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Effect of Maternal Anaemia on Neonatal Anthropometry: A Cross Sectional Study

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ABSTRACT

Introduction: As per the WHO, hemoglobin of less than 11g in Pregnancy is considered as Anemia.This study was designed to study the effect of maternal anemia on neonatal anthropometry.

Materials and Methods:A cross sectional study was conducted at a tertiary care hospital in Karnataka with an objective to find the effect of maternal anaemia on neonatal anthropometry. The inclusion Criteria was term mothers aged between 18-35 years with singleton gestation and having anaemia as per WHO definition. The mothers with medical conditions except anaemia like TORCH infection, smokers, alcoholics, known diabetes mellitus and hypertension before pregnancy, Haemoglobinopathies and who received blood transfusion were excluded. Under aseptic precautions, 5ml peripheral vein-puncture blood sample was collected from the pregnant mothers and haemoglobin was estimated. Birth weight ,Length and head circumference were measured using a non-stretchable tape.

Results :A total of 120 term mothers and neonates were included. 60 mothers were in anemic group and 60 were in non-anemic group. On comparing of various neonatal anthropometries with babies born to anemic and non-anemic mothers, it was found that the maternal anemia had statistically significant effect on birth weight, length and mid arm circumference of the neonates. They were significantly lower in babies born to anemic mothers than in babies born to non-anemic mothers.

Conclusion: The present study concludes that the maternal anemia had statistically significant effect on birth weight, length and mid arm circumference of the neonates. Hence appropriate intervention can prevent the deleterious effect of anemia on neonatal growth..

Keywords: *Maternal, Anaemia, Neonatal, Anthropometry*.

1. INTRODUCTION

As per the WHO, hemoglobin of less than 11g in Pregnancy is considered as Anemia.[1] The incidence of anemia in pregnancy is as high as 40%.[2] Although anemia is thought to be a common disorder of pregnancy, it has detrimental effects on fetal outcomes.[3] Birth weight and other neonatal anthropometry are reliable and sensitive indicators of neonatal health.[4] Maternal nutritional deficiency causes disruption of exchanges at fetoplacental unit which leads to micronutrients deficiency in fetus.[5] Hence maternal anemia is an important determinant of pregnancy outcomes affecting the fetal growth.[6] Adverse pregnancy outcomes like still birth, small for gestational age and low birth weight have been reported with maternal anemia.[7]

Hence this study was designed to study the effect of maternal anemia on neonatal anthropometry mainly focusing on birth weight, birth length, head circumference and chest circumference at birth

2. MATERIALS AND METHODS

A cross sectional study was conducted at a tertiary care hospital in Karnataka with an objective to find the effect of maternal anaemia on neonatal anthropometry. The ethical clearance was obtained prior to the study. The inclusion Criteria was term mothers aged between 18-35 years with singleton gestation and having anaemia as per WHO definition.[8] The mothers with medical conditions except anaemia like TORCH (T)oxoplasmosis, (O)ther Agents, (R)ubella, (C)ytomegalovirus, and (H)erpes Simplex infection or smokers or alcoholics or known diabetes mellitus and hypertension before pregnancy, diagnosed renal or heart disease, connective tissue disease and Haemoglobinopathies (e.g. Thalassemia) were excluded. Mothers who received blood transfusion during the current pregnancy were also excluded. Babies born with skeletal deformities or any other congenital malformations at birth were also excluded from the study. Mothers and Babies who fulfilled the inclusion criteria was chosen and written informed consent was taken prior to the study. Detailed history was recorded. Enrolled mothers gravida and inter-pregnancy interval was asked. They were divided into primigravida and multigravida, and a child spacing of 3 years wad considered adequate. Under aseptic precautions, 5ml peripheral vein-puncture blood samples was collected from the pregnant mothers and haemoglobin was estimated. Anaemia in pregnancy is defined by WHO criteria as presence of haemoglobin concentration of < 11g/dL.[8]

Birth weight of the neonate was measured using electronic digital weighing scale with accuracy of 10 grams. Length was measured by infantometer. Head circumference, mid upper arm circumference, chest circumference, mid-thigh and mid-calf circumference were measured using a non-stretchable tape. Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square was used as test of significance. Continuous data was represented as mean and standard deviation. Independent t test was used as test of significance to identify the mean difference. P value <0.05 was considered as statistically significant.

3. RESULTS

A total of 120 term mothers and neonates were included. 60 mothers were in anemic group and 60 were in non-anemic. Out of 120 mothers, 57 were primiparous and 63 were multiparous. 36.8% of the primiparous mothers were anemic and 61.9% of multiparous mothers were anemic as shown in the table 1. Among the 63 multiparous mothers, 30 (47.6%) had adequate spacing of 3 or more years and 33 (52.4%) had spacing of less than 3 years.

Table 1: Comparison of Parity with anemic and non-anemic mothers.

Parity	Non Anemic mothers	Anemic mothers
Primiparous	36	21
multiparous	24	39

Out of 120 term neonates, 72 (60%) were females and 48(40%) were males. There were 42 (35%) Small for gestational age babies, 2 (1.7%) large for gestational age babies and 76 (53%) appropriate for gestational age babies. Out of 42 Small for gestational age babies, 37(88%) were born to mothers with anemia.

