

Research article**Haemoglobin status of pregnant women in island rural area of Bangladesh**Hossain, M.A.^{1*}, Sharmin, K. N.¹, Begum, A.¹, Sarwar, N.² and N. Yesmin¹¹Department of Applied Food Science and Nutrition, ²Department of Food Processing and Engineering, Chittagong Veterinary and Animal Sciences University, Chittagong-4225, Bangladesh**ARTICLE INFO***Article history :*

Received: 16/06/2016

Accepted: 22/08/2016

Keywords :

Anaemia, Pregnant Women, Body Mass Index, Low Body Weight

** Corresponding Author :*Email: altaf0810@gmail.com

Cell : +88 01728-417530

ABSTRACT

Anaemia is the world's most prevalent nutritional disorder. Pregnant women are particularly at risk of developing Iron Deficiency Anaemia (IDA) with a highest prevalence in South-East Asia and especially in Bangladesh. The objective of the present study was to evaluate haemoglobin status of pregnant women in Hatiya, Sandwip and Monpura Upazilla of Bangladesh. A total number of 49 pregnant women aged between 15 to 35 years were taken for this study. Capillary blood samples were collected and haemoglobin levels were determined by Easy Touch® GCHb Meter (Bioptik Technology, Inc., Taiwan). Most of the women (53.3%) were from the age group of 20 to 30 years and least number of the women (8.2%) were from the age group >30 years. Haemoglobin level during pregnancy was estimated and 78.6% of the pregnant women were observed with low haemoglobin level. Correlation between distribution of haemoglobin level in pregnant women at different age level and with Body Mass Index (BMI) was also done. Major causes of low haemoglobin level in pregnant women were found in availability of antenatal services, lack of care in check up, low level of education background, insufficient intake of iron, folate supplements, lack of proper nutrition knowledge regarding iron rich foods, insufficient consumption of balanced diet, food taboos and the improper initiatives of government and different health organizations in such island rural areas.

To cite this paper : Hossain, M.A., Sharmin, K. N., Begum, A., Sarwar, N., and N. Yesmin. 2016. Haemoglobin status of pregnant women in island rural area of Bangladesh. *Bangladesh Journal of Veterinary and Animal Sciences*, 4 : 27-30

1. INTRODUCTION

Anaemia is the disorder in which the concentration of haemoglobin in the blood is lower than the levels considered normal for a person's age and sex. It represents a condition where a lack of iron in the body leads to a reduction in the number of red blood cells (Haseen, 2004). Anemia is typically defined as hemoglobin level of less than 13.5 gm/100 ml for men and less than 12.0 gm/100 ml for women (WHO/FAO, 1998). But for pregnant women in developing countries like Bangladesh the cut off values of haemoglobin are divided into four groups such as severe (<7.0 g/dL), moderate (7.0-8.9 g/dL), mild (9.0-10 g/dL), normal (>10.0 g/dL) (Elahi et al., 2011). Iron-deficiency accounts for the majority of cases of anaemia that are identified. It is most common in pregnant women and caused by nutritional deficiency or low iron stores resulting from previous pregnancy or previous heavy menstrual blood loss (Van et al. 1986).

Physiological requirements for iron in pregnancy are three times higher than in non-pregnant menstruating women and iron requirement increases as pregnancy advances (Scholl et al., 1992).

Anaemia is a widespread public health problem in Bangladesh and affects the lives of 27 million children, adolescents and women (BBS/UNICEF, 2004). In Bangladesh, anaemia affects 46% of pregnant women, 64% of children aged 6-23 months, 42% of children aged 24-59 months, 30% of adolescent girls and 33% of non-pregnant women (BBS/UNICEF, 2004). It poses a major threat to maternal and child survival, contributes to low birth weight (LBW), lowered resistance to infection, poor cognitive development and decreased work productivity (Ahmed et al., 2005). Its devastating effects on health and physical and mental productivity affect quality of life, particularly among the poor, and translate into significant economic losses for individuals and for the country (Ziaei et al., 2007).

