Original Article

Situation and factors associated with Infant and young child feeding (IYCF) indicators: Insights from a cross sectional study in Jamalpur district, Bangladesh

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ABSTRACT: A community based cross sectional study was conducted in June 2018 in three sub districts of Jamalpur district-Bangladesh. A total of 381 mothers having children of 0-23 months age were interviewed. The rates of initiation of early initiation of breast feeding (EIBF) within one hour after birth and exclusive breast feeding (EBF) were 48.0% and 51.3% respectively. Less than one third of the children were able to meet minimum dietary (MDD) (30%) and minimum meal frequency (MMF) (28%) while iron rich food consumption was found to be very low (24%) among children of 6-23 months of age. Education level of mother was significantly associated (p<0.05) with EBF, MDD and consumption of iron-rich food. In addition MDD was significantly associated with number of family members while iron rich food consumption was significantly associated with number of child in the family and monthly family income (p<0.05).

Keywords: Infant and young child feeding (IYCF), Exclusive breast feeding (EBF), Minimum dietary diversity (MDD), Iron rich food, Bangladesh.

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INTRODUCTION

Malnutrition is considered as a major threat as it efficiently impedes the full expression of intellectual and physical potential for current and future generations. Globally over two-third of under five children deaths are linked with inappropriate feeding practices which can be prevented by optimal breast feeding (13% death) and complementary feeding (6% death) respectively since these two have been the most cost effective child survival intervention[1-3]. Even if the child survives, he/she suffers from diminished quality of life and reduced productivity. The first 1000days of life (time from conception to a child's birth to 2 years of age) is called "window of opportunity " which is the most crucial time to secure the child's sustainable

health, behavioral, cognitive development and growth and it substantially depends on early initiation of breast feeding and exclusive breast feeding.

Considering the importance of Infant and young child feeding (IYCF) practices global strategy for IYCF was adopted by the World Health **Organization and UNICEF in 2002[4]**. In line with the global strategy

Bangladesh Govt. had also undertaken National strategy for infant **and young child feeding in 2007[5]**. In addition Government has undertaken many strategies to ensure optimum IYCF practices such as maternity safety at workplace, baby friendly hospital initiatives (BFHI), mainstreaming and prioritization of IYCF activities, community based support for IYCF

for ensuring IYCF practices during emergencies. It has also enforced "Breast Milk Substitute (BMS)" act that has regulated code for marketing breast milk substitute, commercially manufactured supplementary baby foods and its equipment.

Despite many strategies, the level of IYCF practices in Bangladesh is still not satisfactory. According to Bangladesh demographic and health survey, 2014; the exclusive breast rate (EBF) was reported to be 55%, minimum dietary diversity (MDD) was 28%, minimum meal frequency (MMF) was 64% and recommend IYCF practices was 23% in **children of 6-23 months of age**[6]. . In the literature there are many studies reporting the rate of IYCF practices in Bangladesh and their determinants on national and sub-divisional data but most of them focused on breast feeding and complementary feeding practices with a less focus on the other indicators of IYCF according to WHO guideline. IYCF practices is influenced by various socio-economic, demographic and other factors (child care practices, mother's workload) which needs to be taken into account for measuring the determinants of it. Therefore present study has been undertaken to determine the core indicators of IYCF practices and its determinants in Jamalpur district of Bangladesh.

MATERIALS AND METHODS
Study location, duration and sampling
A community based cross sectional study was conducted in Jamalpur on June, 2018. The targeted areas for the survey were 3 upzillas - Jamalpur Sadar, Islampur and Dewanganj of Jamalpur district. For calculating sample size (n) the prevalence of IYCF core indicator 'exclusive breast feeding' which is 55% according to BDHS 2014 was considered with a 95% confidence interval and 5% allowable error requiring a sample size of 381 mothers having children under two years of age. The sample was drawn proportionately from each upzilla according to geographic population distribution of the surveyed area. Finally a total number of 381 mothers having under two years children were selected randomly and interviewed. The consent of the mothers was obtained before the interview.

