

## Exploring the Association of Mother's Education and Anemia of under five Children in Bangladesh: Descriptive Analysis

MD. ALAMGIR HOSSAIN MSS, MPH<sup>1</sup>

Nutrition and Clinical Services Division  
International Centre for Diarrheal Disease Research  
Mohakhali, Dhaka, Bangladesh

MD. ENAMUL HAQUE MSS, MPH<sup>1</sup>

Nutrition and Clinical Services Division  
International Centre for Diarrheal Disease Research  
Mohakhali, Dhaka, Bangladesh

MD. CHOWDHURY GALIB, MPH

Healthcare Pharmaceuticals Ltd.

### Abstract:

*Study was conducted based on the BDHS-2011 Children of less educated mother's were suffering more compare to higher educated mothers. Rural children were suffering from anemia more than twice compare to the urban children. Children from the poorest wealth quintal were suffering more compare to the other group. One year age group children were more vulnerable to suffering from anemia compare to the other year of age group of the under-five children. During complementary feeding period baby formula reduce the risk from anemia and lack of semi-solid food under-five children were suffering more on anemia.*

*This study was conducted by secondary data which was taken from Bangladesh Demographic Health Survey (2011). BDHS is nationally representative data. The survey was based on a two-stage stratified sample of households. For this analysis of anemia in children there were 2717 samples, selected for analysis. The data was collected from the different urban and rural part of the Bangladesh.*

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<sup>1</sup> Corresponding author: [infoalamgir@gmail.com](mailto:infoalamgir@gmail.com)

*Uni-varaite analysis had applied for examining association of mother's education and anemia of under-five children.*

**Key words:** Mother's Education, Anemia, Child Anemia, Influencing Factor, Complementary Food, Bangladesh

## **1. BACKGROUND**

Global database of World Health Organization on anemia from 1993-2005 data showed that 1620 million people or 25% world population suffer from anemia, and 315.4 million people were affected only in South-East Asian region, among them 76.1% of school age children and 69.0% are pregnant women [1]. Developing and developed countries are suffering from major global public health problem of anemia. In 2002, iron deficiency anemia (IDA) was considered the main contributing factors of global disease burden[1]. Hospital and community level studies of cross-sectional, longitudinal, case-control studies, and randomized trial on anemia found risk factors of child mortality in Africa (Sierra Leone 11.2%, Zaire 12.2%, Kenya 14.3%). I Malawi, a first round survival analysis of an infant cohort found hemoglobin decreased by 10 g/L at six month of age is the risk of dying and the 1.72 times higher[4].

Hemoglobin level at lower limit considered as an anemia with the symptom of different pathogenic conditions [5]. Most of the studies on anemia indicate that certain groups such as children of under-5 year of age are more vulnerable to anemic condition. The prevalence of anemia in school aged children is estimated as 9% in some industrialized and developed countries[6]. In Bangladesh first national nutritional survey was conducted in 1962/64 which reported that one-third of total population had anemia, second and third study were conducted in 1975/76 and found 82 % child were suffering from anemia, in 1981/82, 73% were face the same suffering, in 1995/96 which

found that the prevalence of anemia was 69.5%[7]. In rural Bangladesh, 52.7% of anemia found among the preschool children[8]. Socioeconomic status is risk of anemia of school going children and also an important determinants of nutritional knowledge of family members[9]. Anemia affects cognitive functioning, education achievements and motor performances[10]. Higher maternal education found increase the quality diets of children and knowledge of health and nutrition[11] and Educated mother may involve on decision making of child nutrition requirements[12].

In 2011, according to Bangladesh Demographic and Health Survey, 51% children are suffering from anemia[2]. In Bangladesh a study found that among the poor household anemia is general, due to lack of knowledge on dietary practices of mothers and household members[13] and different types of food related to child growth and development. Various types of food related to mother education and child anemia. But the mother education and anemia of children remain unexplored, so the study is attempted to examine the association of mother's education with anemia of under-five children in Bangladesh.