Anaemia is a concerned public health problem during pregnancy. About 56% of pregnant women in low income countries, in contrast to 18% in high-income countries, are affected (Kalaivani, 2009). It is associated with a number of negative outcomes, such as preterm delivery, LBW, perinatal mortality and for severe anaemia maternal death. Low hemoglobin level in pregnant women leads anemia that increased risk of complications during delivery, including prolonged labour, preterm delivery, LBW and maternal and neonatal death (Lieberman et al., 1987). Infants of mothers with iron deficiency anaemia are more likely to have low iron stores and to become anaemic in infancy and childhood (Dutta, 2006).

In Bangladesh, numerous studies have been conducted on different major cities and Hill tracts and estimated the anaemia prevalence among pregnant women. Ahmed et al. (2005) investigate the prevalence of anaemia and iron deficiency among adolescent schoolgirls in peri-urban Bangladesh, and identify various factors associated with anaemia in this population. The prevalence of Anaemia in Urban Bangladesh and Rural Chittagong Hill Tract were described by BBS/UNICEF (2004). Hyder et al. (2004) described the prevalence of anaemia and its association with measures of iron deficiency (ID) among a group of pregnant women. But research work regarding low hemoglobin level in pregnant women in remote isolate rural area is limited in number. Therefore, information on hemoglobin level and its association with maternal anaemia is not available for remote isolate rural area, particularly among women who are otherwise healthy. The objective of the present work was to evaluate haemoglobin status of pregnant women in Hatiya, Sandwip and Monpura Upazilla of Bangladesh.

2. MATERIALS AND METHODS

2.1 Subjects and Study Area

The study was set up to determine haemoglobin level of pregnant women in Hatiya, Sandwip and Monpura Upazilla of Bangladesh. The study subjects were 49 pregnant women within the age range of 15-35 years. The subjects were given questionnaires that provided useful information for this study. Collected data included age of the patients, height, weight, educational qualification, blood pressure, BMI, haemoglobin level of the patients. The study was carried out during the period from November, 2015 to February, 2016.

2.2 Biochemical analyses

Capillary blood samples were collected in the strip of Easy Touch® GCHb (Bioptik Technology, Inc., Taiwan). Hb level was determined according to the instruction of manufacturer in the field. The haemoglobin values

were recorded in the provided log sheet. The system has been shown to have accuracy and precision similar to the standard cyanmethaemoglobin method (Schenck, 1986).

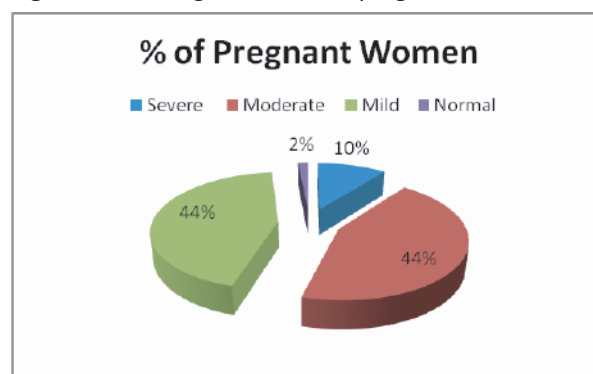
2.3 Experimental design and Statistical Analysis

A cross-sectional study was carried out and obtained data were stored in Microsoft Excel 2007 and then exported into SPSS Version 17.0 software (SPSS Inc., USA) for statistical analysis. Descriptive analysis was performed by using percentages, mean and standard deviation for different variables.

3. RESULTS AND DISCUSSION

The mean age of the pregnant women was 23±5 years and the range was between 15 to 35 years. Data of a total of 49 pregnant women was collected from different households of Hatiya, Sandwip and Monpura Upazilla. Most of the women (53.3%) were from the age group of 20 to 30 years and least number of the women (8.2%) were from the age group >30 years. Haemoglobin level during pregnancy was estimated and 78.6% of the pregnant women were observed anaemic. Anaemic pregnant women were divided into four groups such as severe, moderate, mild and normal. Most of the women fall into the moderate and mild categories Hb level. Figure-1 shows the Haemoglobin levels in pregnant women.

