

A Comparative Study to Assess the Relationship of Placental Weight and Fetal Outcome among Normal and Anemic Mothers Admitted in Tertiary Care Hospital Karad

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Abstract

Severe anemia during pregnancy is a potentially hazardous hematological disorder. According to a World Health Organization (WHO) report the global prevalence of anemia among pregnant women is 55.9%. In India, the highest prevalence of moderate anemia was found in Nagaon District (82.7%) noted by G. S. Toteja et al., in 2006. The present study was aimed to assess the relationship of placental weight and fetal outcome among normal and anemic delivered mothers. The objectives of the study are to assess and compare placental weight and fetal outcome among normal and anemic delivered mothers and to find an association between placental weight and fetal outcome with selected demographic variables in both groups. Quantitative research approach and comparative, descriptive design was used for the study. The study was conducted at Krishna hospital Karad by using Purposive sampling technique on 62 normal and 62 anemic mothers. Descriptive and inferential statistics were used for analysis. Results shows that unpaired t test revealed that mean placental weight of anemic mothers was significantly higher than of normal mothers ($p < 0.05$). Mean fetal weight of babies delivered to normal mothers was significantly higher than the babies delivered to anemic mothers ($p < 0.05$) and length of babies delivered to normal mothers was significantly higher than babies delivered to anemic mothers ($p < 0.05$). There was significant association was found between placental weight of normal mothers and monthly income of family, ($p < 0.05$). The study concludes that correlation between placental weight and birth weight of babies shows significant difference with a positive correlation in both the groups. This means as the placental weight increases the birth weight also increases and vice-versa.

Keywords: Anemic Mother, Assess Placental Weight, Fetal Outcome, Fetal Weight

1. Introduction

Anemia during pregnancy is most common and considerable health problem in developing countries and it is largely preventable and easily treatable if detected in time. Anemia still continues to be a common cause of mortality and morbidity in India. Anemia depends on some factors like socioeconomic status, dietary habit, and lifestyle, communicable and non communicable diseases¹.

Anemia affects placenta and fetal outcome dreadfully. Placenta is a developing organ during pregnancy for providing nutrition, oxygen supply for the fetus and to eliminate excretory wastes, acts as protective barrier. If the placenta has got affected due to anemia it adversely affects for the growth of the fetus. Hence a good fetal outcome depends on mothers' health and her diet during antenatal period².

Anemia is a pathological condition which leads to

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loss of placental weight and poor perinatal outcome and it is major public health problem throughout the world. The World Health Organization (WHO) reports estimated that 56 million live in developing countries the most severely affected area is South Asia where as 89% of pregnant women are anemic in India. Anemia is responsible for 12-28% of fetal loss, 30% perinatal death, and 7-10 % of fetal death³.

Severe anemia during pregnancy is a potentially hazardous hematological disorder. It is associated with late abortions, prematurity, low birth weight and stillbirths⁴ the sum of which is increased perinatal loss. According to a World Health Organization (WHO) report the global prevalence of anemia among pregnant women is 55.9%. Anemia in pregnancy is observed more frequently in developing countries. The prevalence of anaemia in South East Asia is around 56%. In India the incidence of anemia in pregnancy has been noted as 40-80%⁵. The proportion of maternal deaths due to anemia has been estimated in India about 16%⁶. It also increases the maternal, fetal mortality and morbidity significantly⁷.

The prevalence of anemia among pregnant women and lactating mothers at Maharashtra state is 76% and 73%⁸. The prevalence of anemia at Satara district was 45.3%⁹. At Karadataluka percentage of anemia was 43.4 with more prevalence of moderate anemia in 2nd and 3rd trimester¹⁰. The problem statement of this work- A comparative study to assess the relationship of placental weight and fetal outcome among normal and anemic mothers admitted in tertiary care hospital Karad, Maharashtra, India. Based on the above task we framed the below two objectives.

- To assess and compare placental weight and fetal outcome among normal and anemic delivered mothers.
- To find an association between placental weight and fetal outcome with selected demographic variables in both groups.

