DETERMINATION OF HEMOGLOBIN LEVEL AND WEIGHT GAIN DURING PREGNANCY

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ABSTRACT

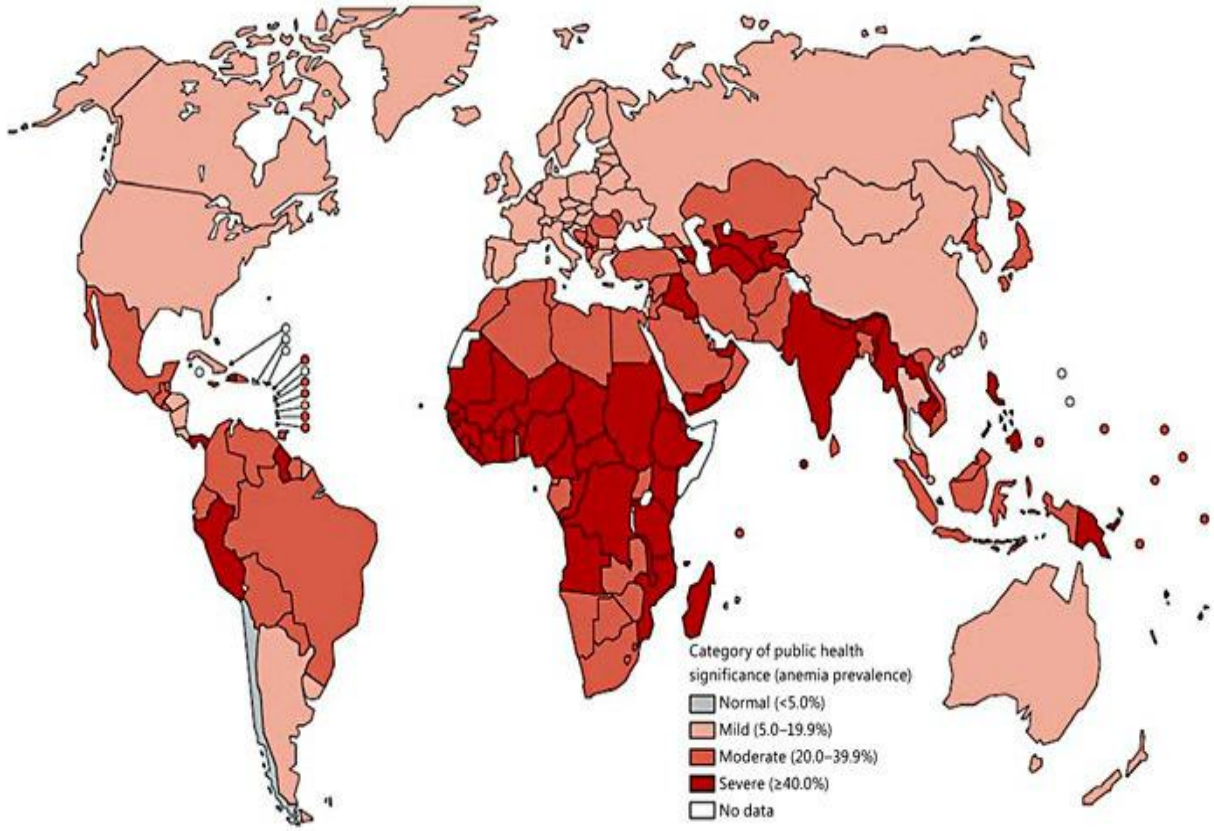
Anemia in pregnancy causes maternal and prenatal mortality, premature delivery, low birth weight and other adverse outcomes. Iron deficiency is one of the major risk factors for disability and death worldwide, affecting an estimated 2 billion people. Nutritional iron deficiency arises when physiological requirements cannot be met by iron absorption from diet. Dietary iron bioavailability is low in populations consuming monotonous plant-based diets. The high prevalence of iron deficiency in the developing world has substantial health and economic costs, including poor pregnancy outcomes. The Present study was conducted to assess hemoglobin level, weight gain and complications during the second and third trimester of pregnancy. One hundred twenty pregnant women were selected randomly from three hospitals, one is a private hospital (Bharat Nursing home) and two were government hospitals (Civil Hospital and PGI Rohtak). Questionnaire containing questions related to socio demographic information, dietary intake and hemoglobin level was prepared and pretested. It was filled by an interview method. Hemoglobin level of pregnant women in their second and third trimester of pregnancy was noted from their OPD card of respective hospitals. Mean Hemoglobin level of pregnant women was found below normal value. Prevalence of anemia was found among respondents. Mean and Standard Error of hemoglobin level was calculated according to family income and parity. The majority (48.3%) of pregnant women were anemic having Hemoglobin level between 9 to 10 gm/100ml of blood followed by 35 percent of pregnant women who had hemoglobin levels less than 9 gm/100 ml. Sixteen percent of pregnant women had Hemoglobin level between 11 to 12 gm/100 ml of blood. Common complications suffered by pregnant women were also noted. Most of the subjects (55%) had weight gain between 6-10 Kg. It can be concluded that the hemoglobin level of pregnant women was below normal and anemia was common among them due to low intake of iron and folic acid in their daily diet. Diet rich in iron, folic acid and cobalt must be provided to get rid of anemia.

