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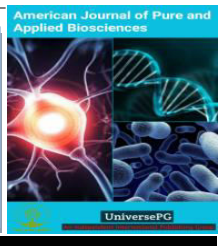

Prevalence of Anaemia among Pregnant Women in a Rural Area of Bangladesh: Impact of Socio-economic Factors, Food Intake and Micronutrient Supplementation

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ABSTRACT

Anaemia during pregnancy is a major health problem throughout the world. The prevalence of anaemia in pregnancy is 41.8% globally and 46% in Bangladesh. It affects both the mother and the baby simultaneously. Women often become anaemic during pregnancy because the demand for iron is increased due to the physiological need for pregnancy. This cross-sectional study was carried out in Savar Gonoshasthaya Kendra project area in Dhaka district. Ninety Five pregnant women of different gestational ages were selected purposively. Haemoglobin level was estimated by cyanomeath haemoglobin method in the laboratory of Gonoshasthaya Samaj Vittik Medical College Hospital, Savar. Among 95 pregnant women, 41.1% was in 20-24 years age group. The mean age of the respondents was 23.74 years. In terms of socio-economic status, 54.7% of the respondents came from lower middle class family. 7.4% of the respondents had no formal education, 54.7% had primary level education and only 6.3% had higher education. Maximum of the respondents (88.4%) were housewife. This study revealed that the prevalence of anaemia among pregnant women was 51.6%. Among 51.6 % of the anaemic respondents, 23.2% were mildly anaemic, 26.3% were moderately anaemic and 2.1% were severely anaemic.

Keywords: Anaemia, Pregnant women, Micronutrient, Socio-economic factor, Rural area, and Prevalence.

INTRODUCTION AND BACKGROUND

Anaemia during pregnancy is a significant health problem in Bangladesh as well as in the world. Worldwide, the prevalence of anaemia during pregnancy has been estimated at 41.8% (McLean *et al.*, 2009). According to WHO, the prevalence of anaemia among pregnant women is 56% in a developing country and 18% in a developed country (BBS, 2013), in Bangladesh, it is 28% (Poggi, 2007). Another study reported, 11.11% of pregnant women had anemia in their first trimester, 39.39% in 2nd trimester and 14.39% were anemic in their third trimester (Lindström *et al.,* 2011). During pregnancy, it affects both mother and baby. It causes preterm delivery, low birth weight of the newborn, poor neonatal health, higher maternal morbidity and mortality and increases the risk of postpartum haemorrhage (Sultana *et al.,* 2019). It may cause pregnancy-induced hypertension, placenta previa and cardiac failure (Allen *et al.,* 2019). Women often become anaemic during pregnancy because the demand for iron and other nutrients is increased due to physiological burden of pregnancy (Zavaleta *et al.,* 2000; Shazeed-Ul-Karim, 2019).

All pregnant women are at risk of developing anaemia. The normal physiological increase in plasma volume causes haemodilution in a pregnant woman. In pregnancy, plasma volume increases to a dis-proportionate degree with an increasing number of red blood cells, resulting in a lowering of the haemoglobin level. Therefore, mild anaemia in pregnancy is considered normal (Habib *et al.,* 2019).

The risk of developing anaemia increases by closely spaced multiple pregnancies, twin pregnancy, heavy pre-pregnancy menstrual flow and micronutrient deficiency. Micronutrient deficiency anaemia occurs in pregnancy due to deficiency of iron, folic acid and vitamin B_{12}. The most common is iron deficiency anaemia. This occurs mostly when the body does not have enough iron to produce haemoglobin. This is often known as nutritional anaemia. There is a greater risk of developing nutritional anaemia if the diet of pregnant women does not contain enough meat, poultry, dairy products and eggs (Nahid *et al.,* 2019).

Nutritional anemia is widely prevalent in South Asia. According to the UNICEF published regional report, the prevalence of nutritional anemia in Bangladesh is highest among the South Asian countries which are 46% (UNICEF, 2004). Untreated anaemia in pregnancy increases risk of having low birth weight baby, anaemic baby and depression in post-partum period. Another study found 30% anaemia among pregnant women in Bangladesh (Ahmed *et al.,* 2018).

