level. An adequate iron intake can level down the number of iron deficiency anemia to prevent stunting (Widyaningsih et al., 2018). (Fig 2)

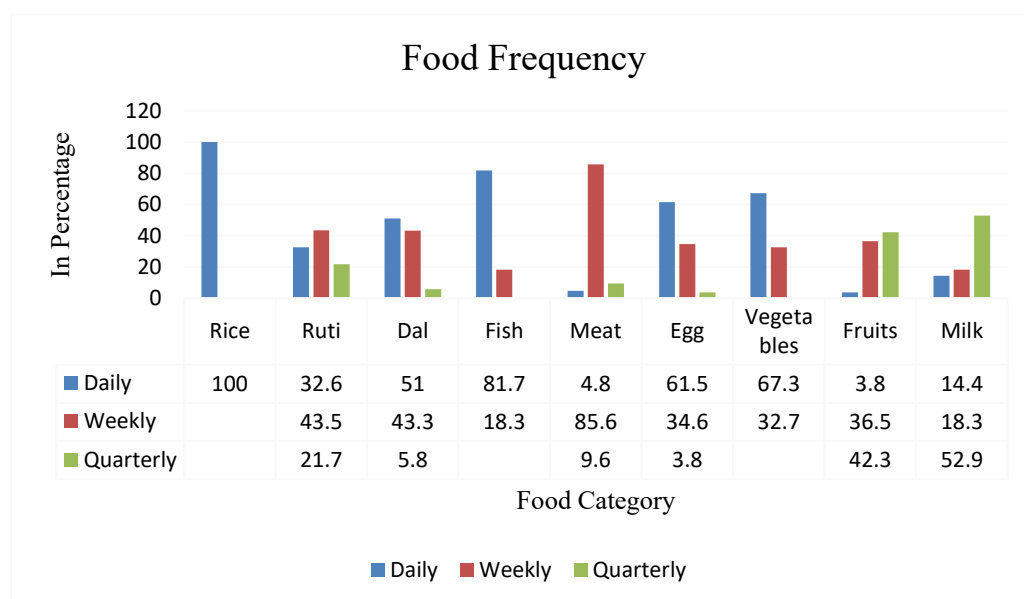


Figure 2: Daily, weekly and quarterly food frequency

Type of prelactetal feeding and other type of feeding except breast milk

Prelacteal feeds are those given to newborns before breastfeeding is established or before breast milk "comes in," usually on the first day. Honey, jaggery (brown sugar from sugar cane), ghee (clarified butter), and ghutti (herbal paste) are examples of prelacteals. In the above figure, it can be seen that those who failed to breastfeed exclusively introduced powder milk, honey, sugar water, and cow milk as prelacteal feedings. Besides, mothers also fed suji, khichuri, banana, and egg within 6 months of age that is similar to the findings of the Ethiopian study (Gebre et al., 2019). There is evidence that prelacteal feeding contributes to malnutrition which could be possibly due to its negative impact on breastfeeding, and children who are not breastfed properly are at greater

risk of developing undernutrition (Abera et al., 2017; Bezatu Mengiste, 2014; Kassahun Alemu, 2013; Teshome et al., 2010). (Fig 3)

Figure 3: Type of prelactetal feeding and other type of feeding (0<6 months)

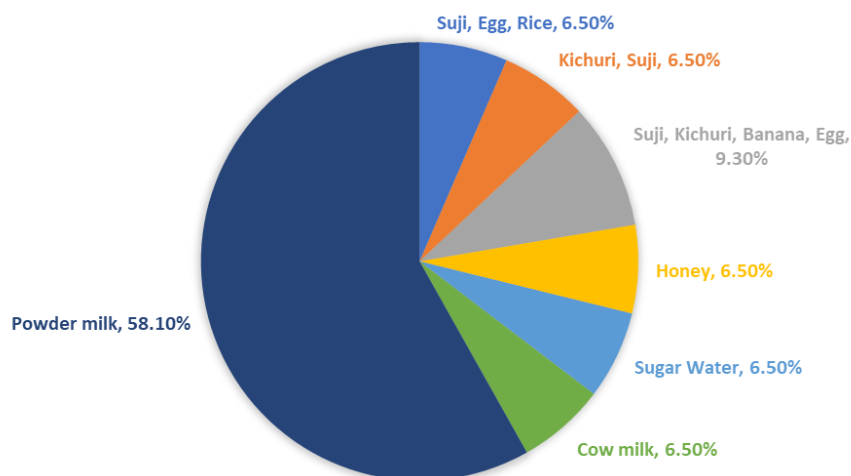


Figure 3: Type of prelactetal feeding and other type of feeding except breast milk

