



Research Article

Perturbing Status of Vitamin D among Adolescents in Jammu

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Abstract

Vitamin D deficiency has emerged as pandemic health problem involving both developed as well as developing countries of the world, but still remains the most under diagnosed and under treated nutritional deficiency of the world. Vitamin D deficiency in adolescents may be asymptomatic or may present with vague manifestations including pain in weight bearing joints, difficulty in walking, climbing stairs and muscle cramps and can be easily misdiagnosed as Fibromyalgia, Chronic fatigue syndrome or even simply depression in adolescents. The present study was undertaken with the aim to evaluate the vitamin D status in adolescent population of this part of the country with abundant sunshine and with people having good economic condition. In this study, a total of 120 adolescents, including 45 boys and 75 girls were screened for their vitamin D (25OH – D) status from the month of May 2019 to December 2019. Out this 72 (60%) were having Vitamin D levels below 20 ngm/ml, 25 (20.8%) were having vitamin D level between 20-30 ngm/ml. Only 23(19.1%) had levels above 30 ngm/ml. This study has shown a very high prevalence of vitamin D deficiency in adolescence population of Jammu and it is suggested that all adolescent boys and girls who present with non specific musculoskeletal pains should be screened for vitamin D status.

Introduction

Vitamin D deficiency is very prevalent in India. In our previous studies a very high prevalence of vitamin D deficiency along with other micronutrients has been observed in urban population of Jammu, comprising of pregnant women,¹ school going children² and elderly population of jammu.³ The deficiency of Vitamin D, also known as sunshine vitamin, is very common in adolescents because of their changing life style, adaptation to western diet, decreased

outdoor activities and more indulgence in indoor computer and internet games and less exposure to sunlight, As such vitamin D deficiency has assumed a pandemic proportions and is a major public health problem.⁴ It is essential not only for skeletal growth but is important for many extra skeletal functions also and the deficiency has been linked with high prevalence of osteoporosis, cancer,^{5,6} autoimmune disorders,⁷ diabetes and other metabolic syndromes.⁸ In our previous studies we have found a high prevalence of

vitamin D deficiency among different sections of society in Jammu and continuing our efforts to understand the prevalence of vitamin D deficiency in this region, this study was undertaken to assess vitamin D status in adolescent population of this hilly union territory of India.

Material and Methods

A total of 120 adolescent, including 45 boys and 75 girls were screened for their 25(OH) D status from the month of May 2019 to December 2019. Blood sample were obtained from antecubital vein under aseptic conditions with their consent, duly following the guidelines and norms of the hospital and serum obtained from this was taken for vitamin D level by using Abbott architect chemiluminescent micro particle immunoassay.¹⁰ The cut off value of vitamin D slevel below 20 ngm/ml was considered as severe vitamin D deficiency, 20-30 ngm/ml as insufficiency levels and levels more than 30 ngm/ml as vitamin D sufficiency. In these analysis adolescents with history of diabetes mellitus, thyroid disorder, cardiovascular disorder, metabolic bone disorder

and hyperparathyroidism were excluded from this study. The results were analyzed by applying standard statistical procedures.

Results

In this study a total of 120 adolescent comprising of 45 Boys and 75 Girls were screened for vitamin D 25(OH) D levels in the serum, Out this 72 (60%) were having vitamin D levels below 20 ngm/ml, the mean level was 13.6 ngm/ml, 25(20.8%) were having vitamin D level between 20-30 ngm/ml with a mean value of 24.8 ngm/dl and 23 (19.1%) were having levels above 30 ngm/ml with the mean value 42.4 ngm /ml of vitamin D in their blood. Out of 75 Girls 52 (69. 3%) had severe deficiency with levels below 20 ngm/ml as compared to 20 (44. 4%) out of a total of 45 boys. Also 15 girls out of 75 (20%) had insufficient levels of 25(OH) D in comparison to 10 out of 45 (22.2%) male whereas only 8 (10.6%) girls had sufficient 25(OH)D levels as compared to 15 (33. 3%) adolescent boys (**Table – 1**).

Table 1Prevalence of Vitamin – D Deficiency among Adolescents of Jammu

Study Subjects	25 (OH) D Status		
	Deficient < 20 ngm/ml	Insufficient 20-30 ngm/ml	Sufficient > 30 ngm /ml
Total Subjects <i>n</i> = 120	72 (60%)	25 (20. 8%)	23 (19. 1%)
Mean Value 25 (OH) D ngm/ml	13. 6	24. 8	42. 4
Adolescent Boys <i>n</i> =45	20 (44. 4%)	10 (22. 2%)	15 (33. 3%)
Adolescent Girls <i>n</i> = 75	52 (69. 3%)	15 (20%)	08 (10. 6%)

