IRON DEFICIENCY ANEMIA:
SCENARIO OF PREGNANT WOMEN LIVING AT AN ALTITUDE OF ⩾5000 FEET IN DISTRICT ABBOTTABAD.

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PROF-1814

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ABSTRACT... Objectives: To estimate the frequency of iron deficiency anemia in a sample of population of pregnant women residing permanently at high altitude of ⩾5000 feet in different areas of district Abbottabad. **Study Design:** Cross sectional Study. **Place & duration of Study:** Northern Institute of Medical Sciences Abbottabad: From 17 August 2009 to 15 June 2010. **Subjects and Methods:** This study was carried out on hundred pregnant women residing permanently at an altitude of ⩾ 5000 feet above sea level in district Abbottabad. The age range was fixed to 15-45 (child bearing age) years. Suspected study participants having anemia were tested for iron status by serum ferritin test. Pregnant women having both anemia and iron deficiency were labeled as patients of Iron deficiency anemia. Results: The age range was 15-41 years with a mean of + / - SD of 28.13 + / - 6.61. All women were of low and middle socioeconomic class with 74 % illiteracy. 60 % of women had birth spacing of two or less than two years. 64 % of pregnant women had three children. Anemia was detected in 74 % (X^2 =9.42 p > 0.05), iron deficiency in 66 % (X^2 = 14.76 p <0.01) and iron deficiency anemia in 60 % (X^2 = 13.56 p < 0.01). **Conclusions:** High altitude resident pregnant women remain at high risk of developing iron deficiency anemia because of illiteracy, poverty and ignorance. With adequate nutrition and health education the problem can be addressed effectively.

Key words: High altitude, Pregnancy, Anemia, Iron deficiency, Iron deficiency anemia

INTRODUCTION

Iron deficiency anemia (IDA) is the most common types of anemia at the global level. It is a public health problem for pregnant women in all countries of the world which urgently needs to be addressed[1]. In Pakistan the prevalence rate of Iron deficiency anemia in pregnant women was found to be 36 % 2 and 39.1[1]. On the gravity of public health significance World Health Organization has classified anemia prevalence (%) into four categories of , severe (⩾ 40%), moderate (20-39.9%) ,mild (5-19.9%) and normal (⩽ 40%)[3] and accordingly Pakistan falls in the moderate category.

Normally in whole pregnancy there is an increased need of about 700-850 mg of body iron while lactation results in loss of iron via breast milk 3. Many women enter pregnancy with low iron stores resulting from heavy menstrual periods, previous pregnancies, breast feeding, or poor nutrition[4]. During pregnancy plasma volume expands by 46-55 % whereas red blood cell volume expands by 18-25 % [5 ,6]. The resulting haemodilution is called as physiological anemia of pregnancy. The mean minimum normal hemoglobin during pregnancy is to be taken in first and third trimester as 11.0 (<g/dL) and in second trimester as 10.5 (<g/dL)[7]. If the hemoglobin concentration is 15.0 g/dl or haematocrit is > 45.0 % during the second or third trimester, there could be potential pregnancy complication related to poor blood volume expansion. Women with anemia are reported to have high fetal mortality and deliver babies with lower birth weight and low Hb and serum ferritin levels as compared to non – anemic women in different gestational age groups[8,9,10].

High altitude and chronic smoking are two independent variables of increased value of hemoglobin/ haematocrit

and therefore need to be adjusted when assessing their maximum values used in iron deficiency anemia. Longer residency at high altitude ⩾ 3000 feet causes a generalized upward shift in Hb/Hct values. To confirm anemia as iron deficiency anemia at least one additional iron state indicator such as serum ferritin, transferrin – saturation, MCV, erythrocyte prot- porphyrin or serum transferin receptor is required[11]. The range of values for serum ferritin in presence of anemia are commonly taken as evidence of Iron deficiency[12] .Ferritin is a protein that stores iron in the cell of the body, the level drops in iron deficiency anemia but it may be elevated by fever or infection, arthritis , or other types of inflammation or by liver damage[7].

The aim/objective of the study was to estimate the prevalence of iron deficiency anemia in a sample of population of pregnant women residing permanently at high altitude of ⩾ 5000 feet in different areas of district Abbottabad.

SUBJECT AND METHOD

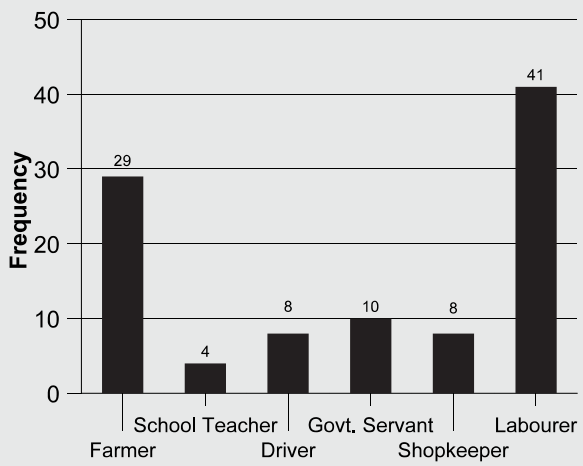
This was a cross sectional study conducted from 17 August 2009 to 15 June 2010. Pregnant women of 15 - 45 years having long term residency at areas of Dhamtore, Harnu, Bagnutar, Namlimera, Samandar katha , Sajan Gali, Nathiagali , Ayubia , Kheragali, Katwal, and Kalapani of district Abbottabad were included. These areas have an altitude of five to eight thousand feet. Smokers, subjects with chronic illness and visitors were excluded. Consent of the husband/ elders were taken. A questionnaire was drafted for taking information regarding socio demographic indicators like education, family size; birth spacing years and occupation of husband. The health care facilities like basic health units, rural health centers, civil dispensaries, and civil hospitals were visited for the search of sample population. A quota of hundred women was fixed. The cut off values adjusted for altitude 5000-5999 feet for Hb was 0.5[7], hence the 1st term of pregnancy Hb values as 10.5, 2nd term as 10 g /l and 3rd term as 10.5 g/dl were adjusted for labeling anemia. Hb analysis was done by cyenmethaemoglobin method. Test for serum Ferritin concentration was included to confirm anemia as iron deficiency anemia. Roche serum ferritin elecsys kit was used to perform this test. A value of 20 mcg/l was taken as evidence of iron deficiency [14]. However for labeling IDA, ferritin value of <12 mcg/l was fixed.

