

CALCIUM AND VITAMIN D SUPPLEMENTS IN PREGNANT WOMEN: EFFECT ON FOETAL WEIGHT

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SUMMARY

This study was conducted on six hundred pregnant women attending antenatal clinic of Medical College and Hospital, Rohtak. Three hundred women were put on calcium and vitamin D supplements, remaining three hundred were not supplemented. Serum calcium level estimation was done on fifty women randomly selected from each group. A statistically significant increase in serum calcium levels was observed in the supplemented group as compared to the non-supplemented group. Weight of the new born baby was recorded at birth in all patients. A statistically significant increase was noted in supplemented group.

Introduction

Osteomalacia is highly prevalent amongst Asians. It is a well known complication of pregnancy in Asians (Swan and Cooke, 1971). Deficient dietary intake of calcium and vitamin D coupled with poor solar exposure are believed to be chief causes of this disorder (Smith, 1971). This study was undertaken in view of studies reporting less birth size of Indian Asians in Britain than that of Europeans and Negroes (Grundy *et al*, 1978) and high prevalence of osteomalacia in Asians. Calcium and vitamin D supplements were used in antenatal period to study the effect of these on foetal weight.

Material and Methods

This study was conducted on six hundred normal pregnant women attending the antenatal clinic of Medical College and Hospital, Rohtak. Of these three hundred subjects were supplemented with 375 mgm of calcium and 1200 I.U. of vitamin D per day in the form of tablets, from 20 weeks gestation onwards (Group I). Remaining three hundred formed the non-supplemented group (Group II). Both the groups were matched for age and parity. They were given routine haematinics. Preterm deliveries, congenitally malformed babies and maternal illnesses likely to affect foetal growth were excluded. Serum calcium estimation was done in fifty patients randomly selected, each from Group I and Group II at 36 weeks gestation, to assess their calcium status. In addition fifty non pregnant, non lactating women

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of reproductive age group were investigated (controls). Serum calcium was determined by oxalate permanganate method (Varley, 1976). Baby weight was recorded at the time of delivery in all cases.

Observations

The average daily intake of a pregnant Indian woman according to this study was 500 mg calcium and 40 I.U. vitamin D as compared to recommended doses of 1 gm calcium and 100 I.U. vitamin per day by W.H.O.

Table I, depicts the calcium status in various groups. The serum calcium values were corrected to specific gravity of 1.027 (Dent, 1962). The pregnant women (group II) had statistically significant, lower serum calcium values ($P < 0.001$) than control group. However, on supplementation a statistically significant increase in serum calcium was observed ($P < 0.002$).

Table II gives the mean weight of baby at birth in both groups. The range was

2.3 to 2.9 kg in group II as compared to 2.5 to 3.15 kg in group I.

Discussion

Vitamin D is known to promote growth in young chicks and pups (Jones, 1971). Besides the function of influencing the absorption and deposition of bone minerals, vitamin D seems to have a widespread effect on organic tissue metabolism possibly through citric acid, manifesting as increased growth (Steenbock and Hertig, 1955). An improvement in birth weight in calcium and vitamin D supplemented women has been reported by a few authors but the difference was statistically insignificant (Brooke *et al*, 1980). A statistically highly significant improvement in baby weight in this study may be consequent to higher doses of calcium and vitamin D.

Routine supplementation of calcium and vitamin D during pregnancy, particularly in winters in patients at special risk can be helpful in reducing the perinatal mortality to some extent by improving the average birth weight.

TABLE I
Calcium Status in Various Groups

	Control group (Gp. III)	Non-supplemented group (Gp. II)	Supplemented group (Gp. I)
Serum calcium (mg%)	9.81 ± 0.89	8.72 ± 1.14	9.89 ± 0.97
Gp. III Vs Gp. II		$P < 0.001$	
Gp. II Vs Gp. I		$P < 0.002$	

TABLE II
Effect of Calcium and Vitamin D on Baby Weight

	Non-supplemented	Supplemented	P value
Baby weight in kg.	2.60 ± 0.30	2.80 ± 0.35	< 0.001

References

1. Brooke, O. G., Brown, I. R. F., Bone C. D. M. and Carter, N. D.: *British Medical Journal*, 280: 751, 1980.
2. Dent, C. E.: Some problems of hyperparathyroidism. *Brit. Med. J.*, ii: 1419, 1962.
3. Grundy, M. F. B., Hood, J. and Newman, G. B.: *Brit. J. Obstet. Gynec.* 85: 481, 1978.
4. Jones, J. H.: In Sabrell, W. H. and Harris, R. S. (eds.) *The vitamins*; Vol. III, 2nd edition, 1971, p. 250, Academic Press, New York.
5. Smith, R.: *Biochemical disorders of the skeleton*, 1979, p. 117, Butterworths, London.
6. Steenbock, H. and Hertig, D. C.: *J. Nutr.*, 57: 449, 1955.
7. Swan, C. H. J. and Cooke, W. T.: *Lancet*, 1971, ii: 456.
8. Varley, H.: *Practical Clinical Biochemistry*, 1976, p. 197, New Delhi Arnold Heinemann.
9. W.H.O. Expert Committee: *Nutrition in pregnancy and lactation* p. 39, World Health Organization, Geneva, 1965.