ORIGINAL ARTICLE

Vitamin D Status in Normal and Disabled School Children

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ABSTRACT

Aim: To find out the vitamin D level in normal and disabled children.
Study Design*:* Descriptive cross-sectional study
Place and duration of study: This study was carried out in a school managed by an NGO, Pakistan society for Rehabilitation of Disabled (PSRD) in Lahoreon 22 Feb 2016.
Methodology: A total of fifty students including 16 normal and 34 disabled were consecutively inducted Blood samples for vitamin D level were drawn in gel tubes and transported to laboratory where tests were performed on Abbott Architect immunodiagnostics system using chemiluminescence technology patented as CHEMIFLEX.Data were analyzed using SPSS version 23.The results are interpreted as means, giving standard deviations. Comparison of mean vitamin D levels were made among normal and disabled, male and female students byusing t-test.
Results: Our study included a total of fifty students. Out of these 34(68%) were disabled and 16(32%) were normal. Mean age was 11 years. Out of the total students,half were boys (50%) and half girls (50%). Mean vitamin D level was 17ng/dl (SD=12.6), with minimum level of 10 ng/dl and maximum of 66ng/dl. A total of 42(84%) students have below normal vitamin D level and 8(16%) normal level. Thirty sevenstudents (74%) were having vitamin D deficiency and 5 (10%) vitamin D insufficiency. Boys have a mean 16ng/dl (SD=13.6) and girls have 19.7ng/dl (SD=11.5) of vitamin D level, respectively. Statistically the observed difference was insignificant (p-value, 0.31).Mean vitamin D level of disabled students was 20 ng/dl (SD=14) while mean vitamin D level of normal student was 13ng/dl (SD=5.8). The observed difference was of no statistical importance (p-value= 0.06)
Conclusion: Our study reveals a significant number of students are suffering from low vitamin D level andno difference between vitamin D levels of disabled and normal childrenpresent.
Key words*:* *V*itamin D, disabled children, chemiluminescence

INTRODUCTION

Vitamin D3 (calciferol) is a fat soluble hormone. Major portionof it comes from 7- dehydrocholesterolon sun exposure.Only less than 10% of the total is derived from the diet[1].This is taken to liver for hydroxylation forming 25-Hydroxyvitamin D (25-OH-D)[2]. It observes another hydroxylation in kidney, transforming it into active 1,25-OH-D form[3]. It is vital for calcium homeostasis and required in a sufficient amount for normal bone development and mineralization [4].

Deficiency of vitamin D_3 is an important health issue all around the world[5,6]. More than one billion are estimated to have low levels all over the world and majorities are asymptomatic[4]. In our region the prevalence of low vitamin D level is 85-98%[4,7]. In Pakistan, among children prevalence is 41%[8]. The deficiency is also present in disabled children[9,10]. Criteria for interpretation of vitamin D_3 values is below[11,12].

Decreased vitamin D level leads to rickets, osteomalcia and osteoporosis. Its deficiency is associated with diseases like multiple sclerosis, diabetes, rheumatoid arthritis, cardiovascular diseases, microbial infections and myopthies[4,5]. American academy of Pediatrics recommends supplementation with 400 IU/ day of vitamin D[13] while Canadian Pediatrics society recommends 800IU/day[14]. This study was conducted to show the vitamin D level in disable and normal students.

Vitamin D Deficiency	Less than 20 ng/ml
Vitamin D insuffiency	21-29 ng/ml
Vitamin D suffiency	Equal or more than 30 ng/ml
Vitamin D toxication	More than 150 ng/ml

METHODOLOGY

This study was conduct in a school managed by an NGO, Pakistan society for Rehabilitation of Disabled (PSRD). Although, the school primarily caters physically handicapped children of various magnitude with no mental disability yet it provides its services to physically normal children, too.Qualified Pediatrician with junior doctor and medical students arranged a visit to the school in collaboration with school administration on 22 February 2016. A total of fifty students including normal and disabled were

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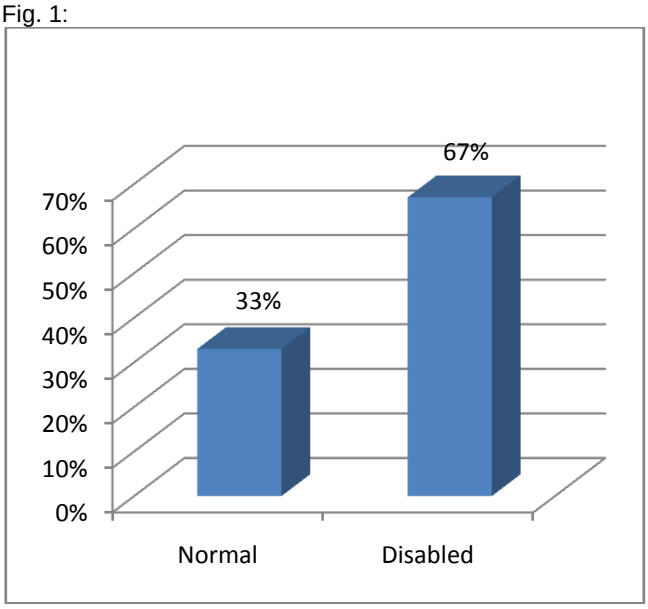
enrolled. A student was considered disable, for the study purpose, if he is unable to walk unassisted and/or one of his/her upper or lower limbs were having functional limitations of any degree. Proformas were filled having the name, age, sex and diagnosis/ disability if present.