MATERIALS AND METHODS

This cross-sectional study was conducted among the pregnant women in Gonoshasthaya Kendra (GK) Project area of Savar upazilla in Dhaka district in Bangladesh. Data were collected during the period of February 2015 to March 2015. Total ninety five pregnant women were selected purposively. Data were collected using a semi-structured questionnaire. The respondents were interviewed face to face for socio-demographic characteristics, daily food intake and intake of micronutrient (iron and folic acid).

Socio-economic statuses of the respondents were classified as Ultra Poor, Poor, Lower Middle Class, Middle Class, Upper Middle Class and Rich according to the guideline of GK, a local NGO in Bangladesh. The respondents who have no regular income, mostly engaged in begging were classified as Ultra Poor. The respondents, who have monthly income less than 3,000.00 but don't beg, were classified as Poor. The respondents who have monthly income 3,000.00-10,000.00 were lower Middle Class, those who have monthly income 10,000-25,000 were Middle Class, those who have monthly income 25,000.00-50,000.00 were Upper Middle Class and who have monthly income more than 50,000.00 were classified as Rich.

Blood was drawn with all aseptic precaution and haemoglobin level was estimated in the laboratory of Gonoshasthaya Samaj Vittik Medical College Hospital by cyanomeath haemoglobin method using a colorimeter. According to WHO, anaemia is defined as a haemoglobin concentration below 11 gm/dl and is categorized as mild, moderate and severe (Sharma and Shankar, 2010). Haemoglobin level between 10-10.9 gm/dl is defined as mild anaemia, 7-9.9 gm/dl is moderate anaemia and below 7 gm/dl is severe anaemia. Data analysis was performed by using SPSS version 16.0.

RESULTS AND DISCUSSION

Anemia is low hemoglobin (Hb) concentration, red-cell count, or packed-cell volume, with subsequent impairment in meeting the oxygen supply to demands of tissues. The mean age of respondents was 23.74 year. Majority of the respondents (41.1%) were in 20-24 years age group. Among the respondents, 16.8% were in the early reproductive age group (15-19 years). In terms of socio-economic status, 54% of pregnant women belonged to lower middle class family. While 54.7% of the respondents completed primary education and 7.4% had no formal institutional education.

Table 1 shows the socio-demographic characteristics of the respondents. Age, Socio-economic status, level of education and occupation of respondents were shown here. **Fig 1** shows 60% of the respondents were taking iron and folic acid regularly while 40% did not take any micronutrient. In this study, 60% of the respondents were taking micronutrient regularly (**Fig 1**).

Table 1: Socio-demographic characteristics of the respondents.

Characteristics	**N**	**%**
Age in years (Mean age = 23.74 years)		
15-19	16	16.8
20-24	39	41.1
25-29	27	28.4
30-34	12	12.6
35-39	1	1.1
Total	**95**	**100**
Socio Economic Status		
Poor	12	12.6
Lower middle class	52	54.7
Middle class	23	24.2
Upper middle class	7	7.4
Rich	1	1.1
Total	**95**	**100**
Education		
No formal education	7	7.4
Primary education	52	54.7
Secondary education	23	24.2
Higher secondary education	7	7.4
Graduate	6	6.3
Total	**95**	**100**
Occupation		
Housewife	84	88.4
Garment worker	8	8.4
Service holder	3	3.2
Total	**95**	**100**