**2. Hypothesis:** There is no Association of Mother's Education and Anemia of Children of under five in Bangladesh

**3. Objective:** Assessing the Association of Mother's Education and Anemia of Children of under five in Bangladesh

#### **4. Variable**

##### **4.1 Dependable variable**

Anemia of under-five children

##### **4.2 Independent variable**

- Mother's Education
- Place of residence

- Wealth quintile
- Sex of Children
- Age of children
- Antenatal care visit

### **Food pattern**

- Exclusive breast feeding
- Complementary feeding
- Baby formula
- Solid-semisolid food

### **5. Method:**

Though the BDHS-2011 data become old but the question of the research are related on this data source, in BDHS-2014 such types of data were not found to see the relation of mother education and child anemia. So, nationally representative BDHS-2011 data were used for this study. This survey was conducted by the National Institute of Population Research and Training (NIPORT) under the authority of the Ministry of Health and Family welfare, collaboration with the United States Agency for the International Development (USAID). The reports on this study were available and for the data may be accessed upon request (<http://dhsprogram.com/data/available-datasets.cfm>). This study covers the entire population. Primary sampling unit of this survey is enumeration area (EA) in each of this area have on an average 120 household. In this survey 2-stage stratified sample of were used to select the Household. In first stage, 600 EA were selected consideration with probability of proportional EA size, with 207 clusters in urban and 393 clusters in rural areas. In second stage, 30 households were selected based on the systematic sample procedure used. The survey is conducted 6210 household in urban and 11790 households in rural areas. 18222 ever married women were identified for the interview but 17842 were interviewed and the response rate 98%. Among those households 7861 children

found 0-59 month's age. For this analysis, we extracted the children and women data set from the BDHS 2011 original file.

### **5.1 Sample size**

Out of total 2717 selected households children are eligible for hemoglobin testing. Hemoglobin testing was carried out among children age 6-59 months in every third household in the BDHS sample. For this analysis of anemia in children there were 2717 samples, selected for analysis.

$$N = [z^2 p (1-p)/d^2]$$

$z$  = Z score at 95% level of confidence

$p$  = Proportion of anemia in population (0.5 is estimated assuming that it gives the largest sample)

$d$  = margin of error (0.05)

### **5.2 Anemia data collection tools**

Hemoglobin measurement considered to be standardizing method of screening for anemia. For BDHS 2011 hemoglobin measure Hemocue rapid testing were used. HemoCue is a battery operated photometer and a disposable micro-cuvette, a small transparent laboratory vessel coated with dried reagent that work as blood collection device. For the test a drop of capillary blood is taken from child's fingertip and drawn into micro-cuvette. The blood in the microcuvette is analyzed by using the photometer, which indicates the hemoglobin concentration. Hemoglobin levels were successfully measured 92% of eligible children for testing. In this study is consider the less than 11.0 g/dL hemoglobin concentration specified as anemia and more than 11.0 g/dL were considered to be normal in anemia condition. World Health Organization classified anemia according to hemoglobin concentration such as, less than 7.0 g/dL hemoglobin concentration specified as severe, 7.0-9.9 g/dL hemoglobin concentration specified as moderate and 10.0-10.9 g/dL hemoglobin concentration specified as mild.

### **5.3 Statistical Analysis**

To perform the analysis SPSS 11.5 software has been used. Data analysis used the conventional strategies of uni-variate analysis.

### **5.4 Ethical Approval**

The Institutional review board of the Bangladesh Medical Research Council approved the BDHS-2011. Inform consent was received from each of the participants before conducting the interview and before measuring the hemoglobin (Hb) verbal consent also received from the mother of the 6-59 month children. The DHS erased all personal information of the respondent from the database before available in online. To use the BDHS-2011 data we follow the instruction of the DHS.

## **6. Results**

Table 1.1 shows that, among the 2297 study population, 7.4% under-five children of uneducated mother's were suffering from anemia compare to the 4.3% children of higher educated mothers. Table 1.2 shows that, among the 2112 study population, 29.8% children were suffering from anemia that lives in rural settings and in urban area 14.1% under five children were suffering the same problem. Wealth quintal has significant affects of under-five children anemia table 1.3 shows that, among the 2287 study population, poorest (9.7%) and poor (8.7%) household suffering more compare to the middle (8.0%), rich (8.5%) and richest (8.1%) wealth quintal. A table 1.4 shows that, among the 2297 study population, male sex of children is more vulnerable on anemia compare to the female children. Age of children is a significant cause of child anemia table 1.5 shows, among the 2575 study population that 1 year age children are more suffering from anemia compare to the 2, 3, 4 and 5 years of age children. Antenatal care visit of pregnant

mother shows that in table 1.6, among the 2543 study population, those mother visit antenatal care less than 4 times during their pregnancy period their children were suffering more (23.3%) compare to the more than 4 times (18.1%). Table 1.8 shows that, among the 1977 study population, Food pattern also has significant association with the anemia of under five children during complementary feeding period those children eat baby formula those were suffering more (6.1%), compare to the those who were not eat formula milk (38.3%) with this during these period those who were not receive solid and semi-solid food (42.8%) were suffering more compare to the who received the same types of food.

