cholesterol metabolism. It is known that many factors are associated with lipid characteristics in new born. In a study of 303 newborns and their mothers at the mean value of cholesterol was 72 mg/100 ml for the newborns and 253 mg/100 ml in the mothers. By multiple regression analysis it was shown that a significant independent correlation exists between cord blood cholesterol and the cholesterol of the mothers, birth weight, sex and the blood group of the ABO system of both the newborn and the mother. This demonstrates that several factors known to influence cholesterol in adult life are already operating at birth. Lipid profile in newborns has been studied in ethnically diverse populations and similar distribution has been noted in various populations. (table 7)

Table -7: Comparison of studies from different countries

	CHILE(20)	CHINA(19)	INDIAN(21)	ISREAL(18)
Total Cholesterol	64 mg/dl	65.91 mg/dl	76.6 mg/dl	88.4 mg /dl
LDL Cholesterol	30 mg/dl	31.59 mg/dl	20.7 mg/dl	61.7 mg/dl
HDL Cholesterol	27 mg/dl	22.62 mg/dl	22.5 mg/dl	21.6 mg/dl
Triglycerides	35 mg/dl	20.47 mg/dl	---	31.09mg/dl

Table 7 clearly shows that despite diverse ethnic backgrounds the metabolic milieu of newborn remain constant across the globe. The correlation of lipid profile with anthropometric measurement, however, showed no correlation in present study. A study of term newborns in Israel 18 had shown a negative correlation of LDL cholesterol with abdominal circumference, birth weight and head circumference. However present study showed no correlation of LDL with either abdominal girth, birth weight and head circumstance in term newborns (p=0.875, p=0.221 and p=0.978 respectively.)

Similarly no correlates were found for Total Cholesterol, HDL, Triglycerides and VLDL with Weight, Length, Abdominal Girth, Ponderal Index or Head Circumference respectively of term newborns at birth in present study.

Barker[14] originally noted that smaller abdominal circumference at birth is associated with higher lipid levels. Based on this observation he suggested that, since abdominal circumference at birth is through to reflect liver size, and cholesterol metabolism is regulated by the liver, impaired liver growth in uterus re-sets cholesterol concentration towards more atherogenic profile. This view is supported by one other study that shows a negative association between abdominal circumference and TG in growth-retarded human fetuses [23]. However, more research is needed to show whether the association between abdominal circumference and lipids exists in other populations, and how accurately measurement of abdominal circumference reflects the size of the liver in a new-born baby. The concordance between the size of the liver and abdominal circumference in humans is so far weak 10. Present study also shows no significant correlation between abdominal girth with lipid fractions in cord blood sera. A statistically significant correlation was found to be emerging after ANNOVA analysis of HDL among four abdominal girth groups (p=0.023), however the HDL values which seemingly behaved positively with abdominal girth as it increased from 30cm to 31cm fell as girth rose above values of 31cm. However, larger study with inclusion of maternal lipid profile, maternal anthropometry, maternal macro and micronutrient intake with placental weight and neonatal anthropometry may prove useful in studying the concept of fetal programming and impact of maternal variables in this context.

Moreover, study of atherogenic lipoprotein fractions mainly Apo E, other fractions Apo B & Apo C may probably elucidate more interesting data. More important studies is long –term follow up; to study weather those with altered lipid profiles at birth manifest the chronic disease of adulthood independent of lifestyle variables.