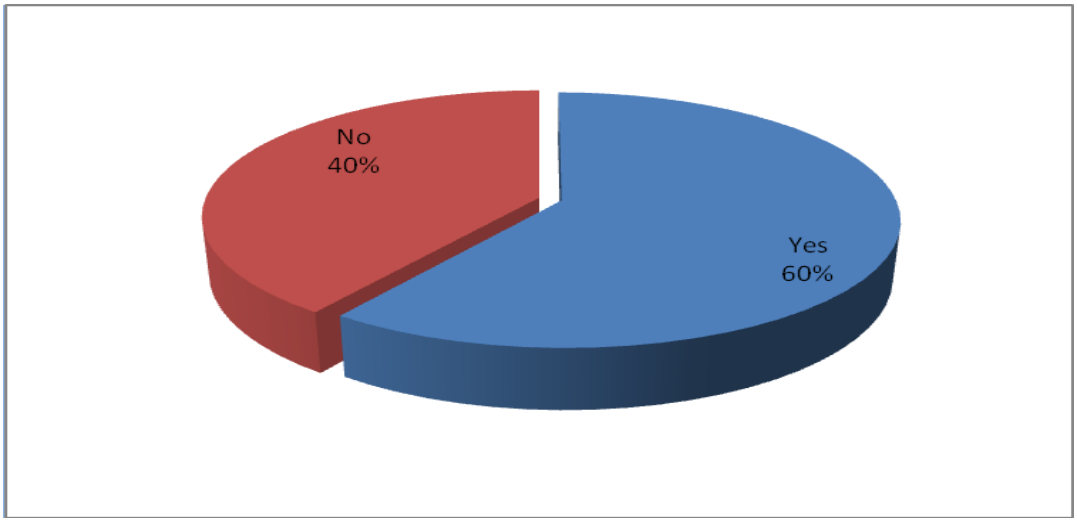

Fig 1: Micronutrient (Iron and Folic acid) intake by the respondents.

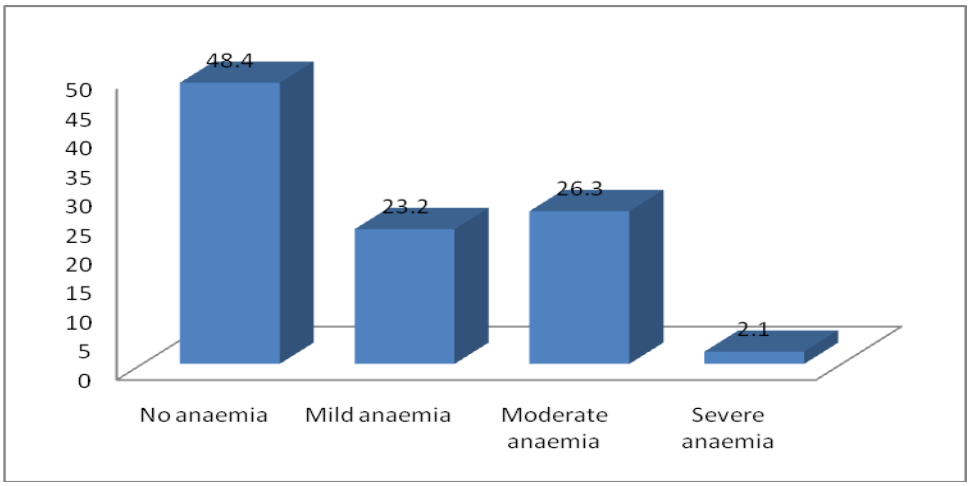

Fig 2: Anaemia status of the respondents.

Among them, 43.2% were non anaemic and 16.8% were anaemic. Out of 40% of the respondents who did not take any micronutrient, majority (34.7%) was anaemic and very few (5.3%) were non-anaemic. This result revealed that micronutrient intake had a significant influence on anaemia in pregnancy. This is also statistically proven (p=0.000). Even in many developed countries, the iron requirement for pregnant women cannot be met from dietary source (Bendich and Zilberboim, 2009).

Consequently, daily supplements of iron and folic acid have been universally recommended (Stoltzfus and Dreyfus, 1998). A study conducted by C Menendez et al found that iron supplementation led to a significant reduction of anaemia in pregnancy (Menendez *et al.,* 1994). Pregnant women are frequently advised to consume more food than any other times. It is assumed that more food has a positive influence on mother and foetus during pregnancy (Rahman *et al.,* 2019). This study found that 58.9% of respondents were taking daily 4 times or more meal. Among them, maximum (36.8%) were non anaemic, in contrast, among the 41.1% respondents, who were taking food daily 3 times (normal practice) or less than that, 29.5% were anaemic and 11.6% were non anaemic. This result indicates a significant influence of daily food intake on anaemia (p=0.001).