**Table 1.1: percentage study population by mother's education and anemia of under five children**

Mother education	Percentages of study population by mother education and anemia			Total Population % (N=2297)
	Anemia % (N=1009)	No anemia (N=1288)	%	
No education	<b>7.4 (170)</b>	9.9 (228)		17.3 (398)
Primary	12.2 (281)	16.0 (368)		28.2 (649)
Secondary	20.0 (459)	25.3 (582)		45.3 (1041)
Higher	<b>4.3 (99)</b>	4.8 (110)		9.1 (209)

**Table 1.2: percentage of study population by place of residence and anemia of under five children**

Place of residence	Percentages by place of residence and anemia			Total Population % (N=2112)
	Anemia % (N=1127)	No anemia (N=1047)	%	
Urban	14.1 (325)	17.4 (214)		31.5 (539)
Rural	<b>29.8 (684)</b>	38.7 (889)		68.5 (1573)

**Table 1.3: percentage of study population by wealth quintile and anemia of under five children**

Wealth quintile	Percentages by wealth quintile and anemia		Total Population % (N=2287)
	Anemia % (N=1127)	No anemia % (N=1047)	
Poorest	<b>9.7 (223)</b>	11.8 (271)	21.5 (494)
Poor	<b>8.7 (199)</b>	12.0 (275)	20.7 (474)
Middle	8.0 (183)	11.1 (254)	19.1 (437)
Rich	8.5 (196)	11.0 (253)	19.5 (449)
Richest	8.1 (180)	10.2 (235)	19.3 (443)

**Table 1.4: Percentage of study population by sex of children and anemia of under five children**

Sex of children	Percentages of sex of children and anemia			Total Population (N=2297)
	anemia % (N=1009)	No anemia (N=1288)	%	
Male	<b>22.2 (509)</b>	29.6 (680)		51.8 (1189)
Female	21.8 (500)	26.5 (608)		48.3 (1108)

**Table 1.5: percentage of age of children and anemia of under five children**

Age of children	Percentages by age of children and anemia		Total Population % (N=2575)
	Anemia % (N=1127)	No anemia % (N=1047)	
1 Year	<b>10.3 (266)</b>	9.5 (245)	19.8 (511)
2 Year	8.2 (211)	10.6 (274)	18.8 (485)
3 Year	7.4 (190)	10.8 (277)	18.2 (467)
4 Year	8.6 (221)	13.5 (347)	22.1 (568)
5 Year	9.4 (243)	11.7 (301)	21.1 (544)

**Table 1.6: Percentage of study population by antenatal care visit and anemia of children**

Antenatal care visit	Percentages of antenatal care visit and anemia			Total Population (N=2543)
	anemia % (N=1009)	No (N=1288)	anemia %	
≥ 4 Visit	<b>23.3 (593)</b>	33.2 (844)		56.6 (1437)
4+ Visit	18.1 (460)	25.4 (646)		56.8 (1106)

**Table 1.8: Percentage of food patterns and anemia of under five children**

Food patter of children	Percentages of food patterns and anemia of under five children			Total Population (N=1977)
	anemia % (N=1009)	No (N=1288)	anemia %	
Exclusive breast feeding	5.6 (111)	7.4 (146)		13 (257)
Complementary feeding	<b>37.9 (750)</b>	49.1 (970)		87 (1720)
baby formula	6.1 (27)	5.2 (23)		11.3 (50)
No	<b>38.3 (171)</b>	50.4 (225)		88.7 (396)
solid-semi-solid food	1.6 (7)	2.5 (11)		4.1 (18)
No	<b>42.8 (191)</b>	53.1 (237)		95.9 (428)

## 7. Discussion

This study aimed at exploring the association of mother's education with anemia in children aged 6 to 59 months. The important highlights of the result are discussed below.

