RESEARCH ARTICLE

PREVALENCE OF IRON DEFICIENCY ANEMIA AMONG ANTE NATAL MOTHERS

*Daisy Kameng Baruah, Mridula Saikia Barooah and Daisy Sharma

Department of Food Science and Nutrition, College of Home Science, Jorhat- 785013 Assam

ARTICLE INFO	ABSTRACT
	Anaemia in pregnancy is associated with increased rate of maternal and perinatal mortality, premature delivery, low birth weight and other adverse outcomes. This study was conducted to determine the prevalence of anaemia among pregnant females attending selected nursing homes in sivasagar district, Assam and to assess the etiologic risk factors contributing to it during pregnancy. A cross-sectional study was conducted on 30 randomly selected pregnant females; data were collected using an interview questionnaire to collect data about socio-demographic characteristics, medical, obstetric and dietary histories. Hematological indicators were obtained from the last recorded values in the patients' files. Anaemia was defined as haemoglobin level of less than 11.0g/dl. The observed prevalence rate of anaemia found in this study was (39%) and was higher among females from 25 to less than 35 years, house wives , low level of education, decreased birth spacing and history of anaemia before pregnancy were associated with increased risk of anaemia. Emphasis should be placed on pregnant women since they were particularly at risk. Health professionals must pay more attention to teach pregnant women good long-term dietary habits as a part of an overall approach to health promotion

INTRODUCTION

Iron deficiency is one of the most prevalent nutrient deficiencies in the world, affecting an estimated two billion people (Stoltzfus and Dreyfuss1998). Young children, pregnant and postpartum women are the most commonly and severely affected because of the high iron demands during these periods. However, where diets are based mostly on staple foods with little meat intake, or people are exposed to infections that cause blood loss (primarily hookworms and urinary schistosomiasis), iron deficiency may occur throughout the life span. Current WHO/International Nutritional Anaemia Consultative Group/United Nations Children's fund/United Nations Children's fund (WHO/INACG/UNICEF) guidelines recommend universal iron and folic acid supplementation of young children and pregnant women where anaemia is highly prevalent(Stoltzfus and Dreyfuss 1998). Recent data shows that 17% of pregnant women in developed countries suffer from IDA and up to 56% in developing countries. In pregnancy, anaemia may lead to tiredness, poor exercise tolerance.

Corresponding author: Daisy Kameng Baruah,
Department of Food Science and Nutrition, College of Home Science, Jorhat- 785013 Assam, India.

At delivery anaemia decreases a woman's ability to cope with any blood loss and increases her chance of complications and of needing a blood transfusion. Further issues can arise following birth with increased postnatal infection, less energy and higher rates of postnatal depression. Medical Director of Women's and Children's Services at the Launceston General Hospital Dr Amanda Dennis and consultant haematologist, Associate Professor Al Khalafallah, conducted a two year research project which included the screening of 2645 pregnant Tasmanian women. The research outcomes have led to changes in the treatment of pregnant IDA sufferers whereby many are now given an intravenous infusion of iron instead of the previous method of iron tablets. Women who receive the infusion have shown much higher iron levels before and after giving birth. Subsequently, the LGH has administered over 1000 iron infusions over the last 5 years and has been recognised as a national and international leader in the management of IDA in pregnancy with the hospital having the lowest transfusion rates of comparable hospitals in the Women's Hospitals Australasia network. The high risk of women of fertile age and pregnant women for incurring negative balance and iron deficiency is due to their increased iron needs because of menstruation and the substantial iron demands of pregnancy. Median requirements of absorbed iron are estimated to be 1.36 and 1.73 mg per day among adult and teen-age menstruating females. However, 15% of adult

menstruating women require more than 2.0 mg per day, and 5% require as much as 2.84 mg per day. The superimposition of menstrual losses and growth in menstruating teenage girls increases the demands for absorbed iron; 30% need to absorb more than 2.0 mg of iron per day; 10% as much as 2.65 mg, and 5% 3.21 mg. These requirements are very difficult, if not impossible to satisfy even with good quality, iron-fortified diets. Iron needs exhibit a marked increase during the second and especially during the third trimesters when median daily needs increase up to an average of 5.6 mg per day (that is, 4.1 mg above median pre-pregnancy needs). The approximate range would be 3.54 and 8.80 mg per day. This amount of absorbed iron needs cannot be met from food iron even if iron fortification is in place. Thus the importance of two factors: pre-pregnancy iron reserves upon which to draw; and iron supplementation during pregnancy. The present study was thus implemented on 30 numbers of pregnant women in sivasagar district to assess the prevalence of iron deficiency anaemia among them.