2. Materials and Method

Quantitative research approach and comparative, descriptive design was used for the study. The dependent variable was placental weight, and independent variable was fetal outcome (birth weight, fetal length, head circumference). The study was conducted at Krishna

Hospital, Karad, Satara district, Maharashtra, India on 124 delivered mothers (group one 62 mothers Hb>11 gm/dl and group two 62 mothers Hb<11gm/dl.) by using convenient sampling technique. The sample size was calculated as:

$$n = \frac{(SD_1^2 + SD_2^2) (1.96 + 1.645)^2}{(X_1 - X_2)^2} = 62 \text{ in Group 1 \& 62 in Group 2}$$

The tool was prepared after extensive review of literature and with help of experts to assess the relationship of placental weight and fetal outcome among normal and anemic delivered mothers. The research tool consist of two part

Part A: Performa for collecting socio-demographic data

Part B: Standard electronic weight machine, tap measure and Performa to collect maternal and fetal variables.

3. Method of Data collection

Official permission to conduct the study was obtained from the Medical Director, Krishna Hospital and Medical Research Center Karad. Informed consent was obtained from the each subject before collecting data by explaining the purpose of conducting the study and after considering the inclusion and exclusion criteria.

4. Plan for Data Analysis

The data were analyzed in the term of objective of the study by using descriptive and inferential statistics.

5. Results

Normal mothers 36(58.1%) of them were between age 24-29 yrs, 60(96.8%) from Hindu religion, 37(59.7%) from nuclear family, 49(79%) were consuming mixed type of diet, 16(25.8%) were having monthly family income between Rs.11,000 to 15,000 and majority 33(53.2%) were primipara. From anemic mothers 30(48.4%) of them were between age 24-29yrs, 56(90.3%) from Hindu religion, 41(66.1%) from nuclear family, 47(75.8%) were consuming mixed type of diet, 21(33.9%) were having monthly family income between Rs. 11,000 to 15,000 and majority 33(53.2%) were primipara.

Table 1. Distribution of mothers according to demographic variables in both groups N=102

Demographic variables	Normal Mothers Hb \geq 11 gm/dl		Anemic Mothers Hb< 11 gm/dl	
	No	Percentage	No	Percentage
Age in years				
18-23	20	32.3	27	43.5
24-29	36	58.1	30	48.4
>30	6	9.7	5	8.1
Religion				
Hindu	60	96.8	56	90.3
Muslim	2	3.2	6	9.7
Type of family				
Joint Family	25	40.3	21	33.9
Nuclear Family	37	59.7	41	66.1
Type of diet				
Mixed	49	79	47	75.8
Vegetarian	13	21	15	24.2
Monthly family income				
<4000- Lower	2	3.2	1	1.6
5,000 to 10,000 -Lower middle	12	19.4	14	22.6
11,000 to 15,000-Middle	16	25.8	21	33.9
16,000 to 25,000- Upper	14	22.6	14	22.6
26,000 to 29,000-Upper middle	11	17.7	8	12.9
>29,000	7	11.3	4	6.5
Parity				
Primipara	33	53.2	33	53.2
Multipara	29	46.8	29	46.8

Table 2. Mean, SD, t and p value of maternal variables in Both the Groups N=102

Variables	Normal Mothers Hb \geq 11 gm/dl		Anemic Mothers Hb<11 gm/dl		t value	p value
	Mean	SD	Mean	SD		
Placental weight (gm)	459.4	74.8	512.8	89.8	3.6	0.001
Fetal weight (kg)	2.84	0.45	2.48	0.47	4.22	0.001
Fetal length (cm)	51.15	2.7	49.21	1.87	4.63	0.001
Head circumference (cm)	32	2.13	31.4	2.23	1.52	0.13
Gestational age at delivery(wks)	39.02	1.78	38.7	1.63	1.06	0.29

The mean placental weight of anemic mothers was significantly higher than normal mothers ($p<0.05$). The mean fetal weight of babies delivered to normal mothers was significantly higher than babies delivered to anemic mothers ($p<0.05$). The mean fetal length of babies

delivered to normal mothers was significantly higher than babies delivered to anemic mothers ($p<0.05$). There was no significant difference between GA at delivery (weeks) and mean head circumference of babies delivered and to anemic mothers and normal mothers ($p>0.05$).