This study found association with the mother's education and anemia of children in Bangladesh. This factor was found associated with anemia of children in others studies conducted in Uganda, China, South Korea and Myanmar. A study from Uganda reported that mother's education level has significant association with the anemia of children where they showed relationship with lower level of mother education, among 49.2% uneducated mother 81.1% do not have any knowledge of enriching (adding energy and nutrient dense food) children's food [15]. Maternal education and anemia has been

evaluated in industrialized countries like Korea, they shows that 14.9% suffering anemia of low maternal education group and 7.8% on high maternal education group because educated mother provide more nutritious food to their children like meat, poultry, fish and shell fish compare to less educated mother[9] this result also match with these study. These studies found significant association with anemia of under-five children and place of residence in rural were most suffering. A study in India showed that the anemia of children in rural areas is higher compare to the urban areas[16]. In china a study shows anemia among the children of rural western china become a severe public health problem and the prevalence of anemia among the 36 months aged children 52.5% (95% CI 51.35-53.7%) [17]. This study found statistical significant association between the poorest wealth quintile. In India a study shows that socio-economic factor associated with anemia and they also said that poor economic condition related to the anemia for women [18]. Poorest wealth quintile may address children of those families have limited access to meet their dietary need. In that case we may said that poorest wealth quintile have limited access to food. This study showed the sex of children is not associated with the child anemia. This findings is inconsistent with another study conducted in India where they reported that male children have more risk to develop anemia compare to its counter parts [18]. Boys are reportedly to be more susceptible to iron deficiency anemia than the girls because of their rapid growth from the first month [19]. That result different may be in India and Bangladesh for the discrimination between male and female for their food pattern during their childhood. In India a study shows that health status of women reflects gender discrimination from birth [20]. Age of children is significant with anemia of children. In Burma and rural India found the age of children negatively associated with anemia of children, moreover they explain that beyond the 6 month of age

of children is not get enough iron and most standard diet do not supply enough iron among the age of children aged 6 to 24 months [17]. But in Bangladesh it may be differ to the India and Burma because mother introduces other food before their 6 months of age. In this study is not found antenatal care visit is associated with anemia of children. Under normal circumstances, the World Health Organization (WHO) recommends that a pregnant woman should have at least four ANC visits (WHO, 2007). Exclusive breastfeeding is useful for the first six month age of children for exclusive and complementary feeding start with age after six month to five years. In this study has found no association with the history of breast feeding up to 59 months and anemia of children. Breast milk is considering as a main nutritional resource [17] for less than 5 years of children. Fully breastfeed children <4 month age of children has less risk for anemia compare hemoglobin between 1 and 2 years of age [21]. In USA s study shows that those are fully breastfed for  $\geq 6$ months three to five times more risk for to 12 months [21].

Complementary food has relationship with anemia of children and this relationship depends on mother's education in Bangladesh on under five children. In South Korea a study shows the significant association with mother education effect the child anemia through selecting and preparing food of children. Foods such as meat is considered as an important factor for the prevention of anemia in a study [22]. However in a study which was conducted in south Korea showed that maternal education level associated with children's dietary intake and food consumption behaviors on anemia of children [23]. Although another study measured the food intake in kilo calories on the basis of food criteria and amount of food[23]. Baby formula and solid and semi-solid food are considering main food for under five children to prevent from anemia and generate red blood cell and iron concentration in blood but in

Bangladesh for anemia of children may affect history of breast feeding.

## **8. Limitations:**

The study is based on the BDHS data, it has some limitation in collecting data regarding mother's education. Mothers' education means the formal education but if it reflects the information of mothers' knowledge about anemia or health of children then it might be easy to analyze. Our formal education does not have any content related to health education and nutrition of children.

## **9. Recommendations**

Different countries found significant relationship with mother's education and anemia of children and in Bangladesh we found statistically significant association with anemia in descriptive analysis. So, that mother education in primary level is a cause of anemia of children in Bangladesh and need proper initiative for mother higher education to reduce anemia of children. Further regression model study need to initiate to understand the significant risk factors of mother's education and anemia of under-five children.

## **10. Conclusions**

To reduce child anemia and ensuring children standard growth and development, we must have to focus on take mother mother's education. Though the Bangladesh government has several programs along with different NGOs to reduce anemia since 1962/64, but still we cannot reach the expected goal to ensure proper child growth and development. More research or

surveillance is needed to detect the actual prevalence and cause of anemia among the under five children.

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