MATERIALS AND METHODS

The present investigation was conducted to find out the prevalence of anaemia among pregnant women attending antenatal care units of selected hospitals of sivasagar district. Data were collected from the pregnant women using an interview schedule. Haemoglobin was recorded by their test reports in hospitals.

Subjects

The study included 30 randomly selected pregnant females attending attending Pragati Nursing Home and Research center of Sivasagar district Assam. Pregnant mothers who agreed to participate were included. Females with history of ante-partum haemorrhage or haemoglobinopathies were excluded. The study, including data collection, was approved by the hospital Board

Tools

Interview questionnaire: A specially designed questionnaire was prepared. The questionnaire was divided into three main areas covering; socio demographic data, medical and obstetric histories including previous and current use of iron supplements

Food frequency questionnaire (FFQ): The FFQ included frequency response formats to recall each pregnant diet. The food intake frequencies were classified into four categories: 1time per week, 2-5 times per week and more than 5 times per week, the questionnaire included the most important items that are rich or poor in iron or influences the absorption of iron. Therefore, we included six categories: dairy products, Protein foods, vegetables, fruits, cereals and miscellaneous groups of food.

Anthropometric assessment: The height and weight of the pregnant mothers were collected and measured with the expected standard weight at the particular period of pregnancy.

Pregnancy Body Mass Index: Pregnancy BMI was calculated from pregnancy body weight (in kg) divided by square of height (in meter). Pregnant women were categorized into 3 groups based on WHO criteria.

1) Underweight: BMI < 18.5 kg/m2.
2) Normal weight: BMI 18.5–24.9 kg/m2.
3) Overweight and obese: BMI ≥ 25.0 kg/m2.

Laboratory investigations: Haematological parameters including: Haemoglobin (Hb), Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Haemoglobin Concentration (MCHC), Red blood cell (RBC) count and Haematocrit value (HCT), were taken from the last recorded values in patients's files. Based on haemoglobin level, all patients with a value less than 11g/dL were considered anemic. Hemoglobin level less than 7 g/dl indicates sever anemia, 7-8.9 g/dl moderate anaemia, and levels between 9-10.9 mild anaemia (Mirzaie et al., 2010).

RESULTS

Ascertainment of Gestational Age

Gestational age was assessed from 2 sources:

1) Based on first day of LMP in women with regular menstruation history, who could recall the exact date and those whose FH was correlated with GA, or GA by LMP was no more than 1 week different from ultrasound.
2) From ultrasound performed in the first half of pregnancy, in women who did not fulfill criteria

Socio-demographic characteristics of pregnant mothers

Table 1 showed that females less than 35 years had the highest prevalence rate of anaemia (69.2%) among the anaemic group. Abdelhafez and El-Soadaa (2012) observed prevalence rate of anemia in their study as (39%) and was higher among females from 25 to less than 35 years among females Attending Primary Health Care Centers in Makkah, Saudi Arabia. Women who got married at the age of 13-21 and 22-25 years show maximum level of iron deficiency (34.7% and 44.7% respectively). Similar study revealed that the prevalence of anaemia was 59.80 per cent among antenatal women who got married below 18 years of age (Noronha., et al. 2008). This indicates that early marriage predisposes the risk for occurrence of anaemia in pregnancy. Percentage of anaemia increases with decrease in educational qualification of the mothers. Target group who are in low income group (3000/-) tends to have lower haemoglobin level. About 87.2 percent of target group who are housewives were suffering from anaemia in comparison to working women (12.8%). It reveals that working status and income level highly affect the health status in pregnancy. The table below reveals that the women who attended their first conception below the age of 20 were found to be more susceptible to iron deficiency anaemia in compared to ages above 25. Anaemia before pregnancy results in higher risk of low Hb level during pregnancy. The data also revealed that irregular consumption of iron supplements or tablets are common among anaemic group.

