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### RESEARCH ARTICLE

## PREVALENCE OF PNEUMONIA, DIARRHEA AND ANEMIA AMONG INFANTS (CHILDREN UP TO 1 YEAR) IN SOUTH-WEST REGION OF BANGLADESH.

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### Abstract

Exclusive breast feeding means that the baby has no other food or drinks even 'dummy' or 'pacifier'. Human milk provides immunoglobulin and lactoferrin which protects the host gastro-intestinal system from enterotoxigenic *Escherichia coli* a major cause of infant Diarrhoea. Secretory immunoglobulin-A is an important component of passive immunity in first weeks before endogenous immunoglobulin production begins. The current study showed that out 400 infants 15.5% were not anemic and possessed good health but 35% were moderately anemic, 43% were mild anemia and 6.5% were severely anemic. But this study showed alter result because child's health not only depend on breastfeeding but also many other factors such as weaning practice, vaccination, mother's awareness about sanitation and hygiene over all nutritional status of mother, usually they are anemic. After breastfeeding the second most critical factor is weaning practice that affects the child's health. Study showed around 59% family don't know about weaning practice and their benefit and the proportion even higher in rural area (80.5%). The anemia prevalence (66%) was higher among 7-12 months age group compared to below six months aged infants (34%). The prevalence of other two diseases was also higher among infant from rural area (40 and 57%). This higher prevalence of anemia, pneumonia and diarrhea among infant within 7 to 12 months and particularly in rural area could be explained by the hypothesis of inadequate knowledge and practice of weaning.

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### Introduction:-

Children under 5 years are considered as the most vulnerable and high risk group (Shaikh et. al., 2014). Both communicable and non-communicable diseases (eg, malnutrition, asthma, infectious diseases, diarrhea, pneumonia etc.) are very common in this group (Heather and Thomas, 2014). The prevalence of pneumonia and diarrhea remains a leading killer of infants and young children who lives under low socioeconomic status and also having poor nutrition (Bryce et al., 2005; Shaikh et. al., 2014). While the incidence of childhood pneumonia was about 0.29 episodes per child-year in developing countries while 0.05 episodes was in developed countries (Rudan et. al., 2008). However, the leading causes of mortality among infants in the developing countries were about 43% for infectious diseases and malnutrition whereas one-third of all deaths were for non-communicable diseases (WHO,

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2003). Over the last 25 years, pneumonia was the leading cause of childhood death in Bangladesh (Luby et al., 2008) and severe pneumonia during childhood have potential effects on long-term respiratory morbidity (Puchalski et al., 2009). On the other hand, anemia is a common clinical problem throughout the world and an enormous public health problem in developing countries, and also it has adverse effects on child growth, development, and survival (Mohamed et al., 2013; Osório et al., 2001). The prevalence of anemia is also high (twice) among the young children than the preschool children (Karr et al., 1986). In Bangladesh, the prevalence of anemia among 6-35 months aged children was approximately 51% whereas in India and Nepal was 79% and 46% respectively (Khan et al., 2016). Exclusive breastfeeding during the first 6 months of infant plays a significant role to protect child from many diseases like pneumonia, diarrhea and anemia (Niessen et al., 2009). Improvements in nutrition, dietary habit and living standards also reduced the mortality rate of infants from various infectious diseases (Mulholland, 2007).

However, in the low-income countries of Asia and Africa, misconception about food, weaning practices, unhygienic water drinking and handling, sanitation facilities and mother's education were considered as influencing factors for acute and chronic diseases (Afroza et al., 2013). Thus the aim of this study was to perceive the prevalence of and the main risk factors of both communicable and non-communicable diseases in young children at South-West region of Bangladesh.

### **Materials and Methods:-**

This study was done for the determination of prevalence of anemia, pneumonia and diarrhoea under one year of infants at doctor's chamber of Kushtia districts in Bangladesh. In our study, socioeconomic and socio-demographic data, cultural and dietary practice, food habits and their beliefs were considered and data were analyzed by NCHS reference data.

