Reviewer note:

This is a consistent article, with just minor typewriting errs and stylish inconsistencies. I wrote my suggestions in the text, highlighted in yellow or in red.

Please, be consistent with non-American (anaemia, anaemic, foetus, foetal) or American spelling (anemia, anemic, fetus, fetal).

The references' numbers are not consistent. I did not format them.

The abbreviation of "litre" is "L", not "l". Be consistent with measure units: g/dL or g/mL.

Define "AVBRH"

The concept of "normal" was not fully approached by the authors. There are a lot of diseases and conditions that may interfere in the placental weight, and they were not properly described or studied. It will be more scientifically accurate to compare anaemic versus non-anaemic mothers. I change the main text, but I left the changing of the figures to the authors.

Deserves publication.

A comparative study to assess the placental weight in anaemic and non-anaemic mothers in the Indian Wharda district

ABSTRACT

Background: Despite the fact that anaemia during pregnancy is the most prevalent and significant health problem in impoverished nations, anaemia has a negative impact on the placenta and foetal development. The placenta is a growing organ that provides nutrition, oxygen, and eliminates excretory wastes for the foetus while also acting as a protective barrier throughout pregnancy. If the placenta is compromised by anaemia, it has a negative impact on the foetus's growth.

Methods and material: Quantitative Research Approach was used and a non-experimental correlational research design was used.

Result: The result of the study shows that 93% of non-anaemic mothers had an average condition of placental weight, 2% non-anaemic mothers had a good condition of placental weight while in anaemic mothers it was found that 30 percent had an average condition of placental weight, 73.3% non-anaemic mothers had an average condition of the foetal outcome, 26.7% non-anaemic mothers had a good condition of foetal outcome while in anaemic mothers it was found that 93.3% percent had an average condition of the foetal outcome, 06.7% had a good condition of foetal outcome.

Conclusion: The study concludes that there is a lack of generalization number of sample. Therefore, a study with more samples might be useful to find out the findings. Proper health education should be given to mothers to improve their knowledge regarding proper nutritional care which will prevent ~~from~~ anaemia.

(Keywords: anaemia, placental outcome, foetal outcome, intranatal)

BACKGROUND

The placenta is a feto-maternal organ made up of a maternal component: the endometrium-derived decidua basalis, and a foetal component: the chorion frondosum, which develops from the chorionic sac[1]. At full term, the human placenta consists of three parts: A) A foetal surface that is shiny, gray, and translucent enough, due to the color of the underlying maroon villous tissue; B) The maternal surface which is finely granular, mapped into 15-20 cotyledons limited by placental septum. C) The umbilical cord; insertion is usually central but may vary in some specimens like battledore/marginal, velamentous, or eccentric.[2, 3]

In different types of hypoxic stress, such as high altitude and maternal iron deficiency anaemia, the foetal vasculature of the human placenta adapts uniformly. Hypoxic conditions, such as maternal iron deficiency anaemia, cause increased capillarization of term villi. The main adaptation to hypoxia is dilatation of the capillary sinusoid, which is accompanied by thinning of the villous membrane. There is a relative hypoxia in maternal anaemia, which could be the main reason for syncytia trophoblast proliferation and syncytium thickness growth. [4]Anaemia is a medical disorder characterised by a low level of haemoglobin in the blood. It is a condition in which a person's haemoglobin concentration is lower than non-

anaemic for his or her age, gender, and environment, resulting in a reduction in the blood's oxygen-carrying capability.[5]Anaemia during pregnancy is defined as a haemoglobin concentration of less than 11 g/dL, according to the World Health Organization (WHO), which ranges from mild to severe. WHO classify anaemic pregnancy based on hemoglobin level as 10.0-10.9 g/dL (mild anaemia), 7-9.9 g/dL (moderate anaemia) and <7 g/dL (severe anaemia) (14). Pregnancy causes an increase in the iron requirement, which climbs from 2.5 mg per day in the first trimester to 6.6 mg per day in the third trimester. Women will get anaemia if demand and supply are not balanced.[6]