Data collection on IYCF indicators
A predesigned and structured questionnaire was used to collect information about socio-demographic profile (income, land holding, educational qualification), IYCF indicators and others associated information such as: delivery type, work load of mother, decision maker in the family etc. were collected.

Five core indicators of IYCF practices that are Early Initiation of Breast Feeding (EIBF), (Breast feeding within one hour of birth), Exclusive breastfeeding (EBF) under 6 months, Minimum dietary diversity (MDD) ($\geq$ 4 food groups), Minimum meal frequency (MMF) and Consumption of iron-rich or iron-fortified foods were assessed using 24 hour recall method according to World Health Organization (WHO), 2010 guideline[7]. In addition two optional indicators: continued breastfeeding at 2 years of age and bottle feeding practice were also assessed.

Data entry and analysis
Data entry and analysis was done using SPSS v20.0. The prevalence of IYCF indicators were assessed using descriptive statistics and association between variables were assessed using Chi-square test. P value <5% was considered to determine the significance level.

Ethical considerations
All ethical aspects were addressed and all participants were informed before the interview.

RESULTS
Socio-demographic information of children and their mothers
Socio-economic and demographic information of the studied population is shown in table 1.

Table 1. Characteristics of Infant and young children and their mothers in Jamalpur district, 2018 (n=381).

Characteristics		Frequency (Percent)
Gender	Male	196(51.4)
	Female	185(48.6)
Child's age	0-5 months	76(19.9)
	6-11 months	97(25.4)
	12 to 23 months	208(54.6)
Family type	Nuclear	257(67.5)
	Extended/Joint	124(32.5)
Average household member	Household member <=4	161(42.3)
	Household member >4	220(57.7)
Birth order of child	1st child	140(36.7)
	2nd child	118(31.0)
	3rd or 4th child	123(32.3)
Education level of mother	Illiterate	86(22.6)
	Primary	231(60.6)
	SSC/equivalent	27(7.1)
	HSC and above	37(9.7)
Education level of father	Illiterate	116(30.4)
	Primary	183(48.0)
	SSC/equivalent	36(9.4)
	HSC and above	46(12.1)
Occupation of mother	Housewife	365(95.8)
	Service	7(1.8)
	Others	9(2.3)
Occupation of the father	Agriculture	183(48.0)
	Business	42(11.0)
	Service	67(17.6)
	Others	89(23.4)
Monthly family income	<=8000 BDT	147(38.6)
	8001-10000 BDT	116(30.4)
	>=10001 BDT	118(31)

Amount of cultivable land	<20 decimals	80(21.0)
	20-70 decimals	67(17.6)
	>70 decimals	234(61.4)
Child delivery type	Normal	306(80.3)
	Caesarean	75(19.7)
Assistance during delivery	Trained health worker	118(31)
	Untrained health worker	263(69)
Work load of mothers	< 8 hours	135 (35.4)
	>= 8 hours	246 (65.6)

The study included a total of 381 children aged below 2 years. Among them 196(51.4%) children were male and 185(48.6%) children were female. Around one fifth of the children were under 6 months of age while 55% of the children were aged 12-23 months. About 67.5% of the children belong to nuclear family and around 58% households had more than four members. The illiteracy rate among mothers and fathers were 22.6% and 30.4% respectively . Agriculture was the dominant occupation (48%) of household head and almost all mothers (95.8%) were housewives . The monthly income distribution of the household revealed that around 31% of household had monthly income more than 10,000 BDT while land holding data shows

that about 61% of the households have more than 70 decimals of cultivable lands. Around 80% of the children had undergone normal delivery while only 31% of the delivery were supported by trained health workers. Around two-third of mothers (65.6%) had a workload of >=8 hours which might impede child care practices.

Assessing the condition of IYCF indicators in children

The study followed the protocol of WHO, 2010 for assessing the IYCF practices among children under two years of age. In total we assessed five core and two optional indicators (table 2).