#### **Study Design:-**

A cross sectional study was conducted at the chamber of child specialist at Kushtia District from December 2018 to July 2019, using a structured questionnaire to collect the relevant information from the mother during the study period for the treatment of the child regarding various problems like difficult to feeding, repeated infection, general weakness, Failure to thrive, weight loss etc. Routine blood collection and complete blood picture CBC and Haemoglobin level were also noted.

#### **Sample size and study population:-**

A total of 400 infants (aged 0-12 months) were randomly enrolled in this study. Subjects were selected randomly and measured the prevalence of sign symptoms in a population at one point in time or over short period of time. It provides a snapshot of the health experience of a population at a given time. The prevalence of a problem, rather than the incidence, is recorded in a cross-sectional survey.

#### **Data analysis:-**

The principal investigator supervised the data collection and management. Microsoft Excel and SPSS were used for analysis. The chi square test was used to compare proportions between the two at the 5% significant level.

### **Results:-**

This study was conducted on 400 infants to investigate the prevalence of pneumonia, diarrhea and anemia in urban and rural area. Equal number of participant (200) were selected from urban and rural area (Table-2). Among these 400 participants, 54.75% were male and the rest were female (Table-1). Around 42% of infants were within 6 months of age and rest of the infants (58%) were within the age of 7 to 12 months (Table-1). In the rural area more infant were breastfeed exclusively up to 1 year (79.5%) compared to infant from urban area (69.5%). However, the breastfeeding practice among anemic infants of were not significantly related according to age groups and resident ( $p > 0.05$ ). Moreover, normal breastfeeding practice were also significantly higher among rural infant and these percentages were higher both up to 6 months and 12 months (Figure-1). This figure also represents around 75% infant were exclusively breastfeed both in rural and urban area.

The sample included 88 and 70 respondents from rural and urban area respectively, who had family members more than 5, 77 and 62 had 2-5 family members and 35 and 139 had family members less than 2. These frequencies were significantly different ( $p = 0.0000$ ) (Table-2). In rural area 44% respondents were from the family with more than 5 members, whereas this percentages were 35% for respondents from urban area. In contrast percentages respondents

from family with less than 2 members were almost twice from urban area compared to rural (Table-2). Like family size, family income and residency of the respondents were significantly different ( $p < 0.001$ ) (Table-2). More than 50% of the respondent were from family with monthly income range 5100 to 10000 BDT and this was true for both urban and rural region (Table-2). Both in urban and rural area, most of the mother of the respondents (51 and 64% respectively) were housewives and around twenty percent of the mother were service holders (Table-2). These frequencies of mother in rural and urban areas were significantly different ( $p < 0.01$ ) (Table-2). Weaning practice between respondents from urban and rural area were significantly ( $p < 0.01$ ) (Table-2). Three-fifths of the infant's family from urban area were familiar with weaning practice, whereas only one-fifth family from rural areas were familiar.

The percentages of infants vaccinated either by partially or completely did not differ by residence area ( $p > 0.05$ ) (Table-2). Around 80% of respondent, both from urban and rural areas, were vaccinated completely (immunized against seven communicable diseases). Around half of the respondents (49.75%) had history of diarrheal diseases and one-third (33.5%) had pneumonia. The prevalence of pneumonia and diarrhea were higher among infants from rural area compared to infants from urban areas. However, this difference was not statistically significantly ( $p > 0.05$ ) (Table-2).

Table-3 represent that around 85% infant were anemic and in terms of severity around one-third infant were moderately anemic and two-fifth were mildly anemic. Only 6.5% of infant were severely anemic with hemoglobin level less than 7 gm/dl (Table-3). The study showed that female babies were more prone to be anemic (60%) than male babies (40%). Infants aged more than 6 months were likely to be more anemic (66%) than infants less than 6 months (34%) (Figure-2). The difference in prevalence of anemia by gender were significant ( $p < 0.05$ ) (Figure-2).