Table 1. Demographic characteristics of the subjects

Sl no.	Characteristics	Percentage
1.	Age in years	
	15-	15.4
	25-	53.8
	35-	30.8
	45-55	0.0
2.	Age at marriage	
	13-21	34.7
	22-25	44.7
	26-30	18.2
	30 above	4.4
3.	Educational qualification	
	Illiterate	30.5
	Primary /preparatory	30.5
	Secondary school	28.2
	University or higher	20.5
4.	Income	
	1000-3000	50.0
	3000-5000	26.9
	>5000	23.9
5.	Work Status	
	Working	12.8
	House wife	87.2

They are also very irregular in their monthly checkups in the hospital. The data also reveals the Body mass index (BMI) of the target group which shows that 48.7% of women were normal against 12.8% of underweight, 20.5% overweight and 18.0% of obese women.

Table 2. Distribution of the studied pregnant mothers according to their obstetric and medical histories

Sl No	Variables	Percentage
1.	Age at first pregnancy	
	<20	41.1
	20-	28.2
	25-	20.6
	30<	10.1
2.	Having anaemia before pregnancy	
	Yes	74.4
	No	25.6
3.	Iron supplementation in this pregnancy	
	Yes	74.4
	No	25.6
4.	Iron supplementation before pregnancy Yes	28.2
	No	71.8
5.	Pregnancy BMI categories	
	Underweight	12.8
	Normal	48.7
	Overweight	20.5
	Obese	18.0

Prevalence rate of anaemia among the studied population

Based on Haemoglobin (Hb) level the overall prevalence rate of anaemia among the studied population was (39.0%) (Fig. 1)

Gestational weight gain is the amount of weight gained during whole pregnancy which can affect the immediate and future health of a woman and her infant (American college of obstetricians and gynaecologists (2015). Above figure shows that 10 percentage of pregnant mothers had less than recommended gestational weight gain with minor complications like dizziness, vomiting, body pain etc. The Figure also revealed 5 percent of pregnant mothers having

body weight more than recommended gestational weight gain, against 15 percent of normal bodily gestational weight gain.
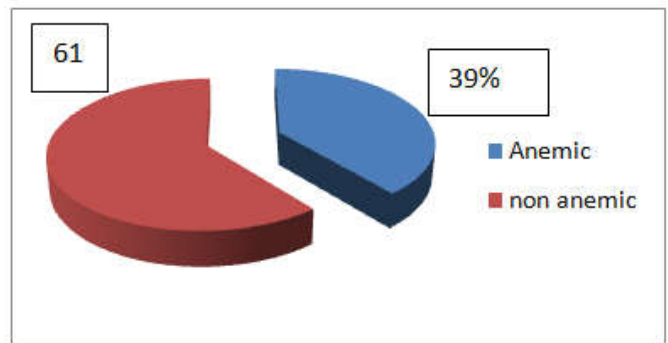
Fig. 1. Prevalence of anaemia among target group

Table 3. Categorisation of the studied pregnant women according to their body mass index based on WHO criteria

Characteristics	Underweight (<18.5)	Normal weight (18.5-24.9)	Overwt and obese (≥25.0)
Pregnancy weight	12(40.00%)	10(33.33%)	8(26.22%)
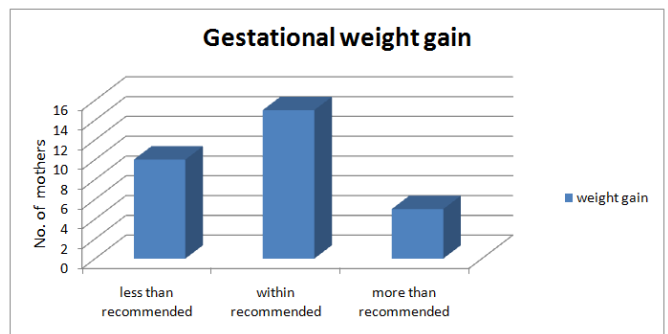
Fig. 2. Gestational weight gain