Fig 2 shows that 23.2% of the respondents were mildly anaemic, 26.3% were moderately anaemic and 2.1% were severely anaemic. However, 48.4% of the respondent had no anaemia. This study revealed that 51.6% of the respondents were anaemic and 48.4% had normal haemoglobin level. Among 51.6% of the anaemic respondents, 23.15% had mild anaemia, 26.31% had moderate anaemia and only 2.1% had severe anaemia (**Fig 2**). A report of UNICEF in 2004 showed that the prevalence of anaemia in pregnancy was 46% in Bangladesh (BBS, 2013). The finding of our study was just higher than UNICEF's observation. Another study conducted by Hyder's *et al* (2004) found prevalence of anaemia to be 50% that is more close to the findings of this study. Bivariate analysis revealed that socio-economic status did not have a significant influence on anaemia in pregnancy (p=0.61). However, education, frequency of daily food intake and micronutrient intake had a notable influence on the status of anaemia (Mondol *et al.,* 2019).

Table 2: Bivariate analysis of anaemia

Variable	**No anaemia**		**Anaemia**		**Total** *N=95*	
	f	**%**	***f***	**%**	***f***	**%**
Level of education						
No formal education	2	2.1	5	5.3	7	7.4

Institutional education	44	46.3	44	46.3	88	92.6
P=0.01						
Socio-economic status						
Poor	7	7.3	5	5.3	12	12.6
Lower middle class	22	23.1	30	31.6	52	54.7
Middle class	12	12.6	11	11.6	23	24.2
Upper middle class	4	4.2	3	3.2	7	7.4
Rich	1	1.1	0	0	1	1.1
P=0.61						
Frequency of meal						
≥ 4 times daily	35	36.8	21	22.1	56	58.9
≤ 3 times daily	11	11.6	28	29.5	39	41.1
P=0.001						
Micronutrient (iron and folic acid) intake						
Yes	41	43.2	16	16.8	57	60.0
No	5	5.3	33	34.7	38	40.0
P=0.000						

Table 2 illustrates bivariate analysis of anaemia with education level, socioeconomic status (SES), frequency of meal and intake of micronutrient. An analysis of educational level, 7.4% of the respondents had no formal education, of whom, 5.3% were anaemic and 2.1% were non-anaemic. This result revealed that anaemia was high in illiterate pregnant women which is statistically significant (p=0.01). 92.6% of respondents had formal institutional education, of whom, 46.3% was anaemic and 46.3% was non-anaemic. A study conducted by Balasubramanian *et al* (2016) found a significant relationship of educational status with anaemia in pregnancy. Analysis of socio-economic status revealed that maximum respondents from the different socio-economic class were non-anaemic. 12.6% of respondents were poor, of whom, 7.3% were non-anaemic and 5.3% were anaemic; 54.7% were lower middle class respondents, of whom, 23.1% were non-anaemic and 31.6% were anaemic; 24.2% were middle class respondents, of whom, 12.6% were non-anaemic and 11.6% were anaemic; 7.4% were upper class family, of whom, 4.2% were non-anaemic and 3.2% were anaemic and only 1 respondent came from a rich family who was non-anaemic. But these results had no statistical significance (p=0.61).

CONCLUSION

This cross-sectional study was conducted among ninety five pregnant women. The prevalence of anaemia found in this study was 51.6%. Of them, 26.3% was moderately anaemic and only 2.1% was severely anaemic. Among the respondents, 60% received micronutrients. Prevalence of anemia was low among them. A study conducted by Sharma *et al* (2003) in Delhi found that anaemia prevalence is less among pregnant women eating more meat but they found no effect of dietary habits on anaemia in pregnancy. Another study conducted by Al-Tel *et al* (2010) found the relationship of eating practices with anaemia. Similarly, those who have good socio-economic status and those who eat more food daily have less anaemia.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

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