Keywords: Hemoglobin level, Trimester, Pregnant Women, Pregnancy, Anemia, Iron Deficiency, Dietary intake, Socio demographic, Folic acid, Prevalence

INTRODUCTION

Anemia is a condition in which the number of red blood cells or the hemoglobin concentration is lower than normal. Hemoglobin is needed to carry oxygen and if a person doesn't have too few or abnormal red blood cells or low hemoglobin, there will be a decreased capacity of the blood to carry oxygen to the body's cells and tissues. This will result in symptoms such as fatigue, weakness, dizziness and shortness of breath. The optimal hemoglobin level needed to meet physiological needs varies by age, sex, altitude, smoking habits and pregnancy status. The most common causes of anemia include nutritional deficiencies especially iron deficiency, folic acid, vitamin B12 and are also some

important causes; infectious diseases, such as malaria, tuberculosis, HIV and parasitic infections. Anemia is a serious global public health problem that particularly affects young children, adolescent girls and pregnant women. WHO estimates that 42% of children less than 5 years of age and 40% of pregnant women worldwide are anemic.



Source: https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-anaemia-in-women-of-reproductive-age-(-)

Cut off values used by World Health Organization to define anemia

Reference Groups	Cut off Hemoglobin level (g/l)	Mild (g/l)	Moderate (g/l)	Severe (g/l)
Pregnant women	110	100-110	70-99	<70
Non Pregnant women	120	110-119	80-109	<80
Children 6-59 months	110	100-109	70-99	<70
Children 5-11 years	115	110-114	80-109	<80
Children 12-14 years	120	110-119	80-109	<80
Men	130	110-129	80-109	<80

Anemia is a major health problem that affects nearly 25% to 50% of the population of the world and more than 50% of pregnant women. Anemia in pregnancy may cause higher chances of maternal and prenatal mortality, premature delivery, low birth weight, and other adverse outcomes. Barooti in a systematic review revealed that the frequency of anemia in Iran is 4.8-17.5 percent. During pregnancy, chances of being anemic increased more than four five times from the first to third trimester. It is found that there is a physiological drop in hemoglobin in the mid trimester. This physiological drop is attributed to increase of plasma volume and hence decrease in viscosity of blood lead to better circulation in placenta. According to the classification of World Health Organization (WHO), pregnant women with hemoglobin levels less than 11.0 g/dl in the first and third trimesters and less than 10.5 g/dl in the second trimester are considered anemic. Anemia in pregnant women is a prime factor to determine fetal growth and pregnancy outcomes. Low birth weight and premature delivery have been associated with anemia in pregnancy (11-14). Yi et al., determined that anemia, hemoglobin concentration before pregnancy was associated with an increased risk of premature delivery. Kozuki et.al. reported that moderate to severe, but not mild, maternal anemia appears to have an association with intrauterine growth retardation. Indian council of medical research considers hemoglobin level below 10.9g/ml of blood as a cut off point for anemia during pregnancy. The National Nutrition Mission has been set up under the oversight of the ministry of women and child development with the aim to reduce anemia among young children, adolescent girls and women in reproductive age (15-49 years) by one third of NFHS-4 levels by 2022.