Blood samples, a total of 3ml,of the disabled and of the normal students who presented for any of their problems, were drawn in gel tubes and transported to laboratory. The tests were performed on Abbott Architect immunodiagnostics system using chemiluminescence technology patented as CHEMIFLEX. The reagents and kit were stored and used according to manufacturer's instructions. As per guidelines about the vitamin D levels, the results were tabulated into deficient, insufficient, normal and toxic vitamin D levels. Data were analyzed using SPSS version 23. Comparison was made among normal and disabled, male and female studentsbyusing t-test. Results are illustrated by pie charts and bar graphs. These results are interpreted as means, giving standard deviations and mean standard errors.

RESULTS

Our study included a total of fifty students. Out of these 34(68%) were disabled and 16(32%) were normal as shown in figure 1. Mean age was 11 years (minimum age=3 years, maximum=18 years). Half of the total students were boys (50%) and half girls (50%).

Fig. 1:

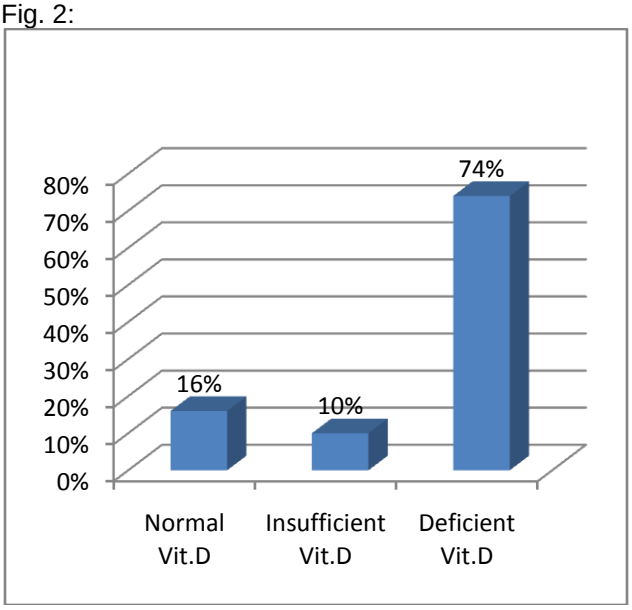


Mean vitamin D level was 17ng/dl (SD=12.6), with minimum level of 10ng/dl and maximum of 66ng/dl. A total of 42 (84%) students have below normal vitamin D level and 8(16%) have normal level. Thirty seven (74%) students were having vitamin D deficiency and 5(10%) have vitamin D insufficiency figure2.I.

Boys have a mean level of 16ng/dl (SD=13.6) and girls 19.7ng/dl (SD=11.5) of vitamin D, respectively. Statistically the observed difference is insignificant (p-value, 0.31).

Mean vitamin D level of disable students was 20 ng/dl (SD= 14) while mean vitamin D level of normal student was 13ng/dl (SD=5.8). The difference is of no statistical importance (p-value= 0.06).

Fig. 2:



DISCUSSION

Vitamin D plays a key role in calcium and phosphate metabolism and is essential for bone health in infants, children and adolescent.[15]The vitamin Ddeficiency has emerged as aglobal epidemic among children and adults[16].Rickets because of vitamin Ddeficiency is not eradicated even in developed countries[17]. Studies conducted in different cities of Pakistan as well as our study strongly advocate the statement.

According to our study 74% students are vitamin D deficient and 10% have insufficient vitamin D level. These are comparable with study results conducted by Haroon K et al, where vitamin D deficiency and insufficiency were 71.5% and 11.3% respectively[18]. The results are also in accordance with the national data reported from Faisalabad where 77.5% of the samples were vitamin D deficient and 18% vitamin D insufficient.[19]In adolescents, deficiency was found from 17% to 47% in a cross sectional.[20] Vitamin D

deficiency was found deficient in 34%, insufficient in 38% and normal in 28% in adolescents presented for acute mental health treatment in the study conducted by Gracious BL, et al[21]. The deficiency of vitamin D was found in 36.7%, insufficiency in 33.3% and only in 30% the levels were normal[22].

The drawback of the study includes not digging deep for various factors like feeding practices, sun exposure, any vitamin intake, use of anti-convulsants or other medical conditions responsible for the vitamin deficiency because of the school setting and shortage of time and lack of historian. The study sample size was too small to make suggestions to outline policies on different levels in the community for the vitamin D supplementation to overcome this global issue.

CONCLUSION

Our study reveals a significant number of students suffering from vitamin D deficiency.No difference in vitamin D level is presentin disabled and normal children studied.

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