Anaemia is caused by a variety of factors, but iron deficiency is regarded to be the primary cause in poorer nations. The incidence of anaemia has often been utilised as an alternative for iron deficiency anaemia in Sub-Saharan Africa, where iron deficiency anaemia (IDA)[7]. Anaemia in pregnancy is most usually caused by a lack of iron or folic acid in the diet; other kinds include chronic illness anaemia, hemoglobinopathies, inherited spherocytosis, or paroxysmal nocturnal haemoglobinuria, drug-induced anaemia, and aplastic anaemia.[6] Pregnancy anaemia can be asymptomatic, and it can be detected with regular testing. The signs and symptoms are frequently nonspecific, with the most prevalent being weariness. Women may also complain of lethargy, reduced mental alertness, pallor, dyspnea, weakness, headaches, palpitations, and dizziness[(6,8)].

METHODS

A non-experimental research design was used in this study. Sixty (30 non-anaemic mothers and 30 anaemic mothers) purposively selected intranatal mothers in the Wardha district, and in this study, the purposive sampling technique was used. In June 2020, data was collected by using a structured questionnaire. During the intranatal time of a designated area, the investigator approached non-anaemic and anaemic mothers and described the goal of the study as well as how it would benefit them. She questioned about their desire to take part in the study and obtained their consent. Soon after the delivery, the placenta was collected. The weight of the placenta was checked as well as the foetal outcome, each sample required a mean time of 30 minutes to complete the placenta and foetal assessment.

The tool was validated by experts from obstetrics and gynaecological nursing, the tool was developed after the investigator updated the theoretical risk of anaemia. The investigator's own experience, theoretical knowledge, and guidance from specialists, as well as a review of literature, all contributed to the development of the tool needed for the study. A structured questionnaire was developed to determine the condition of the placenta and baby's weight

among non-anaemic as well as a mother with anaemia. English expert has revised the tools and later it is translated in the Marathi language without changing any meaning.

STATISTICAL ANALYSIS

The study was analyzed by using descriptive and inferential statistics both. The percentage-wise distribution of the intranatal mothers' demographic characteristics was estimated using descriptive statistics to describe the basic elements of the data in a study and inferential statistics to make conclusions from our data to more general conditions. Student's unpaired t-test, one-way ANOVA, Pearson's correlation coefficient, and reliability analysis were the statistical tests utilised to analyse the results.

An adequate sample was selected from the study population of 60 (30 non-anaemic and 30 anaemic mothers) subjects who were in AVBRH (???????) labour room. The information was gathered in order to classify sample characteristics such as age, parity, family, education, religion, HB%, and diet.

RESULTS

SECTION I: PERCENTAGE-WISE DISTRIBUTION OF PRIMIGRAVIDA MOTHERS ACCORDING TO THEIR DEMOGRAPHIC CHARACTERISTICS

Table.no.1 Percentage-wise distribution of primigravida mothers according to their demographic characteristics.

n=60

Demographic variables	Non-anaemic mothers		Anaemic mothers	
	Number of individuals	Percentage	Number of individuals	Percentage
Age				
18-22 years	8	26.7%	8	26.7%
23-27 years	10	33.3%	8	26.7%
28-32 years	10	33.3%	8	26.7%
33- 37 years	2	6.7%	6	20.0%
Parity				

Primigravida	10	33.3%	8	26.7%
Multipara	20	66.7%	22	73.3%
Family				
Joint	12	40%	8	26.7%
Nuclear	18	60%	22	26.7%
Education				
Primary school	2	6.7%	0	0.0%
Middle school	14	46.7%	12	40.0%
High school	8	26.7%	10	33.3%
Higher secondary school	4	13.3%	8	26.7%
Graduate	2	6.7%	0	0%
Religion				
Hindu	26	86.7%	28	93.3%
Muslim	4	13.3%	2	6.7%
Christian	0	0%	0	0%
Buddhist	0	0%	0	0%
Haemoglobin g/dL				
8-10 g/dL	0	0%	17	56.7%
11-13 g/dL	28	93.3%	13	43.3%
≥ 14 g/dL	02	06.7%	0	0%
Diet				
Vegetarian	22	73.3%	28	93.3%
Mixed	8	26.7%	2	6.7%

The above table shows that according to age group, among non-anaemic mothers, 26.7 % belong to the range of 18-22 years of age; 33.3% belong to the range of 23-27 years of age; 33.3% belong to the range of 28-32 years of age, and 6.7% belongs to 33-37% years of age. While in anaemic mothers, 26.7 % belong to the range of 18-22 years of age; 26.7% belong to the range of 23-27 years; 26.7% belong to the range of 28-32 years of age and 20% belong to the range of 33-37years of age.