It is important that the most vulnerable time for the fetus is anemia in pregnancy.

1. OBJECTIVES

The present study was designed to observe the hemoglobin levels during various trimesters of pregnancy, weight gain during pregnancy and complications during pregnancy.

2. MATERIALS AND METHODS

Locale of study: The present study was carried out on pregnant women from Rohtak city of Haryana.

Sampling Procedure: Three maternity hospitals from Rohtak city were selected purposely. These hospitals were Bharat Nursing Home (Private Hospital), Civil Hospital and PGI Rohtak (Govt. Hospital). Total 120 pregnant women in their second and third trimester were selected randomly.

Development and Pretesting of Questionable: A well structured questionnaire containing questions related to socio demographic information, weight gain, complications, dietary intake and hemoglobin level was prepared. It was pretested on ten respondents using an interview method. Based on responses obtained from pretesting and difficulties faced, necessary changes were made in questionnaire to make it more functional.

Variables and Measurement:

Independent variables:

Age: The chronological age of pregnant women at the time of investigation was taken. All pregnant women were listed according to following age groups and scores were given as:

Age (years)	Scores
Below 20	1
20 to 30	2
More than 30	3

Income: The amount of money earned by the family from all sources in a month was recorded. Total income per month was divided into three categories and scores were assigned to different categories on the basis of modified Kulshrestha socioeconomic scale as given below:

Total family income/month (Rupees)	Scores
Low income	1
Middle Income	2
High Income	3

Parity: First pregnancy or multiple pregnancies were categorised as primipara and multipara respectively. Scores were given to parity. Primi para was given score 1, whereas multipara was denoted as 2.

Dependent Variables:

Hemoglobin level: Hemoglobin level in gm/100 ml of blood was recorded from OPD card of pregnant women. Scores were given as:

Hb. level (gm/100 ml)	Scores
Less than 9	1
9-10	2
11-12 and more than 12	3

Weight gain: weight from the second trimester of pregnancy till due date of delivery was recorded from the OPD card of the respondents at monthly intervals and gain in Weight was calculated. Scores assigned to different categories were as follows

Weight gain (Kg)	Scores
Less than 6	1
6-10	2
11-15	3

Data Analysis: The data was analyzed using statistical tools i.e. frequency distribution, mean and standard error.

4. RESULT AND DISCUSSION

4.1 Frequency Distribution of Pregnant women according to Hemoglobin level:

Data related to Frequency Distribution of Pregnant women according to Hemoglobin level has been presented in Table 1.

Table 1. Frequency Distribution of Pregnant women according to Hemoglobin level

Hemoglobin (gm/100ml)	Frequency (n=120)
Less than 9	42(35.0)
9-10	58(48.3)
11-12	20(16.9)

Values in parentheses indicate percentage of pregnant women

Majority (48.3%) of pregnant women were anaemic having Hb. level between 9-10gm/100 ml of blood followed by 35 percent of pregnant women had Hb. level less than 9gm/100ml. Sixteen percent of pregnant women had Hb level between 11-12 gm/100 ml. Lower level of Hb. during pregnancy was due to lesser intake of iron and folic acid.

4.1 (i) Hemoglobin level of pregnant women in relation to income groups

Data presented in Table no. 2 represents hemoglobin level of pregnant women in different income groups.

