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# SERUM CHOLESTEROL IN NEONATES AND THEIR MOTHERS A PILOT STUDY

Pages with reference to book, From 108 To 109

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## ABSTRACT

Reports from the Aga Khan University indicate that 58% of 400 school children studied had undesirably high serum cholesterol levels. The present study was undertaken to determine whether the high cholesterol levels are present at birth and to determine the relationship between cord blood, maternal blood cholesterol and maternal diet. Cord blood from 58 neonates and fasting venous blood from 45 mothers were analyzed for total serum cholesterol. Mothers were interviewed regarding their usual diet during pregnancy. Mean cord blood cholesterol was 56.90 mg/dl (range 26 to 123 mg/dl). Mean maternal blood cholesterol was 232.4mg/dl (range 141-382 mg/dl). Mean maternal intake of cholesterol was 457 mg (recommended level \_ 300 mg/day). There was no significant co-relation between cord blood cholesterol and maternal blood cholesterol or maternal intake of cholesterol. Eighteen percent of the mothers reported a strong family history of hypercholesterolemia and/or heart disease, but this genetic tendency was not observed in the blood cholesterol level at birth indicating that environmental factors namely diet may have a prime role in determining serum cholesterol levels in childhood (JPMA 40:108, 1990).

## INTRODUCTION

The prevalence of hypercholesterolemia in children and adults in Karachi has been reported to be high (unpublished data). An elevated cholesterol level is known to be a major risk factor for the development of coronary heart disease<sup>1,2</sup>. It has been shown that serum concentration of total cholesterol track rather well from childhood through to adult life<sup>3,4</sup>. Hereditary and dietary factors are known to influence the total cholesterol levels<sup>5-7</sup>. The present study was undertaken to determine whether Pakistani children start life with raised cholesterol levels, implicating heredity as the major factor responsible for the elevated cholesterol levels observed in school children. On the other hand if neonatal cholesterol values are within the normal range then this would indicate that environmental factors such as diet and activity play a more important role in determining the serum cholesterol levels of Pakistanis. Secondly, we wished to determine the correlation of maternal serum cholesterol levels and maternal cholesterol intake with neonatal serum cholesterol levels in order to assess the role of maternal diet on neonatal cholesterol levels.

## MATERIALS AND METHODS

Cord blood was collected from 55 full term babies born at the Aga Khan University Hospital, Karachi during January to July 1989. Venous blood samples were collected from 45 mothers after a 12-hours overnight fast. Total cholesterol was determined by enzymatic methods<sup>8</sup> using an Astra autoanalyzer. Mothers were interviewed in detail about their usual diet during pregnancy using a food frequency questionnaire. The cholesterol intake per day was calculated using food composition tables<sup>9</sup>. The mean

neonatal serum cholesterol was 56.9 ± 19.3 mg/dl with a range of 26 to 123 mg/dl. Two neonates had values above 115 mg/dl. The mean maternal serum cholesterol ranged from 141 to 382 mg/dl with a mean of 232.4 ± 48.9 mg/dl.

## RESULTS

The mean daily maternal intake of cholesterol was 457 ± 209mg/day, ranging from 207 to 1089 mg/day. Milk, eggs, beef and mutton were the foods that contributed the most to the daily cholesterol intake.

**TABLE. Mothers consuming high fat and/or high cholesterol foods daily.**

<b>Foods</b>	<b>Percent of Mothers consuming Daily</b>
<b>Milk</b>	<b>68%</b>
<b>Egg</b>	<b>62%</b>
<b>Beef/Mutton</b>	<b>53%</b>
<b>Biscuits, Cakes etc.</b>	<b>35%</b>
<b>Butter/Cream</b>	<b>32%</b>

Table shows the percentage of mothers who ate these foods daily. One third of the mothers also ate cream/butter and biscuits/cakes daily. Most mothers reported an increase in their intake of milk, butter and eggs during pregnancy. There was no correlation between the neonatal cholesterol level and the maternal cholesterol level ( $r = 0.004$ ) or the maternal cholesterol intake ( $r = 0.03$ ).

## DISCUSSION

The mean cholesterol levels of the Pakistani neonates in our study (56.9 mg/dl) was relatively low as compared to values reported for neonates from various other populations. It has been suggested that concentration of cholesterol above 115 mg/dl be considered abnormal<sup>10</sup>. It should be pointed out that two infants had values of 121 and 123 mg/dl. Okora et al<sup>11</sup> studied 55 Nigerian neonates and reported a mean cord cholesterol level of 104.8 mg/dl. American neonates have been reported to have a mean cholesterol level of 72 mg/dl<sup>12</sup>. Finnish newborns were first reported in 1973 to have a fairly high mean serum cholesterol level, 81.2 mg/dl<sup>13</sup>. Recent data suggests that mean level of serum cholesterol is declining in the Finnish population<sup>14</sup>. This decline is reflected in a 1985 report of 130 newborns whose serum cholesterol was 58.5 mg/dl<sup>15</sup>. This indicates that as a population is made aware of the need to decrease serum cholesterol levels, the change is reflected even in neonatal cholesterol levels. It is difficult to explain the relatively low neonatal cholesterol values in our study in view of the high incidence of hypercholesterolemia in children and adults in Karachi (unpublished data). However our neonate sample was small and more neonates are needed to be studied before we can draw any conclusions. The mean maternal cholesterol levels were relatively high (232 mg/dl). Desoye et al have reported that maternal cholesterol levels increase by about 65% by 38 weeks of gestation as compared