According to parity in non-anaemic mothers, 33.3% belong to the primigravida group; 66.7% belong to the multipara group. While in anaemic mothers 26.7% belong to the primigravida group; 73.3% belong to the multipara group.

According to the family in non-anaemic mothers, 40% belong to the joint family group, 60% belong to the nuclear family group. While in anaemic mothers, 26.7% belong to the joint family group; 26.7% belong to the nuclear family group.

According to education in non-anaemic mothers, 6.7% belong to the primary school group; 46.7% belong to the middle school group; 26.7% belong to the high school group; 13.3% belong to the higher secondary school group, and 6.7% belong to the graduate group. While in anaemic mothers, none of them belongs to the primary school group; 40% belong to the middle school group; 33.3% belong to the high school group; 26.7% belong to the higher secondary school group, and none of them belongs to the graduate group.

According to religion in non-anaemic mothers, 86.7% belong to the Hindu religious group; 13.3% belong to the Muslim religious group, and none of them belongs to the Christian and Buddhist religious groups. While in anaemic mothers, 93.3 belong to the Hindu religious group; 6.7% belong to the Muslim religious group, and none of them belongs to the Christian and Buddhist religious groups. According to the haemoglobin titers, in non-anaemic mothers, none of them was in the 8-10 g/dL range group; 93.3% were in the 11-13 g/dL range group, and 6.7% were in the ≥ 14 g/dL range group. While in anaemic mothers, 56.7% were in the 8-10 g/dL range group; 43.3% were in the 11-13 g/dL range group, and none of them was in the ≥ 14 g/dL range group. According to diet, of the non-anaemic mothers, 73.3% were in the vegetarian diet group, and 26.7% were in the unrestricted diet group. While of the anaemic mothers, 93.3% were in the vegetarian diet group, and 6.7% were in the unrestricted diet group.

SECTION II: ASSESSMENT OF PLACENTAL WEIGHT AND FOETAL OUTCOME IN NON-ANAEMIC MOTHERS AND ANAEMIC MOTHERS

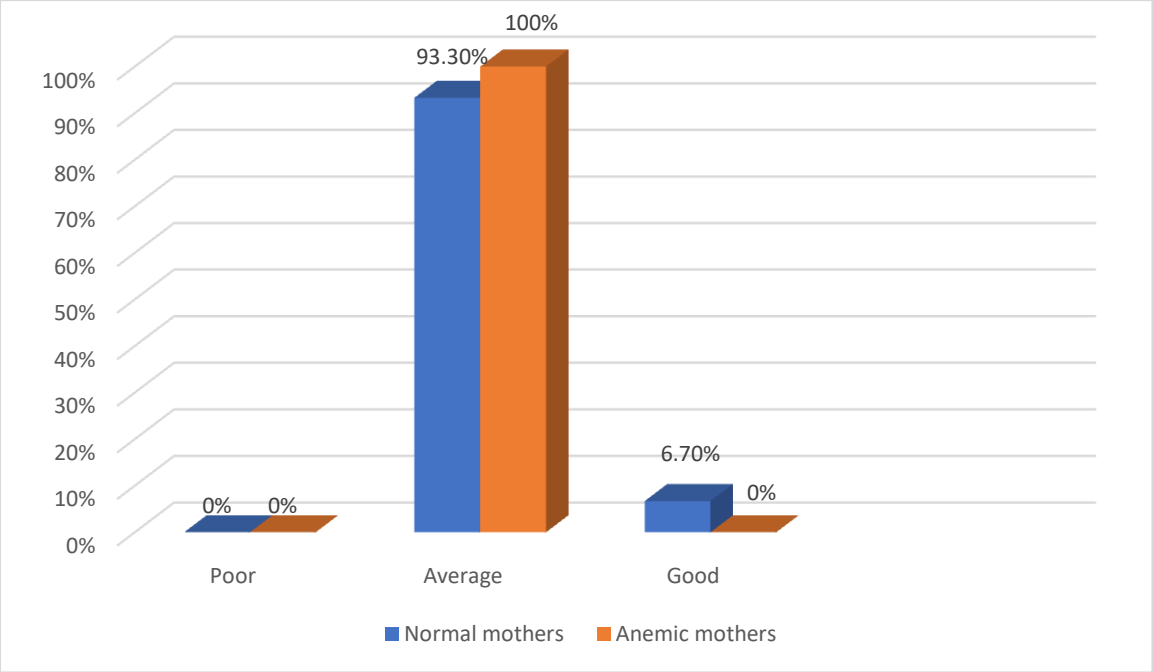
Table no.2.1:Assessment of placental weight in non-anaemic mothers and anaemic mothers.