Table 2. Hemoglobin level of pregnant women in relation to income groups

Income groups	Hemoglobin level (gm/100ml) (Mean+-S.E.)
Group I	08.61 +-1.20
Group II	10.23+-0.68
Group III	09.81+-0.35

Mean hemoglobin level of pregnant women belonging to different income groups were 8.61, 10.23 and 9.81 gm/100ml. Pregnant women from middle income group had higher hemoglobin level than the other two income groups.

4.1 (ii) Hemoglobin level of pregnant women in relation to Parity

Mean hemoglobin level of pregnant women in primi grade and multigrade were 10.14 and 9.33 gm/100 ml respectively.

Table 3. Hemoglobin level of pregnant women in relation to Parity

Parity	Hemoglobin level (gm/100ml)
	Mean+-S.E.
Primi para	10.14+-0.68
Multi para	09.33+-1.12

It has been observed that hemoglobin level of pregnant women decreased with increasing parity (Table 3)

4.2 Frequency Distribution of pregnant women according to weight gain during pregnancy

Frequency Distribution of pregnant women according to weight gain during pregnancy has been summarized in Table 4. Majority (55.8%) had weight gain between 6 to 10 kg.

Table 4 Frequency Distribution of pregnant women according to weight gain during pregnancy

Weight gain (kg)	Frequency (n=120)
Less than 6	12(10.00)
6-10	67(55.80)
Above 10	41(34.16)

Values in parentheses indicate percentage of pregnant women

Whereas 34.16 percent of pregnant women had weight gain above 10 kg. Ten percent of pregnant women had weight gain less than 6 kg.

4.2 (i) Weight gain during pregnancy in relation to income groups

Mean weight gain during pregnancy in relation to income groups were 9.31, 8.53 and 9.59 kg.

Table 5 Weight gain during pregnancy in relation to income groups

Income groups	Weight gain (kg)
	Mean+-S.E.
Group I	9.31+-0.49
Group II	8.53+-1.78
Group III	9.59+-2.00

Gain in weight was higher in pregnant women belonging to higher income group.

4.2 (ii) Weight gain during pregnancy in relation to Parity

Data on mean weight gain during pregnancy has been shown in Table 6. Perusal of data in this table indicates that weight gain in respect of parity were 9.24 and 8.57 kg.

Table 6 Weight gain during pregnancy in relation to Parity

Parity	Weight gain (kg) (Mean+-S.E.)
Primi para	9.24+-0.9
Multi para	8.57+-0.7

Results revealed that as parity increases, weight gain during pregnancy decreases. Higher weight gain was observed in primi Paras.

4.3 Complications during pregnancy

Data related to complications during pregnancy has been presented in Table 7. Result revealed that 75 percent of pregnant women did not have abortion, whereas 17.5 percent of pregnant women had abortions once or twice and 4.6 percent of pregnant women had miscarriages 3 or 4 times in their reproductive age. Majority (63.3%) of pregnant women were suffering from anaemia.

Table 7 Complications during pregnancy

Complications	Frequency (n=120)
Abortion Nil	91(75.8)
Once or twice	21(17.5)
Miscarriages 3 or 4 times	7(6.6)
Anaemia	76(63.3)
Odema	38(31.6)
No complications	6(4.1)

Values in parentheses indicate percentage of pregnant women

It may be due to inadequate intake of iron, protein and folic acid, 31.6 percent of the respondents had odema on their feet and only 4.1 percent of pregnant women didn't have any complication during pregnancy. Indian diets are cereal based which contains anti nutritional factors such as tannins, phytates, saponins etc. inhibits bioavailability of nutrients i.e. iron, calcium and protein.

5. CONCLUSION

It is concluded from the present study that most of the pregnant women were suffering from anemia and having weight gain during pregnancy below average. Therefore it is recommended to increase intake of iron and folic acid i.e. green leafy vegetables, sprouted pulses, jaggery in their daily diet. Nutritional awareness programmes must be organized in society to impart nutrition education.

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