IYCF Practice among children of under two years of age

Table 2: IYCF Practice

Indicators	Frequency (%)
Early initiation of breastfeeding	
Within one hour	77 (74)
2-3 hours	16 (15.4)
4-6 hours	7 (6.7)
After 1 day	4 (3.8)
First feeding of the child	
Honey	2 (1.9)
Sugar water	2 (1.9)
Breastfeeding	98 (94.2)
Powder milk	2 (1.9)
Initiation of colostrum after child's birth	
Yes	101 (97.1)
No	3 (2.9)
Exclusive breastfeeding	
Yes	58 (56.3)

No	46 (43.7)
Prelacteal feeding	
Yes	46 (43.7)
No	58 (56.3)
Continued breastfeeding after birth	
Yes	92 (88.5)
No	12 (11.5)
Complementary feeding	
Yes	71 (68.3)
No	33 (31.7)
Initiation of complementary feeding	
6-7 months	98 (94.4)
>8 months	6 (5.6)
Types of complementary feeding	
Soft	43 (41.3)
Semi-solid	24 (23.1)
Solid	4 (3.8)
Frequency of complementary feeding	
2 times	3 (2.8)
3 times	92 (88.7)
>3 times	9 (8.5)
Force feeding	
Yes	51 (49)
No	49 (51)
Occurrence of disease	
Yes	76 (73.1)
No	28 (26.9%)

The above table shows that almost all the mother initiated breastfeeding within an hour which breastfeeding which is similar to the findings found in United Arab Emirates (UAE), Abu Dhabi, UAE (95.6%) (Taha et al., 2018). Moreover 97% had provided colostrum to their child which is similar to the study findings conducted in Bangladesh (Akhtar K et al., 2012). Despite the high prevalence of breastfeeding initiation, the duration of

exclusive breastfeeding falls short of recommendations (World Health Organization, 2003). Unfortunately the current study showed that only 59% children had exclusive breastfeeding which is slightly higher than national data (et al., 2016). More than one third of the respondents had prelacteal feeding which could be another reason of such high prevalence of malnutrition as another study found that prelacteal feeding were positively associated with wasting (Gebre et al., 2019)

Almost all had initiated complementary feeding around 6 months. The WHO recommendation also implies that the adequacy of breast milk for meeting the nutritional needs of the child is limited to the early months of life (Carlson & Wardlaw, 1990). In contrast a significant proportion of mothers introduced solid foods as late as nine months after birth which might influenced the high prevalence of malnutrition in Bangladesh (Piechulek et al., 1999). Unfortunately, occurrence of disease was very high which might resemble the fact infectious diseases are immediate cause of child malnutrition. This might one of the reasons of higher prevalence of malnutrition in the study area (Beyene Teferi, 2016; Egata G et al., 2014). (Table 2)

Association of nutritional status with socio economic characteristics of the children

In Table 3, female was less likely to be stunted, wasted and underweight compared to male participants, but the findings were found insignificant. Similarly, a study carried out in Benin, stunting and underweight were less prevalent among the female population (Care International). Girls were found to eat more frequently than boys (Mekonnen et al., 2017) probably this is why they are having less malnutrition than boys. However, the malnutrition were found higher in male infants than females(Bhandari et al., 2004). Children of mothers with primary education were found to have more malnutrition compared to mother with higher education. Though the results are not significant still the findings resembles the fact that educated mothers emphasize the importance better child health, because they are well informed about adverse event for the malnourished child (Arimond & Ruel, 2004)

However, socioeconomic status also demonstrated significant role for in reducing undernutrition among the study children. Children belong to higher income usually have the better opportunity to access and afford the MAD than poorest (Nguyen et al., 2013). It is evident that poor people do not use the advantages of health-care services if their particular health problem is not severe as they do not have proper financial security (Mahumud et al., 2015) and also have better access affordability to avail more nutritious food (Nguyen et al., 2013). Overall study findings revealed that father's occupation was statistically associated with stunting, whereas children age, mothers education, mother's occupation and family income were not statistically significant with nutritional status. Among the socioeconomic characteristics, father's occupation showed a significant association with stunting ($\chi^2=10.105$, $p=0.039$), while no significant association was observed with wasting or underweight. This is similar to study conducted by A study from Jimma also reported that there was no significant association between any of the nutritional indices +and mothers' age, education, religion, residence or the sex of the child (Beyene, 2012).