n=60

Condition of placental weight	Non-anaemic mothers		Anaemic mothers	
	Number of individuals	Percentage	Number of individuals	Percentage

Poor	0	0%	0	0%
Average	28	93.3%	30	100%
Good	2	6.7%	0	0%
Minimum score	15		11	
Maximum score	21		20	
Mean score	17.80 ± 1.540		16.23 ± 2.661	

The assessment of placental weight shows that 93% of the non-anaemic mothers had the average condition of placental weight, while 2 % of the non-anaemic mothers had a good condition of placental weight. The score of the minimum was 15 and the maximum was 21, with a mean score of 17.80 while the standard deviation was 1.540 in non-anaemic mothers. While in anaemic mothers it was found that 30% had an average condition of placental weight. The minimum score found was 11 and the maximum score found was 20, the mean score was 16.23 while the standard deviation was 2.661 in anaemic mothers.



Graph no.1. Assessment of placental weight in non-anaemic mothers and anaemic mothers.

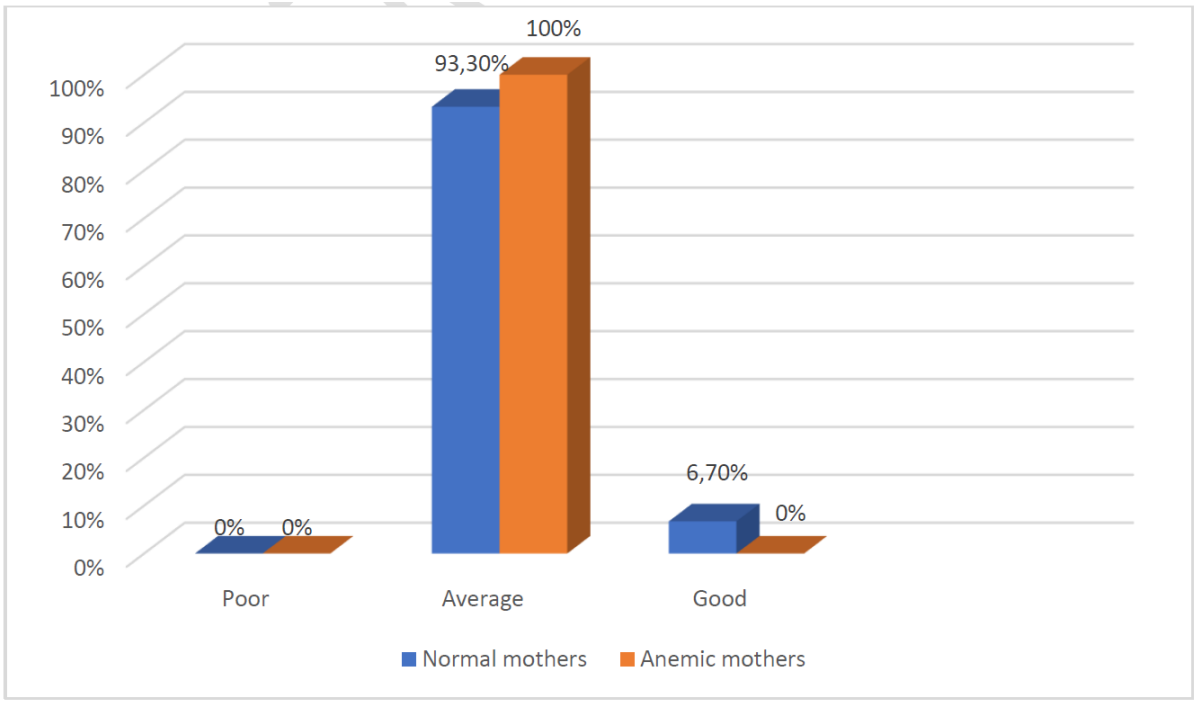
ASSESSMENT OF FOETAL OUTCOME IN NON-ANAEMIC MOTHERS AND ANAEMIC MOTHERS

Table.no.2.2Assessment of foetal outcome in non-anaemic mothers and anaemic mothers.