### Discussion:-

Survey is the collection of information and nutrition surveys can identify and describe those population subgroups at a risk to malnutrition and infection. The nutritional status of any community is dependent on many factors, among them food security, food safety, social status, gender discrimination, women's education, housing, health care, supply of portable water, safe drinking water, and sanitation. Breastfeeding is the normal and most appropriate method for feeding infants and is closely related to immediate and long-term health outcomes. Exclusive breastfeeding to the age of six months gives the best nutritional start to infants and now recommended by a number of authorities. Benefits of exclusive breastfeeding up to six months duration have been studied all over the world and there is enormous amount of evidence to support this (Organization, 2001). The world health Organization (WHO) recommended exclusive breastfeeding for six months and these guidelines is being followed by most of the international community (Santé et al., 2003; Gartner et al., 2005; Health and Council, 2003). The WHO Expert Consultation recommended exclusive breastfeeding for six months, then introduction of complementary foods and continued breastfeeding thereafter. In this study large proportion of infants, were reported to have been exclusively breastfed up to 1 years (74.5%). This percentages of exclusively breastfed infant were slightly higher in rural area. This slight lowering of practice of exclusively breast feeding might by the impact of higher level of weaning practice in urban area than in rural area (Table-1 and Table-2). In rural area family may have less or no alternatives of breastfeeding as families in urban area have. Moreover, the number of mothers of the infant doing service almost three times in urban area and these might push the urban mother to discontinue exclusive breastfeeding and move towards alternative. This phenomenal activity is also justifiable from higher percentages of breastfeeding practice (not exclusive) in urban area than in rural area (Figure-1). This is noticeable for both age group's infant.

The 2014 BDHS report and a report on assessment of infant feeding practices conducted by Norwegian Programmer for development, Research and Education (NFNC) in Bangladesh in 2014, showed fewer children (less than 50%) with exclusive breastfeeding practice in Mymensingh and in Dhaka (Organization, 2005). From this study, it is noticeable that most of the caregivers know about the importance of exclusive breastfeeding up to six months of age and were generally knowledgeable about what and when to introduce other foods to the infants. The majority of those who did not breastfeed exclusively up to six months, provided some water early in the child's life. This findings is also supported by the 2014 BDHS report (Talukder, 2017). Furthermore, studies conducted in African sub-Sharan region it was reported that water alone or mixed with sugar were offered even to newborn infants and 'light' porridge was also offered to infants as young as two months (Vaahtera et al., 2001; Haggerty and Rutstein, 1999).

This study shows that most children suffer from diarrhea mostly by Rotavirus (49.75%), the second common disease of infant is pneumonia (33.5%) and 16.75% suffer from other diseases. Though the ratio of infant got complete vaccination in rural and urban area were almost same, the prevalence of infectious disease studied (Pneumonia and Diarrhea) were higher among infant in rural area. These higher percentages could be due to poor sanitation and lack of hygiene in rural area. However, it is very difficult to predict this hypothesis without further study.

The distribution anemia of study subjects according to age and sex shows females are more anemic than male with 60% and 40% of prevalence respectively. Beyond 6 months infant were reported to be more anemic (66%) than below six (34%). The perception that introducing the baby to solid food on thin porridge made from maize meal.

The Complementary foods commonly introduced do not meet the minimum standard of recommended feeding practices with respect to food diversity, frequency of feeds and consumption of breast milk or milk products. This study corporates other studies that showed that the feeds introduced are not adequate in nutrition and tend to be low in energy and micronutrients such as Iron, Iodine, Zinc, Vitamin-A and other essential nutrients. In developing countries such as Bangladesh anemia in pregnancy is one of the most common problem affecting pregnant women as well as infants accounting for a significant level of Infant morbidity and mortality. Consequence of anemia in pregnancy include maternal as well as foetal complications include intrauterine growth Retardation (IUGR), increased perinatal mortality (Baker, 2003; Horton et al., 1996). Children with anemia shown to have lower level of intelligent quotients (IQ) (Mazumder and Hossain, 2012). Iron deficiency anemia has been estimated to affect as many as 200 million people in the world (Jelliffe and Jelliffe, 1989). Iron is one of the nutritional factors of major importance of in child health. Irrespective of the type of deficiency, is inextricably linked to the implementation of programmes based on a careful assessment and monitoring of the mother and child nutritional status and of factors impacting it (Gibson, 2005). Micronutrient deficiencies resulting in blindness, anemia, and goiter physical and mental retardation are prevalent in Bangladesh (Jahan and Hossain, 1998).

