

**A STUDY OF CORD BLOOD LIPID PROFILE IN NEWBORNS OF ALL GESTATIONAL AGE DELIVERED IN AVMCH, PUDUCHERRY**Ajinkya Wazurkar<sup>\*1</sup>, A. Dharmalingam<sup>2</sup>, N. S. Raghupathy<sup>3</sup><sup>1</sup>Postgraduate, Department of Paediatrics, Aarupadai Veedu Medical College, Puducherry.<sup>2</sup>Professor, Department of Paediatrics, Aarupadai Veedu Medical College, Puducherry.<sup>3</sup>Professor and HOD, Department of Paediatrics, Aarupadai Veedu Medical College, Puducherry.**\*Corresponding Author: Ajinkya Wazurkar**

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Article Received on 21/09/2021

Article Revised on 11/10/2021

Article Accepted on 31/10/2021

**ABSTRACT**

**Background:** Cardiovascular Diseases are major cause of death in India of which IHD and Stroke constitute major part. Foetal origins hypothesis was proposed by Barker which asserts that in utero stress can result in adaptations and programming in the initial critical period of life. It has been widely reported that hypercholesterolemia, a significant risk factor of cardiovascular disease, can be diagnosed at the time of birth by an elevated cholesterol level in umbilical cord blood. This study was done to compare the lipid Profile values between Preterm and Term newborns. **Methods:** This was a cross sectional study done on 100 newborns. The study was done in the Department of Paediatrics in AVMCH, Puducherry. Simple convenient sampling method was followed. Cord blood was taken after delivery and assessed for Total Cholesterol, Triglycerides, LDL and HDL levels. Babies were classified into Term (37-42 weeks) and preterm (<37 weeks). Gestational age was calculated by LMP, if not available 1<sup>st</sup> trimester USG and New Ballard scoring was used respectively. **Results:** In this cross sectional study Term and Preterm babies were 53 and 47 respectively. Lipid profile values were found to be statistically significant for all components between preterm and term babies, between two components that is Total Cholesterol and LDL between AGA and SGA babies whereas no significant difference found between male and female. **Conclusion-** Lipid profile values are elevated in Preterm and SGA babies whereas gender of baby do not influence lipid values.

**KEYWORDS:** Cord blood, lipid profile, Total cholesterol, Triglycerides, LDL, HDL.**INTRODUCTION**

The prevalence of Cardiovascular diseases in India was estimated to be 54.5 million. 1 in 4 deaths in India was due to CVD's with ischaemic heart disease and stroke is responsible for more than 80% of these deaths.<sup>[1]</sup>

In some experiments done in rats, it was found that restriction of nutrition in early life caused decrease in cell number which did not recover even on refeeding,<sup>[2]</sup> and factors which results in growth restriction in early life can cause organ structure and function damage in future.<sup>[3]</sup> Different tissues mature at different time in foetal period as well as infancy so early inadequate growth at different point of time in foetal period will have adverse effect differently which persists in adults. This is known as programming.<sup>[4]</sup>

Foetal origins hypothesis was proposed by Barker which asserts that in utero stress can result in adaptations and programming in the initial critical period of life.<sup>[5]</sup> These adaptations can be seen in the form of cardiovascular, biochemical or endocrinological changes related to cholesterol metabolism, insulin responses to glucose and

structural and functional alternations in the internal organs.

The fetal programming and the fetal origin hypothesis can have significant and continuous impact of fetal health factors on the development of chronic diseases in adulthood.<sup>[6]</sup> In early life, genesis of the lesions of atherosclerosis starts.<sup>[7]</sup> Preterm babies are born prematurely thus not completing gestation period causing less energy stores than term babies. Cord blood can be collected easily from umbilical cord at birth. Cord blood sera contains all components of lipid that can be found in adults so can be used to identify the high risk babies who have deranged lipid profile levels compared to normal.

Because of the probable relationship between the lipid profile early in life and later, we study to compare cord blood lipid profile in preterm and term newborns in this study.

**AIM AND OBJECTIVE**

**Aim:** To compare cord blood lipid profile in preterm and term newborns

**Objective:** To describe variations in lipid profile in preterm and term newborns.

## METHODOLOGY

### Materials and Methods

**Study design** – Cross sectional study

**Sampling** – Simple convenient sampling

**Sample Size** - 100

**Setting** – Department of Paediatrics, Aarupadai Veedu Medical College and Hospital

### Inclusion criteria

All newborns who are delivered in AVMCH, Puducherry both booked and unbooked cases.