Table 3. Association of nutritional status with socio-economic characteristics of the children

Parameter	Category	Stunting (%) Normal / Mod / Sev	χ^2 (p-value)	Wasting (%) Normal / Mod / Sev	χ^2 (p-value)	Underweight (%) Normal / Mod / Sev	χ^2 (p-value)
Child's age (months)	0 - <6	18.3 / 10.6 / 5.8	9.143 (0.166)	29.8 / 2.9 / 1.9	7.009 (0.320)	29.8 / 3.8 / 1.0	8.912 (0.179)
	6 - 12	17.3 / 4.8 / 6.7		25.0 / 1.0 / 2.9		22.1 / 6.7 / 0.0	
	13 - 18	7.7 / 5.8 / 8.7		14.4 / 4.8 / 2.9		13.5 / 6.7 / 1.9	
	19 - 24	7.7 / 5.8 / 8.7		11.5 / 1.0 / 1.9		9.6 / 4.8 / 0.0	

Child's sex	Male	23.1 / 14.4 / 11.5	0.620 (0.733)	37.5 / 6.7 / 4.8	1.991 (0.370)	34.6 / 13.5 / 1.0	1.844 (0.398)
	Female	27.9 / 12.5 / 10.6		43.3 / 2.9 / 4.8		40.4 / 8.7 / 1.9	
Education of mothers	Primary	21.2 / 6.7 / 9.6	7.569 (0.271)	27.9 / 6.7 / 2.9	7.098 (0.312)	25.0 / 10.6 / 1.9	4.263 (0.641)
	Class (VI-VIII)	11.5 / 6.7 / 4.8		21.2 / 0.0 / 1.9		18.3 / 4.8 / 0.0	
	S.S.C	11.5 / 12.5 / 4.8		24.0 / 1.9 / 2.9		24.0 / 3.8 / 1.0	
	H.S.C & Above	6.7 / 1.0 / 2.9		7.7 / 1.0 / 1.9		7.7 / 2.9 / 0.0	
Occupation of father	Service holder	29.8 / 22.1 / 11.5	10.105 (0.039) *	52.9 / 6.7 / 3.8	3.830 (0.430)	47.1 / 15.4 / 1.0	2.159 (0.707)
	Business	15.4 / 1.0 / 8.7		18.3 / 1.9 / 4.8		19.2 / 4.8 / 1.0	
	Other	5.8 / 3.8 / 1.9		9.6 / 1.0 / 1.0		8.7 / 1.9 / 1.0	
Occupation of mother	Job holder	1.0 / 1.0 / 1.0	0.411 (0.814)	1.9 / 0.0 / 1.0	2.180 (0.336)	1.0 / 1.9 / 0.0	3.577 (0.167)
	Housewife	50.0 / 26.0 / 21.2		78.8 / 9.6 / 8.7		74.0 / 20.2 / 2.9	
Monthly family income	Low income	7.7 / 10.5 / 3.8	1.642 (0.801)	13.0 / 4.8 / 1.0	2.544 (0.637)	9.6 / 8.7 / 1.0	3.054 (0.549)
	Middle income	35.6 / 25.0 / 11.5		51.9 / 8.6 / 3.8		48.1 / 12.5 / 1.9	
	High income	7.7 / 13.4 / 6.7		15.4 / 5.8 / 4.8		17.3 / 3.8 / 0.0	
Number of family members	3 - 4	35.6 / 16.3 / 10.6	6.226 (0.183)	53.8 / 3.8 / 4.8	3.978 (0.409)	49.0 / 10.6 / 2.9	4.759 (0.313)
	5 - 8	15.4 / 10.6 / 10.6		26.0 / 5.8 / 4.8		25.0 / 11.5 / 0.0	
	>8	0.0 / 0.0 / 1.0		1.0 / 0.0 / 0.0		1.0 / 0.0 / 0.0	

Note: Values for Stunting, Wasting, and Underweight represent percentages (%) across Normal / Moderate / Severe categories respectively. χ^2 = Pearson's Chi-Square statistic. Degrees of Freedom (df) = 2 for all Chi-Square tests. * Statistically significant association at $p < 0.05$.

Table 4: Association of nutritional status with hygiene and feeding pattern of the children

