DIETARY AND SERUM CALCIUM IN PREGNANT WOMEN

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ABSTRACT

Dietary and serum calcium were estimated in 200 normal pregnant women between 37-41 weeks of gestation and in cord blood of their new born. Calcium intake per person per day was low, 11 . 8mmolIL, as compared with the daily recommended allowance of 30 mmolfL. Mean maternal serum calcium level was also low (1.9 mmol/L) and only 20% of mothers had serum calcium within normal range. Mean calcium value in cord blood was at lower limit of normal range, being 2.3 mmol/L; 38.5% of cord samples (77) were below the normal range (JPMA 41: 278, 1991).

INTRODUCTION

Pregnancy imposes major Changes in the mother's nutritional requirements and calcium metabolism. During the last 10 weeks of pregnancy the foetus obtains approximately 1.8g of calcium or 6.5 mmol per day. This represents about 80% of the net dietary absorption in a normal non-pregnant woman on an average of 20 mmol per day calcium diet. These demands are largely met by increasing the absorption of dietary calcium and not by reduction of urinary calcium nor from maternal skeleton. Increase in absorption is probably due to increase in circulating dehydroxylated metabolite of vitamin D3 -[1,25(OH)2 calciterol (1,25 (OH)2D3)] concentration in maternal blood to twice the non-pregnant values[1]. Dietary calcium playing such an important role in fulfilling pregnancy demands a study was designed to determine intake of calcium and to estimate calcium concentration in maternal and cord blood.

SUBJECTS AND METHODS

Two hundred apparently normal singleton pregnant women were selected from the Department of Obstetrics and Gynaecology, Jinnah Postgraduate Medical Centre (JPMC). All participants were subjected to a questionnaire including age, parity, gestational age, presence of any disease, family history, husband's occupation, monthly income, dietary history, by onc week recall method. Calcium intake per person per day was calculated by using the food composition of Pallet and compared with recommended daily allowance. Clinical examination included height, weight, heart rate, blood pressure and obstetric examination. Estimation of blood calcium, both maternal and cord was done by kit method[4].

RESULTS

Mean age of mothers was 26.1 years, parity 3.8 and gestational age between 37-42 weeks (Table I).

TABLE I. Characteristics of 200 mothers and their newborns.

Characteristics	Mean ± S.D. (Range)
Age (years)	26.1 ± 6.2 (16-45)
Parity	3.8 ± 2.4 (0-10)
Gestational Age (weeks)	38.8 ± 1.2 (37-42)
Mothers' weight (kg)	57.5 ± 7.5 (46-80)
Mothers' height (cms)	152.9 ± 18.8 (138-170)
Babies weight (kg)	2.9 ± 0.1 (2-4.5)
Babies length (cms)	48.9 ± 13.8 (37-57)

Subjects were mostly housewives (90%). Their husbands were either clerks or daily wage labourers. Income per person per day was Rs. 8-9. Dietary analysis revealed diet to be low in calories, animal proteins, vitamin (except vitaminC) and calcium. Daily calcium intake per person was 8 mmol. Mean calcium level in maternal blood was 1.9 mmol/L and in cord blood 2.3 mmol/L. Only 20.5% of mothers had normal values of calcium and 61.5% of newborns had calcium levels between 2.2-2.55 mmol/L (Table II).

TABLE II. Serum calcium in maternal and cord blood.

Investigation (Normal range)	Mother (200)	Cord (200) Mean ± SD (Range)
Calcium mmol/L (2.2 - 2.55)	1.9 ± 0.1 (0.6-2.8)	2.3 ± 1.0 (1.7-2.8)

DISCUSSION

Mean serum calcium in mothers is 1.9 mmol/L and only 20% had values within normal range. These

results are consistent with those reported from other developing countries and developed countries studying low socioeconomic groups[3] and Asian mothers[4]. Main reason for 80% of mothers in this series having low serum calcium is low dietary intake, 11.8 mmol per day as against recommended 30 mmol calcium per day[5]. The foetus requires 6.5 mmol per day, in addition mother's obligatory loss is between 2-5 mmol per day. So a mother needs to absorb between 9-13 mmol calcium per day to remain in balance[5]. Shenolikar[6] reports that pregnant Indian women on a dietary intake of 10 mmol calcium per day absorbed more than half of their dietary calcium, even allowing for the absorbed fraction which is re-excreted into the faeces. Probably same is the case with Pakistani mothers. It seems probable, therefore, that with normal blood levels of 1,25 (OH)2D3, the minimum intake below which maternal calcium deficit is inevitable may be as low as 10 to 15 mmol of calcium per day[5]. Recently correlation between hypocalcemia and hypertension have been highlighted. With 80% of Pakistani mothers having low serum calcium the question arises, is gestational hypertension and pre-eclampsia more common among Pakistani mothers? Sixty-two percent samples of cord blood showed serum calcium between 2.2-2.55 mmol/L i.e., 38% of newborns had low serum calcium (< 2.2 mmol/L) and their chances of developing tetany cannot be ruled out. Well controlled follow-up studies of hypocalcemic mothers and newborn may provide answers to above questions.

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