Iron deficiency is the major contributor to hidden hunger in Bangladesh. The short-term consequences are growth retardation, risk of infection, motor and mental development, mortality. The long term is low productivity, mental capacity, vulnerability to infection and mortality. Babies require 5.7 times more iron than adults because of growing blood volume and muscle mass. WHO/FAO recommended Nutrient intake 9.3mg/day among 7-12 months infant. Iron gap of the introduction of solid food putting small tummies with big needs at higher risk. Table shows the distribution of mother by the type of occupation. Mostly of the mothers of the subjects was housewife. That is 57.50% were housewife and 23.75%, 18.75% were day labor and service holder respectively. Here we found service holder mothers are having anemic along with themselves. Analyzing socioeconomic information, it reveals that 39.0% family contains more than 5 members. About 60% children suffer from malnutrition. There is no information about the linkage between daily diets of children and their development status.

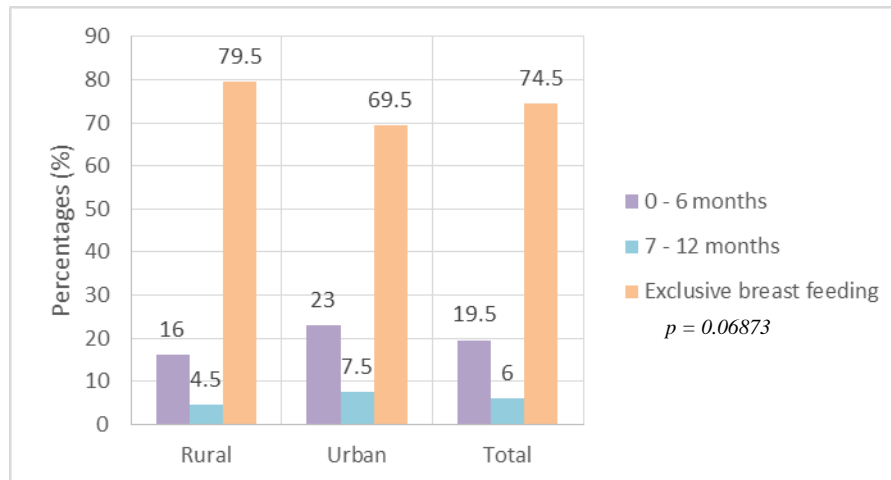
Most of the expenditure on food, mainly rice, baby food purchase is very low in 52 % family. Maximum children 74.5% got breast milk for 12 months some are exclusive breastfeeding without starting weaning food at 6 months age. In both developing and developed countries, artificial feeding is associated with more deaths from diarrhea in infants (Horton et al., 1996). During Breastfeeding nutrients and antibodies pass to the baby and the maternal bond can also be strengthened (Mazumder and Hossain, 2012).

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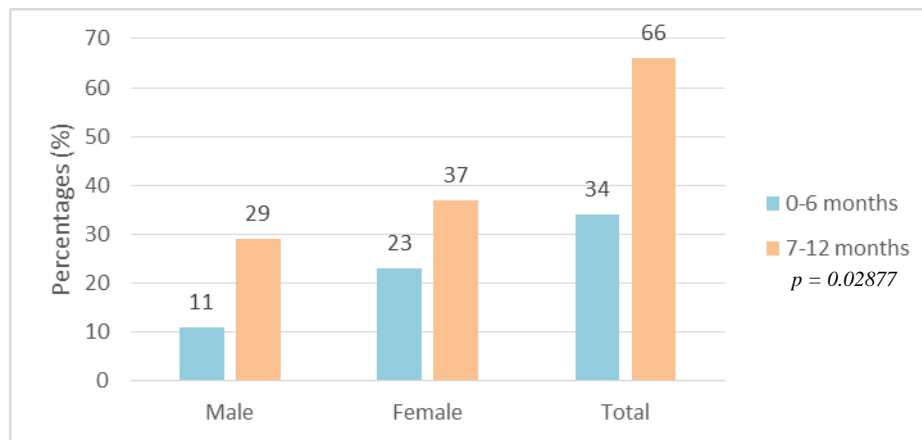
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**Table 1:-** Distribution of infant according to age category.

