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Research Article

A STUDY ON RELATION OF VITAMIN D LEVELS AND IRON CONTENT IN BREASTFED INFANTS AND THEIR MOTHERs: A CASE CONTROL STUDY

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ABSTRACT

Low vitamin D level is an important international public health problem. Vitamin D deficiency and its consequences among children, adolescents and pregnant woman could indeed be considered as one of the most important public health problems. In fact, low vitamin D levels were reported in children, adolescents and pregnant woman. In the present study, increasing prevalence of vitamin D deficiency in pregnant and lactating women (94.3%) is responsible for low vitamin D levels in exclusively breastfed newborns and infants. The main Objectives of the present investigation is to measure the serum vitamin D, calcium and phosphorus in exclusively breastfed infants and their mothers. To correlate maternal serum vitamin D and calcium levels with that of infants. Method: This was a cohort study conducted in Pediatric outpatient department and well-baby clinic of a tertiary teaching hospital from Jan 2015 - Dec 2016. The serum vitamin D, calcium and phosphorus levels were estimated in 30 dyads of mother and baby by standard techniques. Result: thirty six percent of mothers and 70% of infants had low serum 25(OH) D levels. Conclusion: This study was found very high prevalence of hypovitaminosis D in both mother & infant.

Keywords :-Calcium, Phosphates, Hypervitaminosis.

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INTRODUCTION

Low vitamin D level is an important international public health problem. Vitamin D deficiency and its consequences among children and adolescents could indeed be considered as one of the most important public health problems. In fact, low vitamin D levels were reported in both children and adolescents. Several reasons could be taken into account in this regard such as the possibility of the reduced intake or synthesis of vitamin D (due to having a vitamin D deficient mother or a dark skin color), abnormal intestinal function or malabsorption (in small-bowel disorders), or reduced synthesis or increased degradation of vitamin D (in chronic liver or renal disease). More importantly, many countries in developing world are experiencing a substantial percentage of adolescent and youth population with their own health related problems which vitamin D deficiency could affect on their health. The association between obesity and overweighting and vitamin D deficiency has been reported by many researchers. Diabetes mellitus has also an association with vitamin D deficiency, for both type 1 and type 2 diabetes. Due to the importance of vitamin D deficiency and its negative health consequences, taking the vitamin D supplement seems to be necessary [1,2,3,4].

Prevalence of vitamin D deficiency continues to remain as public health problem and it is very distressing to note that it is equally prevalent even in sunny countries including India [4, 5, and 6]. All age groups show variable status of vitamin D deficiency including pregnant women,

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newborns, infants and children. High prevalence of vitamin D deficiency in pregnant and lactating women (84.3%) is responsible for low vitamin D levels in newborns and infants [7]. Vitamin D deficiency does exist in exclusively breastfed infants [8]& hypocalcemia seizures have been observed in them [9]. Placentally transferred vitamin D is adequate only till 8 weeks of age. Breast milk contains only about 20 – 60 IU/L of vitamin D while RDA of vitamin D for infants is 200-400 IU/ day [7]. In order to find out the prevalence of vitamin D deficiency in mother and infants attending this care centre, we decided to perform this study.

MATERIALS AND METHODS

It was a prospective cross sectional study, carried out in pediatric outpatient department and well-baby clinic of a tertiary teaching hospital S.V.Medical college Tirupathi, India, during Jan 2015 –Dec 2016. Sample size was 30 days. Institutional ethical committee approval & informed consent were obtained. Exclusively breastfed full term healthy babies of birth weight of = 2.5 kg& age between 3 to 6 months were included in the study. While infants with co-morbid conditions, infants on formula feeds / top feeds and calcium, vitamin D supplementation, low birth weight and preterm Infants were excluded from the study. Healthy mothers of age between 20 to 35 years, weighing more than 45 kg with normal pregnancy and normal delivery were included in the study. Mothers with any chronic medical, surgical diseases or obstetric illnesses were excluded from the study. Detailed maternal and infant history and other relevant details were recorded in a pre-designed questionnaire. All the mothers were receiving calcium lactate 500mg three time's day, as a part of their postnatal care. Serum calcium and phosphorus were estimated by standard biochemical techniques with adequate control. Serum vitamin D levels were done by fully automated Electro chemiluminescence system. The levels for serum calcium and serum phosphorus as mentioned over the kits were used as norms for mothers. As specific norms are not available for infants, value most commonly mentioned in the literature was used (Reference ranges. calcium 8.8 to 10.8 mg%, s. phosphorus 3.8 to 6.5 mg%, Serum vitamin D levels <15ng/ml were considered 'deficient' while levels between 15-20ng/ml were considered 'insufficient' for both mother and infant[10]. Statistical analysis was done using statistical package for social sciences15.0 for window evaluation version.