Table 2. Achievement of IYCF indicators (%) in Jamalpur district, Bangladesh according to WHO strategy for assessing IYCF indicators.

Indicator number	Indicator type		N (%)	Age group of the children and their numbers
1	Core	Early Initiation of Breast Feeding (EIBF) (Breast feeding within one hour of birth)	183 (48)	0-23 months (381)
2	Core	Exclusive breastfeeding (EBF) under 6 months	39(51.3)	0-5 months (76)
5	Core	Minimum dietary diversity (MDD) (≥ 4 food groups)	92 (30.2)	6-23 months (305)
6	Core	Minimum meal frequency (MMF)	84(27.5)	6-23 months (305)
8	Core	Consumption of iron-rich or iron-fortified foods	73(23.9)	6-23 months (305)
10	Optional	Continued breastfeeding at 2 years of age	32 (60.4)	20–23 months (53)
14	Optional	Bottle feeding	113 (29.7)	0–23 months (381)

EIBF is defined as the child has put to breast milk within one hour of birth, EBF means the child has received only breast milk up to 6 months of age, MDD is defined as children are having at least four food groups out of following seven food groups (grains, roots and tubers; legumes and nuts; dairy products (milk, yogurt, cheese); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin-A rich fruits and vegetables and other fruits and vegetables). Minimum meal frequency (MMF) is defined as children are receiving minimum number of meals as per their age group. Minimum is defined as two times for breastfed infants of 6–8 months; three times for breastfed children of 9–23 months and four times for non-breastfed children of 6–23 months.

Our study finding revealed the rate of EIBF and EBF was reported to be 48% and 51% respectively. Less than one third of the children were able to meet MDD (30 %) and MMF (28 %) while iron rich food consumption was found to be very low (24%). Only 27.5% of the children in the study area were meeting their age wise requirement of complementary food recommended by WHO/UNICEF. The prevalence of IYCF core indicators in Jamalpur district is not satisfactory and it corroborates with findings of Bangladesh demographic and health survey (BDHS), 2014. Optional indicator data shows that around 60% of children were continued to breastfeeding at two years of age and bottle feeding was still prevailing in around one-third (29.7%) of the surveyed population indicating the risk of developing diarrhea.
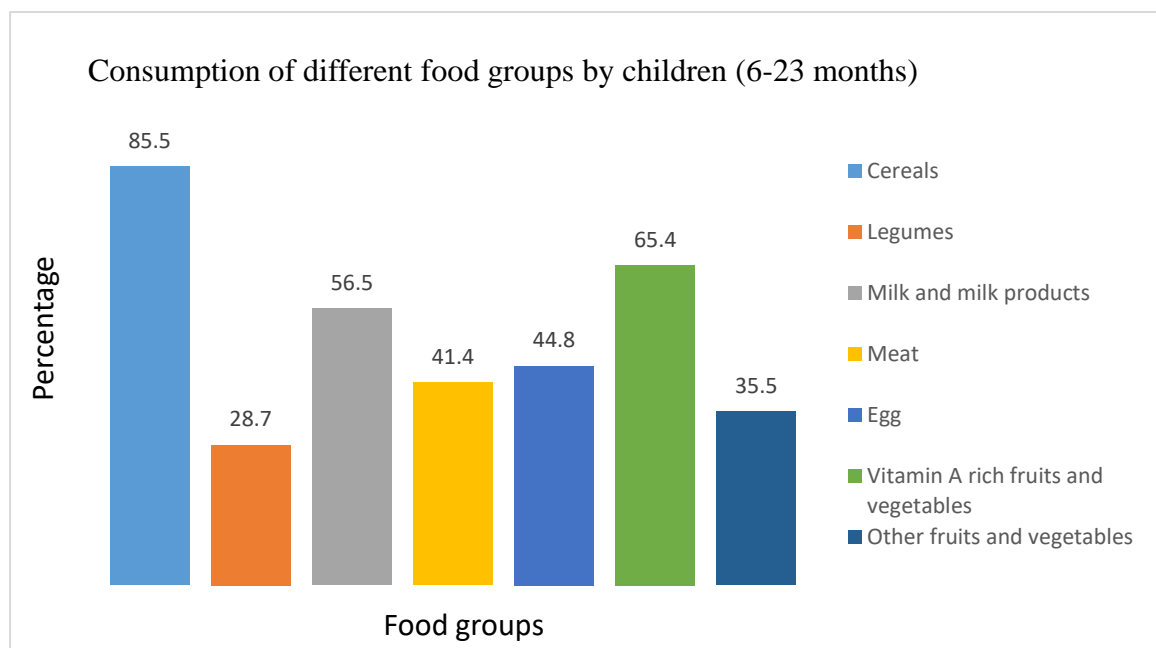

