

RESEARCH ARTICLE

VITAMIN D LEVEL STATUS OF CHILDREN OF DISTRICT SHOPIAN WITHOUT RICKETS.

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Manuscript Info	Abstract	
<i>Manuscript History</i> Received: 20 February 2022 Final Accepted: 24 March 2022 Published: April 2022 <i>Key words:-</i> Vitamin D, Children, Deficiency, Insufficient, Calcium, Tetany, Seizures, Rickets	 Background: Vitamin D is not actually a vitamin but its deficiency can have deleterious effects in children. The prevalence of vitamin D deficiency ranges from 40 to 90 % in the Indian subcontinent and as much as 40% in the European population for one or the other reasons. Objective: To assess the serum Vitamin D level status of children of district Shopian without rickets. Method: We sampled 60 children aged 1 year to 12 years who attended the hospital for common reasons randomly and their serum vitamin D levels determined after proper and detailed history. Results: Of the 60 children, 66.67% were found to be deficient, 26.7% were found to be insufficient and only 6.66% were found to be sufficient. Conclusion: This study finds that the prevalence of Vitamin D deficiency is very high in the children of district Shopian & a survey with a very large sample size will be ideal and vitamin D suplementation be instituted regularly by the healthcare bodies on the recommended guidelines. 	
Introduction:-		

Vitamins come from food and act as anti-oxidants or co-factors in enzymatic reaction. Although called as a vitamin, it is not actually a vitamin, but rather a steroid hormone which can be synthesized in skin epithelial cells^{1, 2}. Children who spend less time under sun have ineffective vitamin D synthesis as is in the children living in the geographical regions where the winter sun is away from the equator³. Fish liver oils, fatty fish and egg yolks are rich sources .Vitamin D is required for calcium absorption⁵ from the gut & hence, its deficiency can have deleterious effects in children^{4, 5}. The deficiency may lead to hypocalcaemic seizures, tetany in infancy and adolescence to full blown rickets in toddlers⁶. The prevalence of vitamin D deficiency is 50 - 90 % in the Indian subcontinent^{7, 8} and as much as 40% of European population is vitamin D deficient, and 13% are severely deficien⁹. The recent pandemic of Covid-19 also showed that the severity of the infection is more in case of vitamin D deficiency in children¹⁰. The main storage form of vitamin D is 25-hydroxyvitamin D [25(OH) D], which is converted to a biologically active form 1, 25-dihydroxy vitamin D [1, 25 (OH) 2D] in kidneys¹¹. A serum vitamin D level of less than 20ng/ml (50nmol/l) is classified as deficiency by US Endocrine Society classification.

Material & Method:-

This study was conducted at district hospital Shopian in children aged above 1 year and below 13 years. We had a total of 60 consenting children out of which 32 were boys 28 were girls. Children with any underlying disease or taking any medication including vitamin D supplementation were excluded. Serum vitamin D (25 OH D) levels

were measured by chemiluminescence immunoassay (CLIA) method. 25 (OH) D was chosen to be measured in the serum sample as it has a half-life of 2-3 weeks and the levels reflect the true status of vitamin D levels. 1, 25 (OH)2D (Calcitriol) being the active form has a half-life of around 4 hours only and hence does not reflect the true status of vitamin D stores¹².

A serum vitamin D level of less than 20 ng/ml (50 nmol/l) was classified as deficiency as advocated by US Endocrine Society classification and the classification is given as¹³:

US Endocrine Society classification:	
Deficiency	< 20 ng/mL
Insufficiency	21-29 ng/mL.
Sufficiency	> 30 ng/mL.
Toxicity	>150 ng/mL.

Consent:

A proper consent was taken from the parents of the participating children after explaining the whole issue of burden of vitamin D deficiency in local language.

Results:-

As we had a total of 60 consenting children/parents of children of which 32 were boys which made up 53.33% of the sample size & 28 were girls which corresponded to 46.67% of the sample size. Of the 60 participating children, 66.67% were found to be deficient, 26.7% were found to be insufficient and only 6.66% were found to be sufficient. The mean serum 25-OH D level was 17.20867 ng/ml with highest levels of 39.50 ng/ml and the lowest levels of 5.50 ng/ml. The mean serum 25-OH D level in males was 15.71275 ng/ml and mean serum 25-OH D level in females was 18.9182 ng/ml. Both groups were deficient although the girl participants had a little higher level.

Few important parameters of the participants are given as: Age: 1 to 12 year old children. Gender: Males 53.33%, Females 43.67%. Average intake of Vitamin D: 40IU/day. Average Ca⁺² intake in school going children: 779.5 mg/day. Mean serum 25-OH D levels: 17.20867 ng/ml. Mean serum 25-OH D levels in males: 15.71275 ng/ml. Mean serum 25-OH D levels in females: 18.9182 ng/ml. Minimum 25-OH D levels: 5.50 ng/ml. Maximum 25-OH D levels: 39.50 ng/ml Mean serum Ca⁺² levels: 8.62 mg/dl.