n=60

Condition of foetal outcome	Non-anaemic mothers		Anaemic mothers	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Weight of the baby				
Poor	0	0%	0	0%
Average	22	73.3%	28	93.3%
Good	08	26.7%	02	06.7%
Minimum score	06		06	
Maximum score	13		11	
Mean score	9.53 ± 1.525		8.47 ± 1.279	

The assessment of foetal weight shows that 73.3% of non-anaemic mothers had an average condition of the foetal outcome, while 26.7% of the non-anaemic mothers had a good condition of foetal outcome. The score of the minimum was 6 and the maximum was 13, with a mean score of 9.53; the standard deviation was 1.525 in non-anaemic mothers. While in anaemic mothers it was found that 93.3% of them had an average condition of the foetal outcome, while 6.7% had a good condition of foetal outcome. The minimum score found was 6 and the maximum score found was 11, the mean score was 8.47 while the standard deviation was 1.279 in anaemic others.



Graph no.2.Assessment of foetal outcome in non-anaemic mothers and anaemic mothers.

SECTION-III: COMPARISON OF THE PLACENTAL WEIGHT AND FOETAL OUTCOME IN ANAEMIC AND NON-ANAEMIC MOTHERS

Table 3.1 Comparison of the placental weight in non-anaemic and anaemic mothers.

n=60

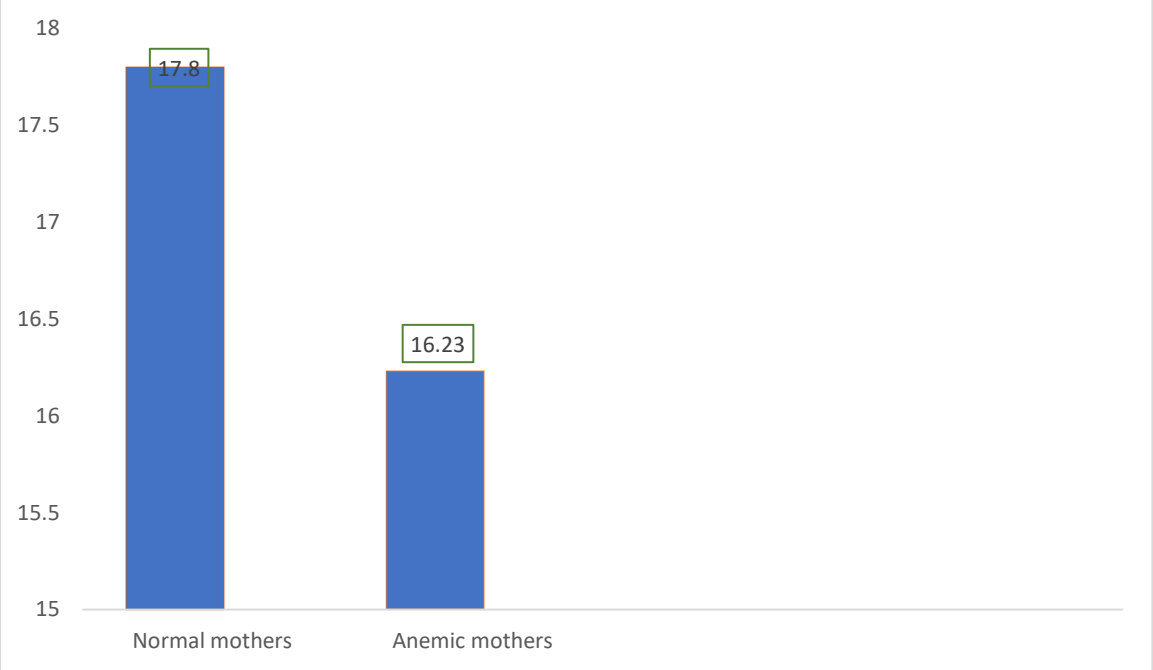
	Mean	Frequency	Std. deviation	df	t value	p-value
Non-anaemic mothers	17.80	30	1.540	29	2.987	.006< 0.05 S
Anaemic mothers	16.23	30	2.661			

Table 3.2 Comparison of the foetal outcome in non-anaemic and anaemic mothers.