### Exclusion criteria

1. Sick babies, infection, sepsis
2. Mother is being on any drugs other than supplements
3. Baby having any congenital anomaly

No. of groups to be studied-Two groups to be studied new born-Preterm (<37 weeks) and Term newborns (37-42 weeks)

Ethical clearance was obtained from institutional ethics committee to conduct this study.

### Study Procedure

This cross sectional study was done in Aarupadai Veedu Medical College and Hospital from Jan 2019 to July

2020. Newborn babies satisfying inclusion criteria were enrolled in study. Written informed consent was obtained from the parents. Immediately after delivery, 2.5 ml blood collected in dry test tube from placental end of cord. After blood was clotted, it was sent to lab where lipid profile values were estimated by means of automated analyzer. After baby was delivered, Gestational age was calculated by LMP, if not available 1<sup>st</sup> trimester USG or New Ballard Scoring was used for that thorough clinical evaluation of baby was done. Weight was calculated by Electronic weighing machine. Babies were classified into AGA, SGA and LGA by means of Fenton's growth chart.

### Statistical methods

Descriptive analysis was executed by mean and standard deviation for quantitative variables. The mean values were compared between study groups for normally distributed quantitative parameters by using ANOVA test. Categorical outcomes were compared between study groups using Chi square test /Fisher's Exact test. Statistical significance is considered when p value is <0.05. For statistical significance IBM SPSS version 2 was used.

### RESULTS

Out of total 100 babies analysed 51 were male babies whereas 49 were female babies.

**Table 1: Comparison of various biochemical parameters among study group.**

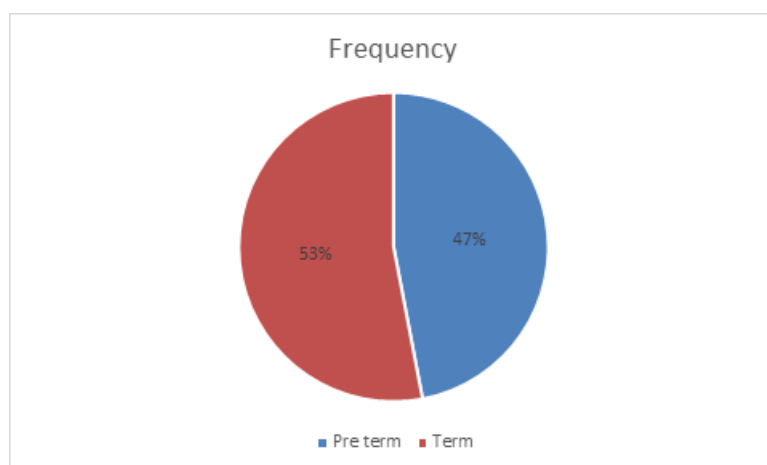
		Mean	Std deviation	P value
TC	Male	69.92	17.29	0.43
	Female	72.59	16.65	
Triglycerides	Male	47.55	22.81	0.341
	Female	51.45	17.49	
HDL	Male	24.47	7.1	0.72
	Female	24	5.97	
LDL	Male	36.2	12.52	0.3795
	Female	38.39	12.3	

In female babies TC, Triglycerides and LDL levels are more compared to male babies and HDL value is less

than male babies but this difference is not statistically significant.

**Table 2: Descriptive analysis of gestational age group in the study population (N=100).**

preterm and term	Frequency	Percent
Pre term	47	47.0
Term	53	53.0
Total	100	100.0



**Figure 1: Descriptive analysis of gestational age group in the study population (N=100)**

Among study group (100) 53 (53%) were term and 47 (47%) were preterm delivery.

**Table 3: Comparison of gestational age with mean weight, TC, Triglyceride, HDL and LDL.**

	Preterm and term	Mean	Std. Deviation	P value(independent t test)
WEIGHT (Kg)	Pre term	2.465	.4628	0.0001
	Term	2.983	.3491	
TC	Pre term	81.47	14.573	0.0001
	Term	62.15	13.421	
TRIGLYCERIDES	Pre term	54.45	18.003	0.020
	Term	45.04	21.465	
HDL	Pre term	27.17	6.578	0.0001
	Term	21.64	5.346	
LDL	Pre term	43.66	10.939	0.0001
	Term	31.60	10.823	

In our study group mean weight 2.465kg, 81.47 mg/dl TC, 54.45 mg/dl triglycerides, 27.17 mg/dl HDL and 43.66 mg/dl LDL were seen in Preterm and 2.983kg weight, 62.15mg/dl TC, 45.04 mg/dl triglycerides,

21.64mg/dl HDL and 31.60mg/dl LDL were seen in term in this study. Statistically significant difference present between term and preterm between all lipid components.