Figure 1. Percent distribution of consumption of different food groups by children of 6-23 months of age in Jamalpur district, Bangladesh.

Figure 1 shows consumption of different food groups by children**.** Majority of the children (86%) consumed cereals while legumes consumption was reported to be very low (29%). Again around 65% of the children consumed vitamin A rich fruits and vegetables while egg consumption was found to be around 35.5%. More than half of children (56.5%) consumed milk or milk product in the past 24 hours of the survey.

Factors associated with IYCF indicators

In order to find out what factors were influencing the IYCF practices in rural Jamalpur setting, following variables - family income, education level of mother, gender, number of children in the family, birth order of the child and type of family were considered. EBF was found to be higher in female children as compared to

boys. EBF practice among children was found to be positively associated with education level of mother, family income, and number of children in the family. It was also seen that children who brought up in the extended family had higher exclusive breast feeding coverage as compared to those living in nuclear family indicating the positive contribution of grand parenting and other family members in child care practice. EIBF didn't vary across gender, family type, child delivery type but it increased with the increment of mother's education level and family income level. The relationship between EIBF and all the probable determining variables were not statistically significant (p>0.05) (table 3).

Table 3. Factors associated with EIBF and EBF in children in Jamalpur district, Bangladesh

Factor	EBF Number N (%)	P value	EIBF N (%)	P value
Gender of the children				
Male	15(40.5)	0.107	94(48.0)	1.0
Female	24(61.5)		89(48.1)	
Number of children in the family				
No of Children <=2	24(49.0)	0.673	117(46.1)	0.420
No of children >2	15(55.6)		66(52)	
Type of the family				
Nuclear	20(41.7)	**0.034***	126(49.0)	0.586
Extended	19(67.9)		57(46.0)	
Education of the mother				
Illiterate	7(35.0)		42(48.8)	
Up to Primary	16(48.5)	**0.024***	106(45.9)	0.666
SSC and above	16(69.6)		35(54.7)	
Monthly family income				
<=7000 BDT	10(43.5)		44(44.0)	
7001- 10000 BDT	13(43.3)	0.111	80(49.1)	0.922
>=10000 BDT	16(69.6)		59(50.0)	

* Statistically significant

Factors associated with MDD and consumption of iron rich food is presented in table 4.

Table 4. Factors associated with MDD and consumption of iron rich food in children of 6-23 months of age in Jamalpur district, Bangladesh

Factor	MDD N (%)	P value	Consumption of iron rich food N (%)	P value
Gender of the children				
Male (159)	48(30.2)	0.992	33(20.8)	0.182
Female (146)	44(30.1)		40(27.4)	
Number of children in the family				
No of Children <=2 (205)	72(35.9)	**0.007***	57(27.8)	**0.023***
No of children >2 (100)	20(20)		16(16.0)	
Number of household members				
Household member <=4 (141)	49(37.4)	**0.017***	31(23.7)	1.00
Household member >4 (174)	43(24.7)		42(24.1)	
Education of the mother				
Illiterate (72)	15(20.8)		7(9.7)	
Up to Primary (188)	59(31.4)	**0.024***	45(23.9)	**0.000***
SSC and above (45)	18(40.0)		21(46.7)	
Monthly family income				
<=7000 BDT (23)	27(22.9)		22(18.6)	
7001- 10000 BDT (30)	32(34.8)	0.089	18(19.6)	**0.012***
>=10000 BDT (23)	33(34.7)		33(34.7)	