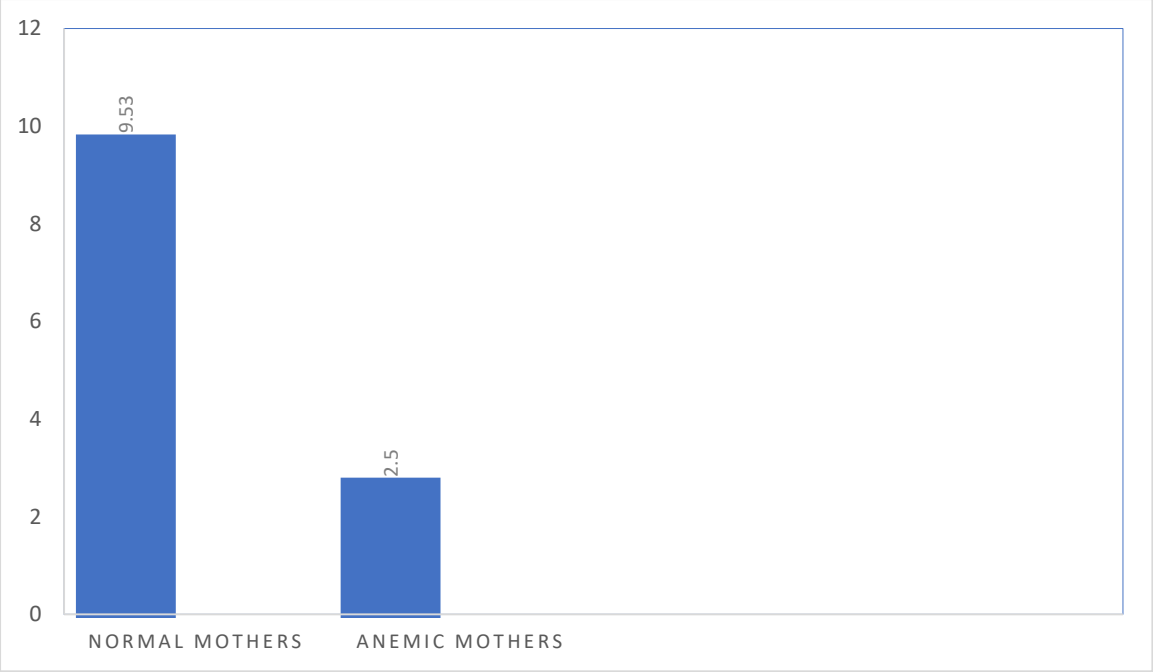
n=60

	Mean	Frequency	Std. deviation	df	t value	p-value
Non-anaemic mothers	9.53	30	1.525	29	2.605	.014< 0.05 S
Anaemic mothers	8.47	30	1.279			

Table 3.1 shows that the mean score of the placental weight of non-anaemic mothers is 17.80, while the mean score of the anaemic mothers is 16.23; the standard deviation for non-anaemic mothers is 1.540 and the standard deviation for anaemic mothers is 2.661; the degree of freedom was 29 and the p-value found was 0.006 which is less than the significative 0.05 p-value. Table 3.2 demonstrates the comparison of the foetal outcome in non-anaemic and anaemic mothers groups. The mean score of the placental weight of non-anaemic mothers group was 9.53, while in the anaemic mothers' group was 8.47; the standard deviation for the non-anaemic mothers' group was 1.525; in the anaemic mothers' group the standard deviation was 1.279; the degree of freedom found was 29 and the p-value found was 0.014 which is less than the significative p-value 0.05; hence the alternative hypothesis (H1) is accepted, i.e. that there is a significative difference in placental weight of non-anaemic mothers and anaemic mothers.



Graph no.3.1Comparison of the placental weight in non-anaemic and anaemic mothers.



