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Relationship between feeding practices and morbidity pattern of children under two years of age in a community setting at Mymensingh

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Abstract

This descriptive cross-sectional study was performed in the department of Pediatrics, Mymensingh Medical College Hospital to assess the feeding practices and their relationship with the morbidity pattern of children under two years of age. For this study four hundred (400) children from eight different Upazilla Health Complexes (UHC) of Mymensingh district were enrolled and UHCs were selected randomly. Mothers with their children under two years of age who gave voluntary, informed, written consent were included and very sick children, motherless children, handicapped children were excluded from the study. Immediately after registration, detailed history was taken from child's mother using a preset questionnaire and clinical examination (anthropometry and bipedal edema) was done. Among them, 214 children (53.5%) were male and 186 children (47.5%) were female and M: F=1.2:1. Regarding morbidity pattern, 17.3% had acute respiratory tract infection (ARI), 12.7% had acute watery diarrhea (AWD), 2.2% had dysentery, and 9.5% children had more than one disease. In exclusive breast feeding (EBF), acute respiratory tract infection was 10.24% where as in partial breast feeding it was 23.24% and acute watery diarrhea in exclusive breast-fed baby was 6.6% but in partial breast-fed baby it was 17.29%. Morbidity were more in children who started complementary feeding with luta, barley, suji and cow's milk with suji than with khichuri and mixed family diet.

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Introduction

First two years of life is critical in terms of one's physical, mental and social development. Optimal infant and young child feeding practices gives a child's best possible start of life. It is not only ensures adequate nutrition but also boosts immunity thus helps in preventing various morbidities.^{1,2} A malnourished child is vulnerable to various morbidities which at times may have fatal outcome. High rates of infection have detrimental effect on a child's growth and development. It had been seen that an undernourished child may have cognitive impairment, growth retardation, and compromised educational achievement and less economically productive in later course of life. Worldwide, more than 170 million children do not have the opportunity to reach their full potential because of poor nutrition in the earliest months of their life.^{3,4,5}

World Health Organization (WHO) and UNICEF have developed the global strategy for Infant and Young Child Feeding (IYCF) with recommendations of continued breastfeeding till 2 years with 6 months of

exclusive breastfeeding, or feeding with appropriate iron rich foods if not breastfed, feeding solid or semisolid food for a minimum number of times per day according to age and breastfeeding status and including foods from a minimum number of food groups per day according to breastfeeding status.⁶ It has been suggested that 20% of under-5 deaths could be prevented⁷ if all IYCF indicators are

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achieved and ~22% of neonatal deaths could be averted with optimal breastfeeding.⁸

The establishment of feeding practices that are comfortable and satisfying for both the parents and the infant is crucial not only for the emotional wellbeing of both but also for ensuring adequate nutrient intakes for the infant.⁹ Appropriate feeding practices are of fundamental importance for the survival, growth, development, health and nutrition of infants and children everywhere.¹⁰ There are many factors affecting infant feeding patterns. These can be broadly categorized as social factors (level of education, social and cultural statuses and economic condition of parents), nutritional and health statuses of mother and infants, bioavailability of nutrients and composition of nutrients in food and government policies.¹¹ More appropriate feeding practices are associated with greater gain in weight and length during infancy.¹² There are three determinants of good health, nutrition and child survival - these are food security, caring practice and disease control. Breastfeeding is an excellent example of all these three things in one.¹³ Optimal infant and young child feeding (IYCF) is very much important as deaths associated with inappropriate feeding practices mostly occur during the first year of life. If it continues through second birth day, children could suffer from irreversible physical and cognitive damage.¹⁴ The Ghana study shows that breastfeeding starting within one hour of birth could reduce 22% of all neonatal mortality; this effect is independent of exclusive breastfeeding.¹⁵ Universalization of exclusive breastfeeding was shown to cut down 13-15% of all child deaths.¹⁶ The duration of exclusive breastfeeding in Bangladesh is low. Women with higher education, high economic level, lower birth interval and delivery assisted by health personnel had lower duration of breast feeding.¹⁷ Many mothers neither exclusively breastfed for the first six months of the baby's life nor continue breastfeeding for the recommended two years or more and