**Table 4: Comparison of cord blood lipid profile between AGA, SGA and LGA.**

		N	Mean	Std. Deviation	P value(anova)
WEIGHT (Kg)	AGA	83	2.819	.38866	0.0001
	LGA	3	3.73	.2052	
	SGA	14	2.057	.2029	
TC	AGA	83	69.48	17.186	0.010
	LGA	3	62.33	10.970	
	SGA	14	83.50	10.279	
TRIGLYCERIDES	AGA	83	48.98	21.338	0.714
	LGA	3	45.00	8.544	
	SGA	14	53.29	15.949	
HDL	AGA	83	23.92	6.623	0.426
	LGA	3	23.33	8.327	
	SGA	14	26.36	5.746	
LDL	AGA	83	35.93	12.813	0.014
	LGA	3	33.33	5.132	
	SGA	14	46.07	5.690	

As shown in Table 4, all four components of lipid profile values that is Total Cholesterol, Triglycerides, LDL and

HDL are elevated in SGA babies. Statistical significance was observed between weight, TC and LDL values significance was observed

## DISCUSSION

1. In 2010 out of total preterm births more than 60% were in South Asia and Africa.<sup>[8]</sup>

2. Mean of Total Cholesterol, Triglycerides, LDL are more than values observed in study of Atiy JK et al,<sup>[9]</sup> but HDL mean is less. Lipid profile values of our study are more than study conducted by Nayak CD et al<sup>[10]</sup> but less than values observed in study conducted by Tohmaz U et al.<sup>[11]</sup>

2. In our study it was found that lipid profile values are slightly elevated in female in terms of TC, Triglycerides and LDL while HDL levels are low but no statistical significance was found in any of the component between male and female babies.

Our results are consistent with the studies done by Yashodha and Anjum SK et al,<sup>[12]</sup> Tohmaz U et al,<sup>[11]</sup> and Aletayeb SMH et al<sup>[13]</sup> where no statistical significance found between the two gender.

3. In the present study preterm babies had significantly higher values of TC, Triglycerides, HDL and LDL compared to term neonates.

1. In a study done by Kalluri MB et al,<sup>[14]</sup> lipid profile values are elevated in preterm babies with statistical significance between all components -TC, Triglycerides, HDL, LDL.

2. Our study is consistent with the study done between late preterm and term babies by Yashodha and Anjum SK et al<sup>[12]</sup> which they concluded that Preterm neonates have high TC (<0.001), Triglycerides (p<0.01) and LDL (p<0.01) values which were statistically significant but HDL values were not having statistical significant difference.

3. Kenchappa et al,<sup>[15]</sup> in their study concluded that all lipid values are elevated in Preterm babies with statistical significance for TC, Triglycerides and LDL (p<0.05)

4. Mathur et al,<sup>[16]</sup> observed in their study that in preterms TC value was higher than term with statistical significance (p value<0.01)

5. Jane Oba et al,<sup>[17]</sup> observed higher values of TC, HDL and LDL in preterm babies with statistical significant difference (p value<0.0001) and Triglyceride levels are more in term babies with statistical significant difference (p value<0.01).

6. In the study done by Pardo et al,<sup>[18]</sup> lipid values Total Cholesterol, HDL and LDL are elevated in preterm babies with statistical significance observed in the values of Total cholesterol (P value <0.001) and LDL (P value<0.001)

4. In our studies in SGA babies cord blood Triglycerides, Total cholesterol, HDL, LDL levels were elevated than AGA neonates. But statistically significance was observed between values of Total Cholesterol and LDL level.

Our study has some similar results to the studies done by Kalluri MB et al,<sup>[14]</sup> and Yashodha et al<sup>[12]</sup> where there is statistical significance between the TC, Triglycerides and LDL values found between AGA and SGA

## CONCLUSION

Gender does not influence cord blood lipid profile whereas it is elevated in preterm and SGA babies. Vessel changes and development of atherosclerosis can be multifactorial of which lipid changes due to prematurity can be a important factor. Further follow up studies are required in this field to ascertain this factors.

## LIMITATIONS

1. Maternal serum lipid was not taken in account.
2. No follow up of the study was done.

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