Table 3. Correlation between placental weight and birth weight of babies N=102

Birth weight	Normal Mothers Hb \geq 11 gm/dl				Anemic Mothers Hb<11 gm/dl			
	LBW(<2500 gm)		NBW(\geq 2500 gm)		LBW(<2500 gm)		NBW(\geq 2500 gm)	
Mean \pm SD	436.67 \pm 65.07		466.59 \pm 76.89		492.43 \pm 88.74		539.26 \pm 85.57	
Unpaired t test	t = 1.48, p=0.15				t = 2.10, p=0.04*			
Placental Weight	No	%	No	%	No	%	No	%
\leq 500 gm	12	80	36	76.5	19	54.2	10	37.1
> 500 gm	3	20	11	23.5	16	45.8	17	62.9
Total	15	24.2	47	75.8	35	56.4	27	43.6
Chi square test	$\chi^2 = 0.07, p=0.78$				$\chi^2 = 1.82, p= 0.18$			

Normal Mothers- The mean placental weight of non anemic mothers delivered NBW babies was significantly higher than mean placental weight of non anemic mothers delivered LBW babies ($t = 1.48, p = 0.15$). There was no association between placental weight and birth weight of babies ($<2500 \text{ gm LBW}, \geq 2500 \text{ gm NBW}$) born to non anemic mothers ($p>0.05$).

Anemic Mothers- The mean placental weight of anemic mothers delivered NBW babies was significantly higher than mean placental weight of anemic mothers delivered LBW babies ($t = 2.10, p = 0.04$). There was no association between placental weight and birth weight of babies ($<2500 \text{ gm LBW}, \geq 2500 \text{ gm NBW}$) born to anemic mothers ($p>0.05$).

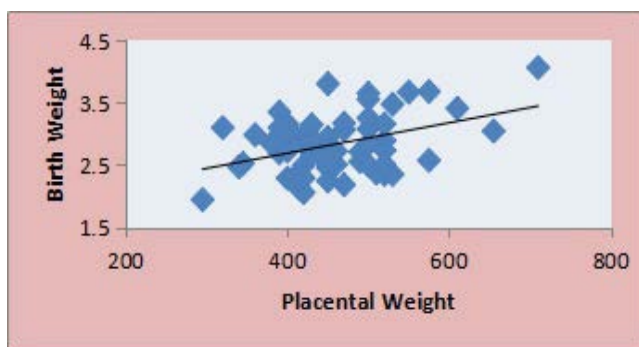


Figure 1. Correlation between placental weight and birth weight of normal mothers.

There was significant correlation between placental weight and birth weight of babies born to normal mothers ($r = 0.40, P < 0.05$) with a positive correlation in the scatter diagram. This means as the placental weight increases the birth weight also increases and vice-versa.

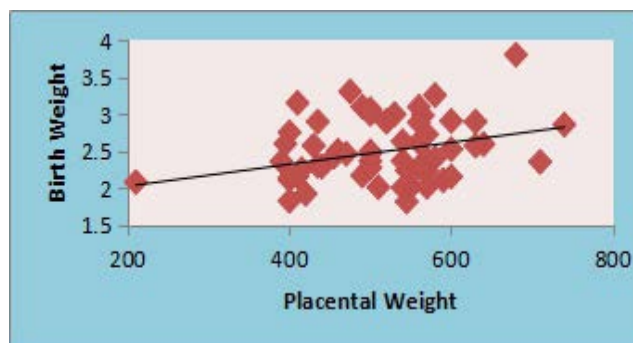


Figure 2. Correlation between placental weight and birth weight for anemic mothers.

There was significant correlation between placental weight and birth weight of babies born to anemic mothers ($r = 0.28, P < 0.05$) with a positive correlation in the scatter diagram. This means as the placental weight increases the birth weight also increases and vice-versa.

There was no correlation between Placental Weight and Fetal Length of babies born to non anemic and anemic mothers. ($p>0.05$).