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REFERENCE

1. **Barker DJP, Martyn CN.** *Maternal and Fetal origins of cardiovascular disease. Journal Epidemiology Health 1992;46:8-11.*
2. **Barker DJP. Mother, Babies and Relation** *in later life. 2nd Edition; Churchill Livingstone 1998.*
3. **Forsdahl A.** *Are poor living conditions in childhood and adolescence an important risk factor for arteriosclerotic heart disease? Br J Prev Soc Med 1977;3:91-5.*
4. **Desai M, Crowther NJ, Ozanne SE, Lucas A, Hales CN.** *Adult glucose and lipid metabolism may be programmed during fetal life. Biochem Soc Trans 1995; 23:331-35.*
5. **Fowden AL Fetal** *metabolism and energy balance. In: Thorburn GD Harding R (eds). Textbook of Fetal Physiology. Oxford: Oxford University Press, 1994, pp. 70-82.*
6. **Barker DJP, Osmond C, Simmonds SJ, Wield GA.** *The relation of small head circumference and thinness at birth to death from cardiovascular disease in adult life BMJ 1993;306:422-26.*
7. **Law CM, Gordon GS, AW, Barker DJP, Hales CN.** *Thinness at birth and glucose tolerance in seven –year-old children. Diabetic Med 1995;12:24-29.*
8. **Philips D.I.** *Birthweight and future development of diabetes, a review of evidence. Diabetes Care 1998;21:B1 150-5.*
9. **Law C.M, Shiell A.W.** *Is blood pressure inversely related to birth weight? The strength of evidence from systemic review of literature. Journ Hypertension 1996;14:935-41*
10. **Roberts AB, Mitchell JM. McCowan LM, Barker S.** *Ultrasonographic measurement of liver length in the small-for gestational-age fetus. Am J Obstet Gynecol 1999;180:634-38.*
11. **Barker DJP, Martyn CN, Osmond C, Weild GA.** *Abnormal liver growth in utero and death from coronary heart disease. BMJ 1995;310:703-04.*
12. **Harding J.E.** *The nutritional basis of fetal origins of adult disease International Journal Epidemiology 2001;30:15-23.*
13. **Srinivasan S.R, Cusanta J.L, Freedman D.S, Webber C.S et al.** *Serum lipids and lipoproteins. Pediatrics 1987;80;789-96.*
14. **Barker DJP, Martyn CN, Osmond C, Hales CN,** *Fall CHD. Growth in utero and serum cholesterol concentration in adult life. BMJ 1993;307:524-7*
15. **Kumar A. Gupta A, Malhotra V.K. Agarwal P.S et al.** *Cord blood lipid levels in low birth weight newborns. Indian Pediatrics 1989;26:571-74*
16. **Jones J.N, Taylor C.G.** *Altered cord serum lipid levels associated with small for gestational age infants. Obstectrics and Gynaecology 1999;93:527-3*
17. **Rifai N, Heiss G.** *Gender and race differences in cord blood lipoprotein, Circulation 1988;2:481.*
18. **Ophir E, Oettinger M, Nisimov J, Hirsch Y et al** *Cord blood lipids concentration and their relation to body size at birth : possible link between intrauterine life and adult disease, American Journal of Perinatology 2004;21:35-40*
19. **Zhao WH, Liu YJ, Shou HC, Chen LJ.** *Cholesterol concentrations I cord blood of newborn infants. Zhonghua Er Ke Za Zhi 2003;41(2):107-9*
20. **Casaneuva V, Cid X, Chiang MT, Molina M, Ferrada MC, Perez R, Casaneuva P.** *Lipids. Lipoproteins and apolipoproteins in normal newborns. Rev Med Chil 1998;126(9):1073-8.*
21. **Kalra A, Kalra M, Agarwal MC, Pant MC.** *Serum Lipid profile in term and preterm infants in early neonatal period. Indian Pediatrics 1998;25;977*
22. **WHO .** *Programming of chronic disease by impaired fetal nutrition: Evidence and implication for policy and intervention strategies. Department of Nutrition for Health and Development, Department of Noncomunicable Disease Prevention and Health Promotion World Health Organization, Switzerland. 2002.*
23. **Roberts A, Nava S, Bocconi L, Salmona S, Nicolini U.** *Liver function tests and glucose and lipid metabolism in growth-restricted fetuses. Obstet Gynecol 1999;94:290-94*