to total cholesterol values at 8 weeks of gestation<sup>16</sup>. There is a tendency for Pakistani women to increase their intake of cholesterol rich foods such as milk, eggs and butter during pregnancy. However, as shown by our study, there is no correlation between the mother's diet during pregnancy and her neonate's cholesterol levels. Dietary restrictions during pregnancy to protect the neonate from having elevated cholesterol levels do not appear to be necessary. In conclusion the results of our study show that the neonates studied had relatively low cord blood cholesterol levels and that there was no correlation between neonatal cholesterol levels and either maternal cholesterol levels or maternal cholesterol intake.

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## REFERENCES

1. KuHer. LH. and Orchard, TJ. The epidemiology of atherosclerosis in 1987: unraveling a common-source epidemic. *Clin. Chem.*. 1988; 34(88): 840.
2. Mabley, R\_W. Atherogenic lipoproteins and coronary artery disease; concepts derived from recent advances in cellular and molecular biolog. *Circulation*, 1985; 72: 943.
3. Webber, L.S., Cresanca, J.L, Voors, A.W. and Berenson, G.S. Tracking of cardiovascular disease risk factor variables in school age children. *J. Chronic Dis.*, 1983; 36: 647.
4. Mellies, M.J., Laskarzewski, P.M., Tracy, T., et al. Tracking of high and low density lipoprotein cholesterol from childhood to young adulthood in a single large kindred with familial hypercholesterolemia. *Metabolism*, 1985; 34 : 747.
5. Morrison, J.A., Namboodiri, K., Green, P., Martin, J. and Glueck, C.J. Familial aggregation of lipids and lipoproteins and early identification of dyslipoproteinemia. The collaborative lipid research clinics study. *JAMA.*, 1963; 250: 1860.
6. Connor, S.L, Artand-Wild, S.M., Classick-Kohn, CJ., et al. The cholesterol saturated-fat index: An indication of the hypercholesterolemic and atherogenic potential of food. *Lancet*, 1986; 1: 119.
7. Kuske, T.T. and Feldman, EB. Hyperlipoproteinemia, atherosclerosis risk, and dietary management. *Arch. Intern. Med.*, 1967; 147: 357.
8. Allanin CC., Poon, L.S., Chan, C.S.G., Richmond, W. and Fu, P.C. Enzymatic determination of total serum cholesterol. *Clin. Chem.*, 1974; 20: 470.
9. Gopalan, C., Rama Shastri, By, and Balasubramanian, S.C. Nutritive value of Indian foods. India National Institute of Nutrition. Indian Council Med. Res. Hyderabad, 1985.
10. Barnes, K., Nestel. P.3., Pryke, E.S. and Whyte, H.M. Neonatal plasma lipids. *Med. J. AusL*, 1972; 2: 1002.
11. Okoro, B.A., Udeozo, 1,0K. and Okeahialam, T.C. Influence of birth weight and social status on cord blood cholesterol in full term Nigerian neonates. *Trop. Geogr. Med.*, 1985;37: 356.
12. Freedman, D.S., Srinivasan, SR., Cresanta, J.L, Webber, LS., and Berenson, G.S. Cardiovascular risk factors from birth to 7 years of age: the Bogaluss Heart study. Serum lipids and lipoproteins. *Pediatrics*. 1987; 80 (5 pt.2): 789.
13. Impiraara. O. and Rimpela, M. napaveren Plasma. kolesteroli is triglyceridipitoisuus suomessa. The levels of umbilical cord blood cholesterol and trygcerides in Finland (In Finnish, Summary in English). *Duodecim*, 1973; 89 899.
14. Viikan, 3., Akerblom. H.K, Nikkon, T. et al. Multicenter study of atherosclerosis precursors in

Finnish children — pilot study of 8years old boys. *Ann. Clin. Res.*. 1982; 14:103.

15. Vjikari, 3.. Akerblom, H.K., Nikan, T., et al. Atherosclerosis precursors in Finnish children and adolescents I.V. serum lipids in new horns, children and adolescents. *Acts Paediatr. Scand. Supplement*, 1985; 318: 103.

16. Desoye, G., Schweditach, M.O., Pfeiffer, K.P., Zechner, R. and Kostner, G.M. Correlation of hormones with lipid and lipoprotein level during normal pregnancy and postpartum. 3. *Clin. Endocrinol. Metab.*, 1987; 64: 704.