Discussion:-

Calcium is very important for the growth of children and in fact plays a great role in metabolism. But for a good homeostasis of calcium, the role of vitamin D is clearly established in literature. In our setup of society, the supplements are hardly taken beyond infancy that too when prescribed by a health care worker. In fact we come across neonates and infants who had never been prescribed vitamin D even in the advanced stage of infancy. In this study we found that a huge proportion of children are vitamin D deficient irrespective of age and gender, summer or winter. The mean levels of vitamin D (17.20867 ng/ml) in around 93% population reflects the magnitude of the burden of the problem of improper diet and inadequacy of the supplementation on the part of the health care workers as well as leniency on the part of the parents regarding the diet of their children. This can be imagined from the fact that we had participants with vitamin D levels of 5.50 ng/ml.

Although this study was conducted in the hospital, we received children from all the areas of the district, different communities, different ages and gender. In order to find the deficiency in the valley of Kashmir, we need to take the sample from all the 10 districts of the valley. As is recommended, the Vitamin D should be supplemented in a daily dose of 400IU/day¹⁴, but the recommendations vary in different countries, ranging from 400 to 2000 IU daily¹⁵. When 100 IU vitamin D is taken daily over a period of 3-4 months, the serum levels increase only by 1 ng/mL¹⁶, hence the responsibility of the health care workers in prescription of vitamin D needs not to be over emphasized.

Conclusion:-

To conclude, the study reveals that the serum vitamin D levels in the children of district Shopian are low and a daily recommended dose should be given to them even after infancy and a very large study must be conducted in children of the whole valley for the same reason.

Recommendation:-

Without overemphasizing, we strongly recommend a proper diet, exposure to the sunlight and the supplementation of vitamin D to all children in the recommended daily doses without rickets so that the level doesn't go too low to present as frank rickets in future.

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References:-

1. Weydert JA, Vitamin D in Children's Health. Children 2014 Sep; 1(2): 208-226.

2. Nair R, Maseeh A, Vitamin D: The "sunshine" vitamin. J. Pharmacol. Pharmacother.2012 Apr; 3(2):118-26.

3. Greenbaum LA, Rickets and Hypervitaminosis D. Nelson Textbook of Pediatrics, 20th edition

4. Voortman T, Vitamin D Deficiency in School-Age Children Is Associated with Sociodemographic and Lifestyle Factors. J. Nutr. 2015; 145: 791–8.

5. Christakos S, Dhawan P, Porta A et al., Vitamin D and Intestinal Calcium Absorption Mol. Cell. Endocrinol. 2011 Dec; 347(1-2): 25–29.

6. Lee JY et al., A Review on Vitamin D Deficiency Treatment in Pediatric Patients. J. Pediatr. Pharmacol. Ther.2013; 18(4):277–291

7. Sharawat I, Sitaraman S, Dawman L, Prevalence of Vitamin D Deficiency among Healthy School Children in Jaipur District, Rajasthan, India * Int. J. Pediatr. 2015 Aug; Vol.3, N.4-2, Serial No.20.

8. Lukose R, Jose J, Subramanian AT. Vitamin - D levels in infants and young children in the era of routine supplementation. J. Evol. Med. Dent. Sci. 2021; 10(03):127-131.

9. Amrein K et al., Vitamin D deficiency 2.0: an update on the current status worldwide. Eur. J. Clin. Nutr.2020; 74:1498–1513.

10. Alpcan A, Tursun S, Kandur Y (2021). Vitamin D levels in children with COVID19: a report from Turkey. Epidemiol. Infect. 2021 Aug; 149:e180:1–4.

11. Zhang R, Naughton DP, Vitamin D in health and disease: Current perspectives. Nutr. J. 2010; 9:65

12. Balasubramanian S et al., Vitamin D Deficiency in Childhood – A Review of Current Guidelines on Diagnosis and Management. Indian Pediatr. 2013Jul; 50(7):669-75

13. Balasubramanian S et al., Vitamin D Deficiency in Childhood – A Review of Current Guidelines on Diagnosis and Management. Indian Pediatr.2013 Jul; 50(7):669-75

14. Taylor SN, Vitamin D in Toddlers, Preschool Children, and Adolescents. Ann. Nutr. Metab.2020; 76(suppl 2):30-40.

15. Institute of Medicine. Dietary reference intakes for calcium and vitamin D. Washington, DC: The National Academies Press; 2011.

16. Weydert JA, Vitamin D in Children's Health. Children 2014 Sep; 1(2): 208-226.