* Statistically significant

Minimum dietary diversity received by the children in last 24hours was found to be significantly associated with number of family members (p=0.017), education of the mother (p=0.024) and number of the child in the family (p=0.007). There was little variation of MDD among children across gender and monthly family income and MDD was also associated with birth order of the children in the family (not shown in table).

The proportion of child received iron rich and iron fortified food during the last 24 hours was associated with their mothers' level of education (p=0.00) and it seemed to be higher in children whose mother had higher level of education. It was also found to be associated with the family's income (p=0.024) and this practice increased with increasing income. Consumption of iron rich food was found to be higher in those families who had <= 2 children (28%) as compared to families having >2 children (16%).

DISCUSSION

The present study depicted the IYCF scenario of Jamalpur district of Bangladesh. EIBF and EBF rate was found to be 48% and 51% respectively while nationally it was found to be 51% and 55% respectively. Higher percentage of mothers had proper knowledge on colostrum's feeding but not all of them were practicing the knowledge appropriately which in turn led to lower practice of EIBF. Bottle feeding was found to be higher (30%) as compared to national data (19%) indicating a risk of diarrheal disease in children of under two years of age in that community. With growing age the need for energy increases, to fulfill this additional energy requirement, sufficient complementary food together with breastfeeding should be provided. But only 27.5% of the children in the study area were meeting their age wise requirement of complementary food recommended by WHO/UNICEF. It is better than overall percentage of Bangladesh which is 23% according to BDHS 2014.

This study attempted to explore determining variables of IYCF practices in Jamalpur district of Bangladesh. The association between IYCF indicators and other variables revealed that education level of mother significantly contributes to improve IYCF practices, MDD was decreased with increment in household demography (number of household members and number of children in the family) due to share of intra-household child food with adult or lack of proper care to the youngest child with increasing number of children in the family. Consumption of iron rich food falls with the increment of child numbers in the family and it increased with monthly income of the family. Thus maternal educational level, number of household members and children in the family, monthly family income and family type were identified as the determinant factors to affect IYCF indicators level. Other previous studies from Bangladesh using BDHS 2011, 2007 data showed several factors, such as, children's age, mother's education, father's education, father's employment status, socio-economic status, food insecurity, place of residence and region of residence were significantly associated with Complementary feeding of the children[8-9]. Similar findings came out from other South-Asian countries such India , Pakistan , SriLanka and Nepal [10-13]. The strength of all these studies is that the data were nationally representative demographic and health survey but they focused only on finding out the determinants of inappropriate complementary feeding practices neglecting other important indicators such as EIBF, EBF, MDD and consumption of iron rich foods which were considered in this study.

The present study had a limitations of inadequate sample size in 0-5 months of age group (only 76 children) which led to inadequate number of cells in contingency tables, and sufficient stratification were not possible and caused imprecise estimation in calculating factors associated exclusive breast feeding. Although in cross tables some percentage difference can be seen, no statistical significance was found within most of the variables.

CONCLUSION

The present study revealed a poor IYCF practices among children of 6-23 months living in Jamalpur district, Bangladesh. It also figured out factors such as educational level of mother, household family members, number of children in the family, monthly family income and family type to be associated with different indicators of IYCF. Although this study is a cross-sectional snap shot; it would help policy makers to indicate points of intervention in infant and young child feeding . Further it is recommended to have a longitudinal study to establish the plausible determining factors and cause effect relationship of Infant and young child feeding indicators in similar settings of Bangladesh.

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