Age in months	Male	Female	Total	p Value
0 - 6 months	89 (22.25%)	78 (19.5%)	167 (41.75%)	0.6938
7 - 12 months	130 (32.5%)	103 (25.75%)	233 (58.25%)	
Total	219 (54.75%)	181 (45.25%)	400 (100%)	



**Figure 1:-** Breastfeeding practice among infant according to age category and residence.



**Figure 2:-** Distribution anemic infant (%) according to age and gender.

**Table 2:-** Family information and prevalence of diseases and vaccination among respondent in rural and urban area.

	Rural Number (%)	Urban Number (%)	Total (%)	p Value
<b>Family Size</b>				
>5	88 (44.00%)	70 (35.00%)	158 (39.50%)	0.0008079
2-5	77 (38.50%)	62 (31.00%)	139 (34.75%)	(<0.001)
<2	35 (17.50%)	68 (34.00%)	103 (25.75%)	
<b>Family Income</b>				
<5000	70 (35.0%)	37 (18.50%)	107 (26.75%)	0.00006544
5100-10000	107 (53.50%)	115 (57.50%)	122 (55.50%)	(<0.001)
>10000	23 (11.5%)	48 (24.00%)	71 (17.75%)	
<b>Mother Occupation</b>				
Day Labor	51 (25.50%)	44 (22.0%)	95 (23.75%)	0.000125
Service Holders	21 (10.5%)	54 (27.0%)	75 (18.75%)	(<0.001)
Housewife	128 (64%)	102 (51.0%)	230 (57.5%)	
<b>Weaning practice</b>				
Do not know	161 (80.5%)	74 (37%)	235 (58.75%)	0.0000
Know	39 (19.5%)	126 (63%)	165 (41.25%)	(<0.001)
<b>Vaccination</b>				
Completed	161 (80.5%)	166 (83.0%)	325 (81.25%)	0.6046

Partially	39 (19.5%)	34 (17%)	73 (18.25%)	
<b>Disease</b>				
Pneumonia	80 (40%)	54 (27%)	134 (33.5%)	0.1543
Diarrhoea	113 (56.5%)	86 (43%)	199 (49.75%)	
Others	47 (23.5%)	20 (10%)	67 (16.75%)	
<b>Total</b>	<b>200 (50%)</b>	<b>200 (50%)</b>	<b>400 (100%)</b>	

**Table 3:-** Hemoglobin level and severity of Anemia.

Hemoglobin level (gm/dl)	Severity of Anaemia	Number (%)
< 7	Severe	26 (6.5)
7-9.9	Moderate	140 (35)
10-10.9	Mild	170 (43)
>11	No Anemia	64 (15.5)

**Conclusions:-**

Exclusive breastfeeding until around 6 months should be the aim for every infant. Breastfeeding beyond 6 months is of continuing value to baby and mother. Promotion of breast feeding is an important public strategy. The caregiver in the communities knew about the recommended feeding practices, but this knowledge was not translated into good practice. Knowledge that most of the mothers will breastfeed and have heard about appropriate breastfeeding practice is important in the development of sustainable strategies required to improve feeding practices and thus nutritional status of children. However, at the age of 6 months every infant should be started weaning of complementary food as during that time the baby require more macronutrients and micro-minerals specially iron. The cause of malnutrition are multi-factorial and the nutrition situation is also linked with a lack of diversified foods, with poor hygiene practices, with lack of women education and very poor availability of public health services. There is a need of integrating all these components in the malnutrition response to be able to observe a positive impact.

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