Parameter	Category	Stunting (%) Normal / Mod / Sev	χ^2 (p-value)	Wasting (%) Normal / Mod / Sev	χ^2 (p-value)	Underweight (%) Normal / Mod / Sev	χ^2 (p-value)
Colostrum feeding	Yes	51.0 / 26.0 / 20.2	4.137 (0.126)	78.8 / 9.6 / 8.7	2.263 (0.323)	72.1 / 22.1 / 2.9	0.996 (0.608)
	No	0.0 / 1.0 / 1.9		1.9 / 0.0 / 1.0		2.9 / 0.0 / 0.0	
Initiation of complementary feeding	6–7 months	50.7 / 21.1 / 22.5	8.794 (0.012) *	73.2 / 9.9 / 11.3	1.596 (0.450)	67.6 / 23.9 / 2.8	1.721 (0.423)
	>8 months	0.0 / 4.2 / 1.4		5.6 / 0.0 / 0.0		2.8 / 2.8 / 0.0	
Continuation of breastfeeding	Yes	48.1 / 22.1 / 18.3	3.462 (0.177)	72.1 / 8.7 / 7.7	0.699 (0.705)	64.4 / 22.1 / 2.9	0.556 (0.757)
	No	2.9 / 4.8 / 3.8		8.7 / 1.0 / 1.9		10.6 / 2.9 / 0.0	
Hand washing practice	Yes	45.7 / 24.3 / 24.3	5.715 (0.057)	74.3 / 8.6 / 11.4	1.978 (0.372)	67.1 / 22.1 / 2.9	0.185 (0.912)
	No	5.7 / 0.0 / 0.0		4.3 / 1.4 / 0.0		4.3 / 1.4 / 0.0	
Disease episode	Yes	38.5 / 19.2 / 15.4	0.320 (0.852)	61.5 / 5.8 / 5.8	1.970 (0.373)	54.8 / 16.3 / 1.9	0.089 (0.956)
	No	12.5 / 7.7 / 6.7		19.2 / 3.8 / 3.8		20.2 / 5.8 / 1.0	
Boiled drinking water	Yes	45.2 / 23.1 / 18.3	0.467 (0.792)	70.2 / 7.7 / 8.7	0.420 (0.810)	64.4 / 22.1 / 2.9	0.556 (0.757)
	No	5.8 / 3.8 / 3.8		10.6 / 1.9 / 1.0		10.6 / 2.9 / 0.0	

Note: Values for Stunting, Wasting, and Underweight represent row percentages for Normal / Moderate / Severe categories respectively. Degrees of Freedom (df) = 2 for all Chi-Square tests. * Statistically significant association at $p < 0.05$.

The study found majority of the children had received colostrum and as there is no noticeable difference between colostrum fed and non-fed group, malnutrition is also higher among the colostrum fed children and so **no significant** association were observed **between** malnutrition and colostrum feeding. Alternatively, a study conducted in Ethiopia showed that colostrum feeding is associated with the lower probabilities of under nutrition among the children. As such all health partners aimed at improving the nutritional status of the children need to give emphasis on the importance of colostrum feeding (Legesse Liben et al., 2016).

The study also showed that malnutrition is also high among those who have initiated complementary feeding between 6 to 7 months. The initiation of complementary feeding showed a statistically significant association with stunting ($\chi^2=8.794$, $p=0.012$), whereas no significant association was observed with wasting and underweight. The timely introduction of complementary food in childhood and their dietary adequacy are cornerstones for lifelong health that also influence the risk for malnutrition (UNICEF, 1998). According to the WHO, timely introduction of complementary food is at 6 months of age where breast milk is no longer sufficient

to meet the energy and nutrient needs of the growing infant (Agostoni et al., 2008). It was evident, in the current study, that the timely introduction of solid food was ‘very good’ according to the WHO IYCF rating (World Health Organization, 2003). Nonetheless, some studies have indicated that a very late introduction of solid food (beyond 6 - 8 months of age) may result in a separate set of health problems connected to micronutrient deficiencies, such as iron deficiency anemia, blindness, and mortality due to vitamin A deficiency, permanent brain damage due to iodine deficiency, and rickets due to vitamin D deficiency (Motee & Jeewon, 2014; Taha et al., 2018). However, no association were observed between continuation of breastfeeding and malnutrition. Similarly another study did not observe any association between breastfeeding practices and nutritional status like earlier study (Meshram et al., 2015); although many studies found such association (Arifeen et al., 2001). This might be due to the influence of other socioeconomic indicators such as maternal education, hygienic practices of the household and others (Meshram et al., 2013). No association were observed between nutritional status and hygiene practices which correlates the findings that undernutrition was negatively associated with personal hygiene (Shrestha et al., 2020). The study found that the occurrence of the disease was high among the children though significant relationship were not observed with nutritional status. The study findings dictates that the higher prevalence of diseases may lead to a lower level of immunity (Mmbando et al., 2022) as well as poor absorption or ability to retain nutrients which might be responsible for a higher burden of malnutrition among children (Checkley et al., 2008). (Table 4)

CONCLUSION

Malnutrition in children under two years of age is a multifaceted issue driven by infant and young child feeding practices, disease prevalence, sanitation, and socioeconomic factors. This study revealed rates of wasting and underweight consistent with national Bangladesh data, whereas the prevalence of stunting was markedly higher. Although household income showed a positive association with nutritional status, breastfeeding and complementary feeding practices yielded no statistically significant correlation. Nevertheless, elevated disease incidence, low exclusive breastfeeding rates, and a high frequency of prelacteal feeding appear to be key drivers of the region’s heightened malnutrition burden. Since the study was conducted among 104 children from a selected area of Badda Thana, Dhaka, the findings should be interpreted within this specific study population and may not represent the nutritional status of children across Dhaka city. These insights expand the evidence base on infant undernutrition and can guide targeted policy interventions aimed at high-risk populations to help achieve the Sustainable Development Goals (SDGs).

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