Discussion

Vitamin D also known as Sun Shine vitamin is an essential hormone for growth and development of bones in adolescents, adequate vitamin D levels in blood is essential for active calcium absorption in the gut and for remodeling of bones. Rickets and osteomalacia secondary to deficiency of 25(OH) D is very high in Asia, Africa and middle east.^{10, 11} In this study, we found a very high prevalence of vitamin D deficiency among adolescent

population with 97 (80.8%) of these having low levels of 25(OH)D in their blood and 72 out of 120(60%) showing severe deficiency (levels less than 20 ngm/ml) and 25(20.8%) with insufficient vitamin D levels (20-30 ngm/ml). In accordance with our findings many studies have shown the prevalence of vitamin D deficiency with rates varying from 30-90%.^{12, 13, 14} In India , Marwah et al have reported high prevalence of severe Vitamin D deficiency (less than 22. 5nmol/l) in

adolescent males (27%) and females (42%).¹⁵ A significant finding of our study was high prevalence of vitamin D deficiency in adolescent girls. The community based Indian studies of the past decade done on apparently healthy controls reported a prevalence ranging from 50% to 94%.^{16,17,18} Clinical presentation of vitamin D deficiency varies according to the severity and duration of deficiency. Vitamin D deficiency in adolescents may be asymptomatic and may go unnoticed for long periods but in severe and prolonged deficiency vertebral compression fractures and fractures of the long bones may occur. Moreover VDD may be misdiagnosed as fibromyalgia, chronic fatigue syndrome, or simply depression in adolescents.^{19,20,21} There is need to create awareness in schools and universities regarding essentiality of vitamin D in our health and at the same time adherence to our age old traditions of balanced diet along with adequate sun exposure and increased outdoor physical activities may be considered.

Conclusion

This analysis has revealed a very prevalence of vitamin D deficiency in adolescent population of this hilly state of India and needs intervention by creating public awareness along with food fortification and adequate exposure to sun light and increased out door sport activities, It may not be necessary to perform universal screening of serum 25(OH)D levels in adolescents, at this stage, but those who presents with non specific musculoskeletal pain, chronic weakness difficulty in climbing stairs and other nonspecific musculoskeletal complaints should be screened for vitamin D status.

References

1. Kaur H, Bhatia AS. Prevalence of Vitamin D deficiency in pregnant women. JMSCR April 2019; 07: 36-39
2. Kaur H, Bhatia AS. High prevalence of Vitamin D Deficiency in school children: Awhistle blower. IJRMS 2019 May; 07(5) :1-3
3. Kaur S, Kaur H, Bhatia AS. Prevalence of Vitamin D deficiency among the urban elderly population in Jammu. JMSCR 2020 March; 08(3) :284-287
4. Ritu G, Ajay Gupta. Vitamin D deficiency in India: prevalence, Causalities and Interventions. Nutrients 2014; 6(2):729– 775.
5. Gorham ED, Garland CF, Garland FC, Grant WB, Mohr SB, et al. Optimal vitamin D status for colorectal cancer prevention : a Quantitative meta analysis. 2007; 32:210-216.
6. Grant WB, Garland CE. Vitamin D as a risk reduction factor for colorectal cancer. Am Fam Physician 2003; 67: 465
7. Hollick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease. Am J Clin Nutr 2004; 80: 1678S-1688S.
8. Martini LA, Wood RJ. Vitamin D status and the metabolic syndrome. Nutr Rev. 2006; 64: 479-486.
9. National Committee for Clinical Laboratory Standards. Procedures for handling and processing of blood specimens; approved guidelines- third edition. NCCLS Document H18-A3; Wayne(PA); NCCLS,2004
10. Prentice A, Vitamin D deficiency: A global perspective. Nutr Rev, 2008; 66(Suppl 2): S 153 – 64.
11. Prentice A, Nutritional rickets around the world. J Steroid Biochem Mol Biol. 2013; 136: 201-6
12. Bassil D, Rahme M, Hoteit M, El-Hajj Fuleihan G. Hypovitaminosis D in the Middle East and North Africa Prevalence, Risk factors and impact on outcomes. Dermato endocrinol. 2013; 5:274-98.
13. Apama P, Muthathal S, Nonckynrih B, Gupta S K. Vitamin D deficiency in India. J Family Med Prim Care.2018; Mar-Apr, 7(2):324-330.

- 14 Harinarayan CV, Akhila H. Modern India and the tale of twin Nutrient Deficiency- Calcium and Vitamin D –Nutrition Trend Data 50 years –retrospective, introspect and prospect. *Front Endocrinol.* 2019; Aug;10: 493
- 15 Marwaha RK, Tondon N, Reddy DR, Aggarwal R, Singh R et al. Vitamin D and bone mineral density status of healthy school children in northern India. *Am J Clin Nutr.* 2005; 82:477-82.
- 16 Chowdhury R, Taneza S, Bhandari N, Sinha B, et al. Vitamin D deficiency predicts infections in young North Indian Children. A secondary Data analysis. *PLOS One.*2017;12 ;e170509.
- 17 Puri S, Marwah RK, Agarwal N, Tondon N, Agarwal R, Grewal K e tal. Vitamin D status of apparently healthy school girls from two different socioeconomic strata in Delhi. Relation to nutrition and lifestyle. *Br J Nutr.* 2008; 99: 876-82.
- 18 Angurana SK, Angurana RS, Mahajan G, Kumar N, Mahajan V. Prevalence of vitamin D deficiency in apparently healthy children in North India. *J Pediatr Endocrinolo Metab.* 2014; 27: 1151-6.
- 19 Plotnikoff GA, Quigley JM. Prevalence of severe hypovitaminosis D in patients with persistent, non specific musculoskeletal pain. *Mayo Clin Proc.*2003;78:1463-70
- 20 Holick MF. Vitamin D deficiency: What a pain it is. *Mayo Clin.Proc.*2003; 78:1457-9
- 21 Soliman A, De Sanctis V, Adel A, Awwa El, Bedair S. Clinical, biochemical and radiologic manifestations of severe vitamin D deficiency in adolescents versus children: Response to therapy. *Georgia Med News.* 2012 ; 210 :58-64.