RESULTS

There were total 50 mother infant pairs. Out of thirty, 27 mothers were between 20-25 years of age. Twenty five mothers were primipara. The average levels of serum calcium, phosphorus, & 25(OH) D levels in mothers and infants are depicted in (Table-1). Average values of calcium, phosphorus, & 25(OH) D levels in mothers and infants.Twenty two mothers had low serum calcium levels. Eight mothers had 'deficient' while sixteen mothers had insufficient' serum 25(OH) D levels. In infants mean age, weight and length were 3.0 months±30days,4.6kg ± 1.2kg & 57.5cm ±6cm respectively. Male: female ratio was 1:1.5.Twenty three infants had low serum calcium levels. Eighteen infant had 'deficient'& 03 infants and 'insufficient' serum 25(OH) D levels. On correlation of mother-infant 25(OH) D levels (Table-2).We found that sixteen mothers and 14 infants had deficient 25(OH) D Levels (p=<0.05).

Table 1. Average values of serum calcium, phosphorus and 25(OH)D levels in mothers and infants

Frequency N0 50	Serum Calcium	Serum phosphorus	Serum 25(OH) D ng/dl
Mother	8.18±0.82	3.28±0.5	20.72±14.8
Infants	7.99±0.77	3.15±0.76	22.31±15.42

Table 2. Correlation between serum 25(OH)D levels in mothers and infants

25(OH)D levels in mother(ng/dl)	25(OH) levels in infants (ng/dl)		
	<15	15-20	20-50
<15 (14)	16	02	00
15-20 (30)	12	05	08
20-50 (06)	05	00	04

DISCUSSION

Exclusive breast feeding is increasingly practiced in our country. Reports of subclinical vitamin D deficiency in exclusively Breast fed infants are appearing in abundance in medical literature. Vitamin D deficiency appears before occurrence of clinical features of rickets, which is extreme form of vitamin D deficiency [12], diagnosing this pre-rachitic subclinical vitamin D deficiency is very important for non skeletal health benefits. In the present study average serum calcium level and 25(OH) D levels of mothers were low. Our results are agreed with other studies reported by Bhalala & Desai [13] were 8.59 ± 0.55 mg/dl and 22.99 ± 10.93 ng/ml respectively which were comparable to our study. Another study showed mean serum 25 (OH) D levels of mothers as 8.89 ± 5.97ng/ml which was lower as compare to other study [9]. There are number of reports in literature on high

prevalence of 25(OH)D deficiency in pregnant and lactating women [11, 12, 13]. Seventy percent of infants enrolled in our study had deficient & 10% had insufficient 25(OH) D levels.

CONCLUSION

In conclusion, both mother and infant pair in our study showed hypocalcaemia and vitamin D deficiency. Vitamin D and calcium deficiencies in pregnancy can adversely affect fetal growth and limit fetal bone Mass. Babies will be born with congenital rickets, resulting to poor skeletal growth and its complications. Adequate vitamin D supplementation to pregnant and lactating mothers and to exclusively breastfed Infants will help in achieving normal bone health and will also lower the risk of future cancers, autoimmune and cardiovascular diseases. Large randomized control trials are required in this context to make vitamin D supplementation as public health policy.

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