Table 2: Comparison of neonatal anthropometry.

Neonatal anthropometry	Newborns of Non Anemic group mothers		Newborns of Anemic group mothers		p value
	Male Mean±SD	Female Mean±SD	Male Mean±SD	Female Mean±SD	
Weight (Kg)	2.82±0.56	2.66±0.76	2.45±0.72	2.28±0.82	0.02*
Length (cm)	48.92±0.73	47.55±0.45	47.67±0.81	46.24±0.14	0.03*
Head Circumference (cm)	34.51±0.12	34.11±0.14	34.32±0.13	34.1±0.11	0.95
Mid Arm Circumference(cm)	9.98±1.3	9.88±1.2	9.84±0.94	9.79±1.01	0.03*
Chest Circumference(cm)	30.55±1.75	30.32±1.4	30.24±1.87	29.99±1.9	0.05
Mid-Thigh	13.78±2.9	13.17±2.56	13.65±2.65	13.44±2.11	0.55

Circumference(cm)					
Mid-Calf Circumference(cm)	9.66±1.84	9.56±1.72	9.44±1.89	9.45±1.91	0.51
* p-value of <0.05 is statistically significant					

Table 2 shows the comparison of various neonatal anthropometries with babies born to anemic and non-anemic mothers. It was found that the maternal anemia had statistically significant effect on birth weight, length and mid arm circumference of the neonates. They were significantly lower in babies born to anemic mothers than to babies born to non-anemic mothers. The Head circumference, chest circumference and mid-thigh circumference did not have statistical significance.

4. DISCUSSION

The present study showed that the birth weight of the neonates born to anemic mothers was lower than the birth weight of babies born to non-anemic mothers and was statistically significant. It is similar to the study done by Nair M et al.,[2] which concluded that the anemic mothers had 4.3 times higher risk of giving birth to low birth weight babies than non-anemic mothers.[2] Similar results were reported by Shah T et al.[3] . But in a study done by Kant, et al.,[7] no significant association was found between maternal anemia and low birth weight of neonates.The present study showed that the birth length of the neonates born to anemic mothers was lower than the birth length of babies born to non-anemic mothers and was statistically significant. It was similar to the study done by Behal M et al.[1], Nair M et al.[2] and Shah T et al.[3]. Most of the literature showed that length was the parameter which was consistently lower in babies born to anemic mothers among all the anthropometric measurements.

The present study did not show statistical significance of maternal anemia on head circumference of neonates. This could be due to brain sparing effect. Similar results were seen in study done by Nair M et al.[2] In contrast to this, in study done by Manpreet Kaur et al.[6] and Shah T et al.[3] it was found that the head circumference was statistically lower in babies born to anemic mothers. The present study showed that the mid upper arm circumference was statistically lower on babies born to anemic mothers which was similar to study done by Shrivastava et al.[4] The anthropometric measurements like chest circumference, mid-thigh and mid-calf circumference did not have statistically significant variations.

5. CONCLUSION

The present study concludes that the maternal anemia had statistically significant effect on birth weight, length and mid arm circumference of the neonates. Hence appropriate intervention can prevent the deleterious effect of anemia on neonatal growth.

REFERENCES

[1] Behal M, Vinayak R, Sharma A. Maternal anaemia and its effects on neonatal anthropometric parameters in patients attending a tertiary care institute of Solan, Himachal Pradesh, India. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2018 Feb 1;7(2):553.

[2] Mohandas Nair GS, Yakoob R, Cherian NC. Effect of maternal anaemia on birth weight of term babies. International Journal of Contemporary Pediatrics. 2018 May;5(3):1019.

[3] Shah T, Warsi J, Laghari Z. Effect of Maternal Anemia on the Anthropometric Indices of Newborn. Journal of Liaquat University of Medical & Health Sciences. 2020 Oct 8;19(03):191-4.

[4] Shrivastava J, Agrawal A, Giri A. Maternal anthropometry in relation to birth weight of newborn: A prospective hospital based study. Indian Journal of Child Health. 2016 Mar 26;3(1):59-63.

[5] Padonou SG, Aguemon B, Bognon GM, Houessou NE, Damien G, Ayelo P, Djossou E. Poor maternal anthropometric characteristics and newborns' birth weight and length: a cross-sectional study in Benin. International health. 2019 Jan 1;11(1):71-7.

[6] Kaur M, Chauhan A, Manzar MD, Rajput MM. Maternal anaemia and neonatal outcome: a prospective study on urban pregnant women. Journal of clinical and diagnostic research: JCDR. 2015 Dec 1;9(12):QC04.

[7] Kant S, Kaur R, Goel AD, Malhotra S, Haldar P, Kumar R. Anemia at the time of delivery and its association with pregnancy outcomes: A study from a secondary care hospital in Haryana, India. Indian journal of public health. 2018 Oct 1;62(4):315-8.

[8] Stephen G, Mgongo M, Hussein Hashim T, Katanga J, Stray-Pedersen B, Msuya SE. Anaemia in pregnancy: prevalence, risk factors, and adverse perinatal outcomes in Northern Tanzania. Anemia. 2018;2018(1):1846280..

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