Graph no.3.2 Comparison of the foetal outcome in non-anaemic and anaemic mothers.

DISCUSSION

In the present study, the assessment of placental weight showed that 93% of non-anaemic mothers had an average condition of placental weight while 2% of the non-anaemic mothers had a good condition of placental weight. The score of the minimum was 15 and the maximum was 21, with a mean score of 17.8 while the standard deviation was 1.54 in non-anaemic mothers. While in anaemic mothers it was found that 30% had an average condition of placental weight. The minimum score found was 11 and the maximum score found was 20, the mean score was 16.23 while the standard deviation was 2.661 in anaemic mothers.

An assessment of foetal weight showed that 73.3% of the non-anaemic mothers had an average condition of foetal outcome while 26.7% of the non-anaemic mothers had a good condition of foetal outcome. The minimum was 6 and the maximum was 13, with a mean score of 9.53 while the standard deviation was 1.525 in non-anaemic mothers. While in anaemic mothers it was found that 93.3% had an average condition of the foetal outcome, while, 6.7% had a good condition of foetal outcome. The score of the minimum was 6 and the maximum was 11 with the mean score of 8.47 while the standard deviation was 1.279 in anaemic mothers.

In comparison, the mean score of the foetal weight of non-anaemic mothers was 17.80 while in the anaemic mothers was 16.23; the standard deviation for non-anaemic mothers was 1.54

and the standard deviation for anaemic mothers was 2.661; the degree of freedom was 29 and the p-value was 0.006 which is less than the significative p-value of 0.05. Table 3.2 states the comparison of the foetal outcome in non-anaemic and anaemic mothers. The mean score of non-anaemic mothers was 9.53 while the mean score of anaemic mothers was 8.47; the standard deviation for non-anaemic mothers was 1.525 and in anaemic-mothers, the standard deviation was 1.279; the degree of freedom found was 29 and the p-value found is 0.014 which is less than the significative p-value of 0.05. Hence the alternative hypothesis (H1) is accepted that there may be a significant difference in foetal outcome in non-anaemic mothers and anaemic mothers.

A similar study was conducted to determine the effect of maternal anaemia on the placenta and newborn. The sample of a total of 69 anaemic mothers (Hb < 11 g/dL) and 16 mothers without anaemia (Hb > 11 g/dL) was studied foetal birth weight, placental morphometry. The result shows that the birth weight, placental weight, and the number of cotyledons were significantly severely reduced in severe anaemic mothers (Hb ≤ 6 g/dL) and had a direct relationship with maternal haemoglobin level However, placental volume and surface area showed no constant relation to maternal haemoglobin. The haemoglobin and iron levels in the cord blood and placental tissue were found to have linear correlations with the maternal haemoglobin levels. The low levels of placental and cord serum iron in the severely anaemic mothers suggest that iron supply to the placenta and the foetus is affected in maternal anaemia and the foetus takes iron in direct proportion to the levels available in the mother. This study concluded that maternal anaemia affects the placenta and newborn.[9]

A similar study was conducted on assessment of placental weight, newborn birth weight in non-anaemic pregnant women and anaemic pregnant women: a correlation and comparative study. This study showed that the mean placental weight in 30 non-anaemic pregnant women was 521g. The mean placental weight in anaemic pregnant women was 553g. There was statistically no difference in placental weight in both groups. The mean birth weight in 30 non-anaemic pregnant women was 3,152g. The mean placental weight in mild, moderate and severe anaemic pregnant women was 3,100g; 2,800g; and 2.930g, respectively. There was a positive correlation between the placental weight and the baby's weight at a p-value 0.05 level of significance.[10]

A similar study was conducted on a comparative study to assess the foetal and placental outcome among anaemic and non-anaemic mothers of a selected hospital of district Mohali,