Table 4. Correlation between placental weight and fetal length N=102

Fetal Length	Normal Mothers Hb \geq 11 gm/dl				Anemic Mothers Hb $<$ 11 gm/dl			
	≤ 50		> 50		≤ 50		> 50	
Mean \pm SD	457.86 \pm 75.09		460.59 \pm 75.69		509.54 \pm 88.79		535 \pm 99.42	
Unpaired t test	t= 0.14, p=0.89				t= 0.69, p=0.51			
Placental Weight	No	%	No	%	No	%	No	%
$\leq 500 \text{ gm}$	21	75	27	79.4	25	46.3	4	50
$> 500 \text{ gm}$	7	25	7	20.6	29	53.7	4	50
Total	28	45.1	34	54.9	54	87.1	8	12.9
Chi square test	$\chi^2 = 0.17, p=0.68$				$\chi^2 = 0.03, p= 0.85$			

Table 5. Correlation between placental weight and head circumference N=102

Head Circumference	Normal Mothers Hb \geq 11 gm/dl				Anemic Mothers Hb $<$ 11 gm/dl			
	≤ 34		> 34		≤ 34		> 34	
Mean \pm SD	446.79 \pm 62.92		533.33 \pm 98.71		505.70 \pm 75.41		594 \pm 108.59	
Unpaired t test	t= 2.54, p=0.03*				t= 1.77, p=0.14			
Placental Weight	No	%	No	%	No	%	No	%
$\leq 500 \text{ gms}$	53	100	0	0	57	100	0	0
$> 500 \text{ gms}$	0	0	9	100	0	0	5	100
Total	53	85.5	9	14.5	57	91.9	5	8.1
Chi square test	$\chi^2 = 6.55, p= 0.01^*$				$\chi^2 = 157, p= 0.21$			

Normal Mothers - There was association between placental weight and head circumference of babies born to normal mothers. The babies having placental weight ≤ 500 gm were having significantly lower head circumference ≤ 34 ($p = 0.01$).

Anemic Mothers - There was no association between placental weight and head circumference of babies born to anemic mothers ($p > 0.05$).

Association between Demographic Variables and Placental weight - There was significant association was found between placental weight of non anemic mothers and monthly family income ($p < 0.001$) and there was no significant association found between other demographic variables and placental weight. There was no significant association was found between placental weights with demographic variables of anemic mothers.

6. Discussion

In the present study the mean placental weight of anemic mothers (512.8 gms) was significantly higher than mean placental weight of normal mothers (459.4 gms) ($p < 0.05$). Placental hypertrophy could occur because the mother suffering from anemia, still it was considered as normal category. The similar findings were noted by Sitti Patimah et al., at Indonesia researcher found that the average of placental weight was 587 g, it was still considered in the normal category. Another researcher Adebami OJ et al., in South western Nigeria reported that an average placenta weight was 565.2g¹¹. The placenta weight disproportionately (placental hypertrophy), indicated the possibility of an adaptive response to bad intrauterine environment. Placental hypertrophy could occur because the mother suffering from anemia, smoking or exposure to cigarette smoke, and low socioeconomic status.

In the present study the mean fetal weight of babies delivered to normal mothers was significantly higher than mean fetal weight of babies delivered to anemic mothers ($p < 0.05$). The similar findings were noted by Sitti Patimah et al., at Indonesia researcher found that placental weight correlated with birth weight infants significantly. In another study by Thame et al.,¹² and Salafia et al.,¹³ noted that placental size was correlated with birth size. Many studies in Norway shown that more than 200,000 births reported the Medical Birth Registry of Norway showed a placental weight relationship with

birth weight¹⁴ In another study conducted by Asgharnia et al.,¹⁵ and Risnes et al.,¹⁶ that there was a relationship of placental weight to birth weight infants ($p < 0.0001$, and $p = 0.001$), as well as the results Alwasel et al.,¹⁷ noted that placental weight correlated with birth weight ($r = 0.34$). Baby were born with placental weight (≥ 500 g) had an average birth weight higher 472 g than birth weight baby with light placenta.

Mean fetal length of normal mothers (51.15 cm) was significantly higher than mean fetal length of anemic mothers (49.21) ($p < 0.05$). The similar findings were noted by Sitti Patimah et al., at Indonesia researcher found that the average of body length of a baby's soon after birth showed 1.2 cm taller than baby born with mild placenta (< 500 g). It showed that placental weight had a significant role to the growth of the fetus¹⁸.

7. Conclusion

- There was correlation between placental weight and birth weight of babies born to non anemic and anemic mothers and shows significant difference with a positive correlation.
- The significant association was found between placental weight and income of family of normal mothers, ($p < 0.05$).

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