The data was processed using manual and computer software SPSS - 14. Analysis was done according to women age, status of pregnancy, education, family size, birth spacing and occupation of husband.

RESULTS

Over all the age range was 15 – 41 years and a mean of +/- SD of 28.13 +/- 6.61. All women were of low and middle socioeconomic class (70% husband were farmer and laborers – Figure -1) with 74 % illiteracy. 60 % of women had birth spacing of two or less than two years. 64 % of pregnant women had three children (Figure -2).

Fig-1. Occupation of husband

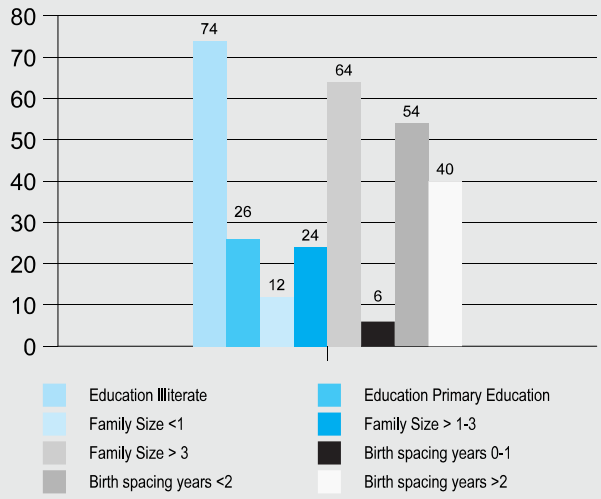


Main victim of iron deficiency and iron deficiency anemia were the women of 2nd and 3rd term. It was found as, 10 (16.7 %) of first term, 22 (36.7 %) of second term and 28 (46.6 %) of third term. Total results are shown in Table – 1. Anemia was detected in 74 % (X^2 =9.42 p > 0.05), iron deficiency in 66 % (X^2 = 14.76 p < 0.01) and iron deficiency anemia in 60 % (X^2 = 13.56 p < 0.01).

DISCUSSION

Anemia in pregnancy is a common and worldwide problem that deserves more attention. In this study labeling of iron deficiency anemia were based on hemoglobin and serum ferritin and the findings indicated

Fig-2. Sociodemographic profile of women



a picture of severe public health problem as per WHO standard[3]. These estimates are also very high as compared to published WHO data for Pakistan[1] on prevalence of anemia in pregnant women, however the results are in accordance with a local study[13] carried out in Abbottabad which detected a prevalence rate of 68 % for iron deficiency anemia. At these mountainous areas due to prevalent illiteracy and lack of health education there was an upward trend in the number of children in the family which was also evident from the picture of birth spacing years. A study[14] in Ethiopia revealed estimates of IDA in 18% in women of reproductive age. These all studies have been carried out without considering the factor of high altitude and pregnancy. A study[15] in Bolivia revealed a prevalence of 51.7% and 26.5%, respectively in women living in tocha (3600 m) and Santa Barbara (4800 m). A study[16] on Mexican pregnant women living at high altitude found anemia prevalence rate of 56%.

This study was focused on rural women residing in mountainous areas where the underlying causes were illiteracy, low socioeconomic status, deficiencies of health care facilities, ignorant attitude towards female. Due to dearth of studies on the subject in Pakistan no comparison was possible.

CONCLUSIONS

Anemia related with pregnancy and altitude increases the risk of developing iron deficiency which leads to Iron deficiency anemia. If untreated, it may result in premature labor, low birth weight, & high output heart failure. At a small scale the scenario in mountainous region showed. an ice burg of the picture calling for urgent need of exploring the hidden mass of the disease in the population living in these areas. This situation demand for emergency rescue services and improvements of basic health care facilities, promotive, diagnostic and curative.

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Table-I. Findings of study variables according to age groups

Age group	Total no. of women (n)	Trimester of pregnancy			Total number of anemic women	Total number of women having iron deficiency	Labeling of IDA
		1st	2nd	3rd			
15-20	15	4	6	5	7	6	5
21-25	21	9	6	6	14	13	11
26-30	32	12	9	11	26	18	17
31-35	15	4	5	6	13	14	13
>35	17	2	7	8	14	15	14
Total	100	31	28	41	71	67	62

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Article received on: 18/07/2011 Accepted for Publication: 29/11/2011 Received after proof reading: 22/02/2012

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Article Citation:
Siddiqui MS, Hayat AS, Siddiqui MK, Atif N, Shah H. Iron deficiency anemia: scenario of pregnant women living at an altitude of ⩾ 5000 feet in district Abbottabad. Professional Med J Apr 2012;19(2): 155-158.

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