Table 3. Distribution of the studied groups according to frequency of consumption of different food groups

Food items	Once/week (%)	Two-five/week (%)	More than five week (%)
Milk	12.8	23.2	23.1
Curd	15.4	33.4	33.3
Cheese	7.7	20.5	12.8
Liver	25.6	10.3	5.1
Meat	35.9	5.1	2.6
Egg	20.5	17.9	12.8
Fish	30.8	10.3	2.6
Tubers	28.2	51.3	12.8
Other vegetables	15.4	12.8	2.6
Green leafy vegetables	30.8	20.5	10.0
Dates	10.4	5.6	2.0
Nuts	17.9	10.5	2.2
Wheat	7.7	4.7	2.6
Rice	15.4	12.6	10.2
Coffee	10.9	5.5	3.0
Cold drink	2.6	2.2	1.6
Tea		7.3	15.4

Gestational weight gain (GWG) is an important predictor of short- and long-term outcomes of pregnancy for both mother and child. Compared with adequate gain, mothers with excessive GWG are at higher risk for cesarean delivery and postpartum weight retention, and their babies have a higher risk for being born large for gestational age, infant mortality, and obesity in later life. Babies born to women with inadequate GWG are at higher risk for preterm birth, small for gestational age, and infant mortality (Oken, et al., 2014). The research also made an attempt to study the dietary habits of the pregnant women. The information on the ability of selection of food rich in iron, protein and vitamin C were collected. The target groups those who had poor food selection ability studied to be at high risk of iron deficiency anaemia. The population under study mostly consumed rice and less of green leafy vegetables, other vegetables and pulses that are rich in iron, protein and Vitamin C.

Nutrition Counseling

Nutrition counselling was given to the entire target group specially the anaemic pregnant mothers, by emphasising on few key messages

1) Increasing quantity of food (eating 1 or 2 additional meals, increasing the amount of food consumed and adding a teaspoon of oil to prepared food)
2) Improving the quality of food (consuming cereal-pulse combination, incorporating greens in staples, consuming fermented foods, consuming yellow fruits and vegetable, adding lemon to food for better iron absorption and consuming milk products like buttermilk and curd).
3) Promoting consumption of iron-folic acid (IFA) tablets (consume one IFA tablet regularly from 4th month onwards, side effects subside after sometime, collect IFA tablets from anganwadi workers (AWWs) or auxiliary nurse midwife (ANM).
4) Rest during pregnancy (rest for atleast 2-3 hours during the day, do not do heavy strenuous manual work in the last trimester of pregnancy).
5) Injection tetanus toxoid (TT) immunization and antenatal checkups (ANC) (getting 2 TT injections immunization completed at an interval of one month from ANM or doctor, undergoing periodic health check-ups for weight gain, blood pressure and anemia).
6) Use of iodized salt (using iodized salt in all food preparations).

Conclusion and Recommendation

Anaemia in pregnancy remains a major problem in nearly all developing and many industrialized countries. The world Health Organization estimates that 58% of pregnant women in developing countries are anaemic. In Asian countries, maternal anaemia, especially iron deficiency anaemia has been considered as one of the most important public health problems (Kalaivani, 2009).

The observed prevalence rate of anaemia found in this study was (39%) and was higher among third trimester pregnant females, low level of education, lower income and history of anaemia before pregnancy were associated with increased risk of anaemia. On the other hand, no such association was between the frequency of consumption of nearly all the studied food items and anaemia was found. Emphasis should be placed on pregnant women since they were particularly at higher risk of iron deficiency anaemia. Additionally Physicians or other health professionals must pay more attention to teach pregnant women good long-term dietary habits as a part of an overall approach to health promotion. More direct dependence on haemoglobin and serum ferritin levels as a screening tool, for pregnant women in their second and third trimesters, along with a more aggressive approach to the level of iron stores at which iron supplementation should be prescribed. The target group showed good response during nutrition counselling in the hospital.

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