instead replace breast-milk with commercial or other substitutes.¹⁸ During the critical period of infancy, breastfeeding and weaning practices play an important role in determining the growth of an infant.¹⁹ Malnutrition and mortality among infant and children in developing countries are major health problems, mainly associated with unhygienic feeding practices. Diarrhea and respiratory tract infections in partially breastfed and totally bottle-fed children is higher than exclusively breastfed children.²⁰ Breastfeeding provides significant protection against infection in newborns and infants. It is estimated that an increase in breast feeding worldwide by 40% would reduce death from respiratory infections by 50% in children less than 18 months of age. Recent investigations show that respiratory tract infections and asthma are reduced in breastfed infants.²¹ Breast fed babies show a better gain in weight during the first seven months of life than bottle fed babies which also had a significantly higher incidence of diarrhea and hospital experience from birth through twelve months of age.²²

Most of the studies conducted in Bangladesh have focused only on breastfeeding aspects but studies on dietary diversity and diet frequency aspects are scarce which are important for IYCF practices. Studies exploring relationship between morbidity and feeding practices are very few in number. With this background, this study was undertaken to assess the feeding practices and morbidity profile of children aged less than 24 months of age in a community setting at Mymensingh, Bangladesh. The study will enable policymakers to design suitable interventions to improve the health status of children.

Methods

This descriptive cross-sectional study was performed in the department of Pediatrics, Mymensingh Medical College Hospital, Mymensingh during the period of November 2009 to May 2010. As the actual prevalence of feeding practices in this age group was unknown, it was taken as 50% and the total

sample size calculated was 384. But for the simplicity of calculation 400 consecutive children under 2 years of age with their mothers were included and very sick children, motherless children, handicapped children were excluded. The samples were collected from the pediatric outpatient department (OPD), oral rehydration therapy (ORT) corner and expanded program on immunization (EPI) corner of eight upazilla health complexes (50 consecutive samples from each upazilla health complex) of Mymensingh district who fulfilled the inclusion and exclusion criteria and gave informed, voluntary, written consent to enroll in the study. The interview was taken by the investigator himself using a preset questionnaire. Immediately after registration detailed history was taken from child's mother, this includes age of the child in full months, maternal age, education, socio-economic status of the family, birth history of the child including term or preterm, place of birth, mode of delivery. Then detailed feeding history were collected from the mother using 24 hours recall method including first feeding, colostrum, type of pre-lacteal food if given, breast feeding status whether the child was exclusively, predominantly or partially breast fed and average duration of breast feeding. Then complementary feeding history including timing and type of complementary food were taken. Finally, any history of illness e.g. acute respiratory tract infection, acute watery diarrhea, dysentery etc. in the past were taken. Then weights of the children were measured by conventional beam scale (Camry, China) which is accurate to 50 gm and were calibrated before every measurement. Weighing were carried out by keeping the baby nude and before feeding. Then lengths of the child were measured by using infantometer to the nearest 1 mm. Then bilateral pedal edema was examined by applying pressure over the dorsum of the foot for about 10 seconds. Finally, weight for age, height for age and weight for height were calculated in both percentile and Z score. After data collection, data was sorted, scrutinized by the researcher himself by the

selection criteria and then data were analyzed by calculator and personal computer by software SPSS version 15 (Statistical package for social science). Comparison of parameters were done by Chi-square test. Level of significance was considered as p value less than 0.05.

Results

Maximum numbers of children were in between the age of 6 to 14 months of age group, i.e. 293 in number (73.1%). Infant less than 6 months of age were 21 (5.3%) and more than 18 months of age were 55 (13.8%). Out of 400 children, 214 children (53.5%) were male and 186 children (46.5%) were female and Male: Female = 1.2:1

Table 1. Distribution of children according to types of morbidity

Morbidity pattern	Frequency	Percentage
Respiratory tract infection	69	17.3
Acute watery diarrhea	51	12.7
Dysentery	9	2.2
Others	13	3.3
None	258	64.5
Total	400	100.0

In this study it was shown that 17.3% (69 children) had acute respiratory tract infection (RTI), 12.7% had acute watery diarrhea (AWD), 2.2% had dysentery and 3.3% had other diseases like skin and soft tissue infection, oral thrush etc. 9.75% (39 children) had more than one disease during the period (up to 24 months of age).