Figure-1: Haemoglobin levels in pregnant women



Anaemia is the world's most prevalent nutritional disorder, affecting more than 2 billion people in both developed and developing countries. Pregnant women are particularly at risk of developing Iron Deficiency Anaemia (IDA) with a highest prevalence in South-East Asia and especially in Bangladesh (Alderman and Hoddinott, 2004). Researchers from various developing countries have shown a prevalence of anaemia in pregnancy of 19 to 50% (Micozzi, 1978). The cut-off values for anaemia during pregnancy for Western population may not be true for Asian population (Rebecca et al., 2012). According to World Health Organization (WHO) anaemia was labeled when

the pregnant women had a haemoglobin level of <11gm/dl (Beutler, 2006). Cut-off value of Hb for this study for pregnant women was taken as 10 gm/dl. Compared to these reports, the present study found that the majority of pregnant women (77.6 %) fall into haemoglobin levels below 10 gm/dl. The main cause of those finding may be because of lack of proper nutrition knowledge regarding iron rich foods, insufficient consumption of balanced diet, low socioeconomic status of their families, food taboos lack of supplementation program and the improper initiatives of Government and different health organizations in such island rural areas.

Distribution of haemoglobin level in pregnant women at different age level was shown in the Table 1. Women aged above 30 years shows the highest and aged below 20 years shows the lowest level of haemoglobin level. The major causes of these findings are women who aged below 20 years are not physically well developed to supply enough nutrients for the fetus and for her own development (Okafor et al., 2013). As they were from remote areas and they were not under proper antenatal check up and didn't take haematenics during pregnancy that leads to iron deficiency.

Table1. Distribution of haemoglobin level in pregnant women at different age level

Age Group	Haemoglobin Level Mean \pm SD
<20 Yrs	8.84 \pm 1.07
20-30 Yrs	9.46 \pm 1.82
>30 Yrs	9.75 \pm 2.89

Table 2. Distribution of haemoglobin level in pregnant women with Body Mass Index (BMI)

Hb Level (g/dL)	Body Mass Index			Total
	<18.50	18.50-24.99	>25	
<7	0	2	2	4
7-8.9	2	8	7	17
9-10	1	13	3	17
>10	4	6	1	11
Total	7	29	13	49

χ^2 was conducted ($P = 0.102$).

Table 2 shows the distribution of haemoglobin level in pregnant women with Body Mass Index (BMI). Women with 18.5-24.99 BMI values were in majority in number and women with <18.5 BMI values were in minority in number of haemoglobin level. Those pregnant women with normal BMI value have higher haemoglobin level than compared with low and high BMI. Undernourished and overweight pregnant women has low iron level because of nutrient level in their body are insufficient.

4. CONCLUSION

Prevalence of low haemoglobin level in pregnant subjects in Hatiya, Sandwip and Monpura Upazilla was found as major issues. The present study found that the majority of pregnant women (77.6 %) fall into haemoglobin levels below 10gm/dl Findings that highlight low haemoglobin level in pregnant women are in less availability of antenatal services, lack of care in check up, low level of education background of pregnant women, insufficient intake of iron, folate supplements, lack of proper nutrition knowledge regarding iron rich foods, insufficient consumption of balanced diet, food taboos and the improper initiatives of Government and different health organizations in such island rural areas. So the Government along with different health organizations should look forward this issue in island rural areas of Bangladesh.

ACKNOWLEDGEMENTS

We are thankful to Department of Applied Food Science and Nutrition, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh for the technical help supplies during this study. We are also thankful to all the pregnant women of Hatiya, Sandwip and Monpura Upazilla for their active participation.