Punjab, India. The study showed that out of 100 mothers, 74% of the anaemic mothers were in the age group of 21-30 years and that 86% of the non-anaemic mothers were in the age group of 21-30 years. Sixty-six of the anaemic mothers were in a joint family and that 52% were in a nuclear family. In the non-anaemic group, 71% were in a nuclear family. Most of the anaemic mothers (48%) had a 5,001-10,000 (DOLLARS????/Year???) familiar income and in non-anaemic mothers, 66% had 5,001-10,000 familiar income. About 44% of anaemic mothers had Sikh religion and in non-anaemic 58% also belonged to the Sikh religion. About 46% of anaemic mothers had primary education and 32% of non-anaemic mothers had secondary education. About 78% of anaemic mothers and 66% of non-anaemic mothers were homemakers. About 54% of anaemic mothers were vegetarian and 66% of non-anaemic mothers were on a non-restricted diet. About 58% of anaemic mothers were from rural and 60% of non-anaemic mothers were from urban area. About 28% of anaemic mothers and 72% of non-anaemic mothers had good foetal outcomes. About 68% of anaemic mothers and 32% of non-anaemic mothers had poor foetal outcomes. About 18.0% of anaemic mothers and 82% of non-anaemic mothers had good placental outcomes. About 46.0% of anaemic mothers and 54% of non-anaemic mothers had poor placental outcomes. The $\chi 2$ value showed that there was statistically no significant association with demographic variables of anaemic and non-anaemic mothers.[11]

The present study revealed that proper health education should be given to mothers to improve their knowledge regarding proper nutritional care which will prevent from anaemia.

CONCLUSION

The study concludes with the following result that placental weight shows that 93% of non-anaemic mothers had an average condition of placental weight, while 2% of non-anaemic mothers had a good condition of placental weight. While in anaemic mothers it was found that 30% had an average condition of placental weight. The foetal weight shows that 73.3% of non-anaemic mothers had an average condition of foetal outcome while 26.7% non-anaemic mothers had a good condition of foetal outcome. While in anaemic mothers it was found that 93.3% had an average condition of the foetal outcome, while, 6.7% had a good condition of foetal outcome. The study concludes that there is a lack of generalization number of sample. Therefore, a study with more samples might be useful to find out the findings. Proper health education should be given to mothers to improve their knowledge regarding proper nutritional care which will prevent from anaemia.

BIBLIOGRAPHY

1. Moore KL, Persaud TVN, Torchia MG. The Developing Human Clinically OrientedEmbryology. 8th ed: Else Health Sc;// Saunders, 2008.
2. Elangovan M, Raviraj, K. Analysis of Morphology and Morphometry of Human Placenta andIts Clinical Relevance. IJIR. 2016;2(8):1532-4.
3. Ashfaq M, Janjua MZ, Channa MA. Effect of gestational diabetes and maternal hypertension gross morphology of placenta. J Ayub Med Coll Abbottabad. 2005;17(1):44-7.
4. Burton G, Reshetnikova O, Milovanov A, Teleshova O. Stereological evaluation of vascular adaptations in human placental villi to differing forms of hypoxic stress. Placenta.1996;17(1):49-55.
5. World Health Organization. Iron deficiency anaemia. assessment, prevention, and control. A guide for program managers. Geneva, Switzerland: World Health Organization; 2001. p. 47-62.
6. Jahan T, Ishaq M, Siddiq A. Anaemia in Pregnant Women; Prevalence in Ibn-e-Siena HospitalMultan. Prof Med J. 2017;24(5): 675-9.
7. World Health Organization. Focusing on anaemia: towards an integrated approach for effective anaemia control. Joint statement by the World Health Organization and the United Nations Children's Fund. Geneva: WHO. 2004.
8. Sabina S, Iftequar S, Zaheer Z, Khan MM, Khan S. An overview of anaemia in pregnancy. JInnov Pharm Biol Sci. 2015;2(2):144-51

9. P N Singla, S Chand, S Khanna, K N Agarwal. Effect of maternal anaemia on the placenta and newborn. 1978 Sep;67(5):645-8.
10. Kaur Daljeet, kaur Bhupinder, LajyaGoyal. Assessment of Placental Weight, Newborn Birth Weight in Non-anaemic Pregnant Women and Anaemic Pregnant Women: A Correlation and Comparative Study. Indian-Journal-of-Public-Health-Research-and-Development-0976-5506.
11. A. Sharma, M.Lal, P.Dangar. A Comparative Study to Assess the Foetal and Placental Outcome among Anaemic and Non-Anaemic Mothers of Selected Hospital of District Mohali, Punjab, India. Published 2017Medicine. International Journal of Current Microbiology and Applied Sciences.