Table 2: Distribution of children by breast feeding in relation to morbidity pattern

Breast feeding status	Morbidity pattern					Total (%)
	RTI (%)	AWD (%)	Dysentery (%)	Others (%)	None (%)	
Exclusive	17(4.25)	11(2.75)	0(0)	0(0)	138(34.5)	166(41.5)
Partial	43(10.75)	32(8)	5(1.25)	6(1.5)	99(24.75)	185(46.25)
Predominant	8(2)	6(1.5)	3(0.75)	4(1)	12(3)	33(8.25)
Not at all	1(0.25)	2(0.5)	1(0.25)	3(0.75)	9(2.25)	16(4)
Total	69(17.25)	51(12.75)	9(2.25)	13(3.25)	258(64.5)	400(100)

$\chi^2 = 73.5$, $df = 12$, $p < 0.001$

Table 2 showed that respiratory tract infection (62.32%), acute watery diarrhea (62.74%), dysentery (55.56%) and other diseases (46.15%) were common in partially

breast-fed group than exclusive or predominant breastfed group and it was highly significant ($p < 0.001$).

Table 3: Distribution of children by timing of start of complementary feeding in relation to morbidity pattern

Timing of start of complementary feeding	Morbidity pattern					Total (%)
	RTI (%)	AWD (%)	Dysentery (%)	Others (%)	None (%)	
Timely, at 6 m	21(5.25)	12(3)	0(0)	0(0)	110(2.5)	143(35.75)
Early, <6 m	27(6.75)	25(6.25)	5(1.25)	4(1)	116(29)	177(44.25)
Delayed, >7 m	16(4)	12(3)	4(1)	6(1.5)	21(5.25)	59(14.75)
Not at all	5(1.25)	2(0.5)	0(0)	3(0.75)	11(2.75)	21(5.25)
Total	69(17.25)	51(12.75)	9(2.25)	13(3.25)	258(64.5)	400(100)

$$\chi^2 = 44.76, df = 12, p < 0.001$$

In table 3, it was shown that those children who took complementary feeding early (<6 months of age) suffered more than timely starting group and it was highly significant ($p < 0.001$).

Table 4: Distribution of children by weight for height in relation to morbidity pattern

Weight for height	Morbidity pattern					Total (%)
	RTI (%)	AWD (%)	Dysentery (%)	Others (%)	None (%)	
<-3 SD	3(0.75)	5(1.25)	2(0.5)	0(0)	0(0)	10(2.5)
-2 SD	24(6)	15(3.75)	4(1)	2(0.5)	0(0)	45(11.25)
-2 or more SD	42(10.5)	31(7.75)	3(0.75)	11(2.75)	258(64.5)	345(86.25)
Total	69(17.25)	51(12.75)	9(2.25)	13(3.25)	258(64.5)	400(100)

$$\chi^2 = 126.76, df = 8, p < 0.001$$

Table 4 showed that children those who were underweight, wasted and stunted suffered more from infection like respiratory tract infection, acute watery diarrhea, dysentery etc. It was statistically significant ($p < 0.001$).

Table 5: Distribution of children by types of complementary feeding in relation to morbidity pattern

Complementary feeding type	Morbidity pattern					Total (%)
	RTI (%)	AWD (%)	Dysentery (%)	Others (%)	None (%)	
Khichuri	5(1.25)	5(1.25)	2(0.5)	2(0.5)	60(15)	74(18.5)
Cow's milk with suji	11(2.75)	9(2.25)	2(0.5)	3(0.75)	73(18.25)	98(24.5)
Luta, Barley, Suji	36(9)	25(6.25)	4(1)	6(1.5)	76(19)	147(36.75)
Rice	4(1)	2(0.5)	0(0)	0(0)	23(5.75)	29(7.25)
Cereal	3(0.75)	4(1)	0(0)	0(0)	4(1)	11(2.75)
Banana	2(0.5)	1(0.25)	0(0)	0(0)	3(0.75)	6(1.5)
Mixed	3(0.75)	4(1)	1(0.25)	1(0.25)	5(1.25)	14(3.5)
Not yet started	5(1.25)	1(0.25)	0(0)	1(0.25)	14(3.5)	21(5.25)
Total	69(17.25)	51(12.75)	9(2.25)	13(3.25)	258(64.5)	400(100)

$$\chi^2 = 47.38, df = 28, p < 0.01$$

Table 5 showed that morbidity was more in children who started complementary feeding with luta, barley, suji and cow's milk with suji than who started with khichuri or mixed food and it was statistically significant ($p < 0.01$).