REFERENCES

- Ahmed, F., Khan, M. R., Akhtaruzzaman, M., Karim, R., Marks, G. C., Banu, C.P., Nahar, B. and Williams, G. 2005. Efficacy of twice weekly multiple micronutrient supplementations for improving the haemoglobin and micronutrient status in anaemic adolescent schoolgirls in Bangladesh. *American Journal of Clinical Nutrition*, 82: 829-35.
- Ahmed, F., Khan, M. R., Islam, M., Kabir, I. and Fuchs, G. 2000. Anaemia and iron deficiency among adolescent schoolgirls in peri-urban Bangladesh. *European Journal of Clinical Nutrition*, 54: 678-683.
- Alderman, J. R. and Hoddinott, J. 2004. Nutrition and Hunger. In: *Global Crises, Global Solutions* (ed. Bjorn Lomborg). Cambridge University Press, Cambridge, UK.
- BBS/UNICEF. 2004. Report on Anemia prevalence survey of Urban Bangladesh and Rural Chittagong Hill Tracts 2003. Dhaka, BBS.
- Beutler, E. and Waalen, J. 2006. The definition of anemia: what is the lower limit of normal of the blood hemoglobin concentration? *Blood*, 107: 1747-1750.
- Dutta, D. C. 2006. *Textbook of Obstetric*. 6th end., Culcutta Hiralal Konar, India, 262p.
- Haseen, F. 2004. Efficacy of daily and weekly home fortification of weaning foods with Sprinkles in improving iron deficiency anaemia among young children in Bangladesh. BRAC, Dhaka.

- Hyder, Z. S. M., Persson, L., Mushtaque Chowdhury, M., Lönnnerdal, B. and Ekström, E. 2004. Anaemia and iron deficiency during pregnancy in rural Bangladesh. *Public Health Nutrition*, 7: 1065-1070.
- Kalaivani, K. 2009. Prevalence and Consequence of anaemia in pregnancy. *Indian Journal of Medical Research*, 130: 627-633.
- Lieberman, E., Ryan, K.J., Monson, R. R. and Schoenbaum, S. C. 1987. Risk factors accounting for racial differences in the rate of premature birth. *New England Journal of Medicine*, 317: 743 - 8.
- Micozzi, M. 1978. On definition of anemia in pregnancy. *American Journal of Public Health*, 68: 907-908.
- Okafor, I. M., Asemota, E. A., Antai, A. B. and Usanga, E. A. 2013. Prevalence of Iron Deficiency Anaemia among Pregnant Women in Calabar, Cross River State Nigeria, *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)*, 7: 60-64.
- Quadrat-E-Elahi, M., Rahman, M., Momtaz, S., Ferdousi, M. and Bhuyan, F. 2011. Haemoglobin Status of Pregnant Women an Analysis of 1804 Cases. *JAFMC Bangladesh*, 7: 2.
- Rebecca, D. M., Shamim, A. A., Ali, H., Labrique, A. B., Schulze, K., Christian, H. and West, K.P. 2012. High prevalence of anemia with lack of iron deficiency among women in rural Bangladesh: a role for thalassemia and iron in groundwater. *Asia Pac J Clin Nutr*, 21: 416-424.
- Scholl, T. O., Hediger, M. L., Fischer, R. L. and Shearer, J. W. 1992. Anaemia vs. iron deficiency: increased risk of preterm delivery in a prospective study. *American Journal of Clinical Nutrition*, 55: 985 - 988.
- Van S. H., Falkensson, M. and Lundberg, B. 1986. Evaluation of 'HemoCue', a new device for determining hemoglobin. *Clinical Chemistry*, 32: 526 -529.
- World Health Organization (WHO). 2000. Nutrition for health and development. A Global agenda for combating malnutrition. WHO/NHD/2000.6, Geneva: WHO.
- Ziaei, S., Norrozi, M., Faghihzadeh. S. and Jafarbegloo, E. 2007. A randomized placebo controlled trial to determine the effect of iron supplementation on pregnancy outcome in pregnant women with haemoglobin ≥ 13.2 g/dl. *British Journal of Obstetrics and Gynaecology*, 114: 684-688.