Discussion:

The improper infant feeding practices can be extremely detrimental to the health and wellbeing of the infant with high morbidity and mortality.²³ Mortality rate for term babies in early infancy can be reduced by simultaneous promotion of breast feeding and prevention of low birth weight.²⁴ Over one third (3.5 million) of about 10 million children die annually due to under nutrition.²⁵ Over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life.²⁶ Recent research shows that 22% of new born deaths could be prevented if newborns initiate breastfeeding within one hour of birth and 13% under five mortality rate will be reduced by exclusive breastfeeding up to six months and continued breastfeeding with proper complementary feeding up to two years will further reduce 6%.²⁷

The international code of breast milk substitute reported that improper feeding increases infant morbidity, diseases and infections.²⁸ Diarrhea and respiratory tract infection in partial breastfed and total bottle-fed children found much higher than exclusively breastfed children.²⁰ The mean monthly episode of diarrhea was 2.0 and 2.4 for those who were partially breast fed for 12 months and 12-18 months respectively, while respiratory tract infection was 1.8 and 3.0 for the same period of partial breast feeding.²⁰ A study performed in Mexico in 1990 concluded that non breast-fed infants (up to six months of age) had 2.3 times greater risk of developing diarrhea than breast-fed infants.²⁹ Breast feeding confers protection against shigellosis till three years of age.³⁰ The estimated benefit from breast feeding is a decrease in diarrheal morbidity by 8-20% and a decrease in diarrheal mortality rate by 24-27% in the first six months of life.³¹ Prolonged breastfeeding

beyond one year in a cohort of 1087 Bangladeshi children was associated with a 6-fold increase in survival compared to non-breastfed children.³²

A prospective study in India showed that breastfed children hospitalized with diarrhea were three times more protected against death compared to non-breastfed children.³³ The recent Lancet series on maternal and child under nutrition has concluded that the relative risk for all cause of mortality is 1.48 and 2.85 for predominant breastfeeding (breastfeeding plus water) and partial breastfeeding as compared to exclusive breastfeeding; the relative risk of diarrhea mortality is 2.28 and 4.62 and pneumonia mortality is 1.75 and 2.49 for predominant and partial breastfeeding as compared to exclusive breastfeeding and the relative risk for prevalence of diarrhea is 1.26 and 3.04 and for pneumonia is 1.79 and 2.49 for predominant and partial breastfeeding as compared to exclusive breastfeeding.²⁵

Morbidity pattern of children in this study showed that among 400 children 17.3% had acute respiratory tract infection, 12.7% had acute watery diarrhea, 2.2% had dysentery, and 9.5% children had more than one disease within the two years of age. The BDHS preliminary report (2007) showed that in <2 years children incidence of ARI was 17.03% and AWD was 10.9%.²⁷ This result is very much close to this study. In exclusive breast-feeding ARI was 10.24% where as in partial breast feeding it was 23.24% and AWD in exclusive breast-fed baby 6.6% but in partial breast-fed baby it was 17.29%. Chitkara AJ showed the incidence of morbidity in these diseases were much more (8.16 episodes/child/year) in non-exclusive breast-fed children than in exclusive breast-fed children (4.06 episodes/child/year).³⁴ A study done by Neha Kapoor and Rajini Thapa found that mothers who were not following the feeding practices accurately which affects the health of the children & Diarrhea and ARI's were the most frequently occurring morbidities among the children under 2 years of age.³⁵

Delaying the introduction of formula milk protects against morbidity associated with respiratory infection, illness, and associated hospitalizations in the first year of life.²¹ In this cross-sectional study information about the feeding practices of infants and their morbidity pattern of different age group were collected by taking mothers' interview. The main problem was the recall bias about the past feeding practices of children and past illness by the mothers, which may be poor in some instances and give rise to erroneous report. Incorrect statement about the child's age by the uneducated mother was another potential problem. Despite these demerits the investigator tried his best to collect the accurate information during interviewing the mother by giving enough time to recall.

Conclusion

Feeding practices of children was not at all satisfactory. There was high burden of morbidity. Unsatisfactory feeding practices adds on to the burden. At every given opportunity health care providers should enquire to mothers of young child regarding their child feeding practices to identify and intervene at the earliest. Mother of the child should be counselled in easily comprehensible local language regarding benefits of optimum feeding practices in ensuring their child health.

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