

**Original research article**

# A study of height growth associated with vitamin d deficiency

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## **Abstract**

Vitamin D is necessary for the body to absorb calcium and maintain normal bone density. Although it was shown that children with short stature had lower concentrations of vitamin D, there is no conclusive evidence to support a connection between vitamin D and the growth of height in young children, including but not limited to those with short stature. This study puts in an effort to find whether Vitamin D deficiency is associated with Height growth.

**Keywords:** Height, growth, associated, vitamin d, deficiency

## **Introduction**

Vitamin D is the substance that gives rise to 25-hydroxyvitamin D, often known as 25(OH)D. 25(OH)D is then transformed into 1-25-dihydroxyvitamin D, which controls the amount of calcium that is absorbed by the intestines. Ergocalciferol, also known as 25(OH)D<sub>2</sub> and cholecalciferol, sometimes known as 25(OH)D<sub>3</sub>, are the two forms that 25(OH)D can take. The 25(OH)D<sub>3</sub> form is the predominant one in humans<sup>[1]</sup> and it is produced when the skin is exposed to sunlight and undergoes photosynthesis. The half-life of 25(OH)D<sub>3</sub> is approximately 15 days, whereas the half-life of the hormonal form, 1-25-dihydroxyvitamin D<sub>3</sub>, is around 15 hours<sup>[2]</sup>. As a result, 25(OH)D<sub>3</sub> is used as a biomarker for determining the amount of vitamin D in the blood. An insufficient amount of vitamin D can disrupt bone homeostasis, leading to the development of rickets in children and osteomalacia in adults<sup>[3-5]</sup>. Even a vitamin D shortage that is not yet clinically apparent can be followed by an increase in the risk of osteoporosis and fractures<sup>[5, 6]</sup>. The recommendation to take a vitamin D supplement has become increasingly popular during the past ten years in a number of nations<sup>[7, 8]</sup>, but not in the United States. To this day, it has been found that vitamin D has a significant relationship not only with bone health but also with immunity, cardiovascular disease, diabetes and a variety of malignancies<sup>[3, 9-16]</sup>. Although it was discovered that children who were underweight had lower levels of vitamin D<sup>[17]</sup>, there is no conclusive evidence that there is a connection between child growth and vitamin D in a typical population.

## **Aims and Objectives**

To study whether Vitamin D deficiency is associated with Height growth.

## **Materials and Methods**

This study was done in the Department of Paediatrics, Kanachur Institute of Medical Sciences, Mangalore.

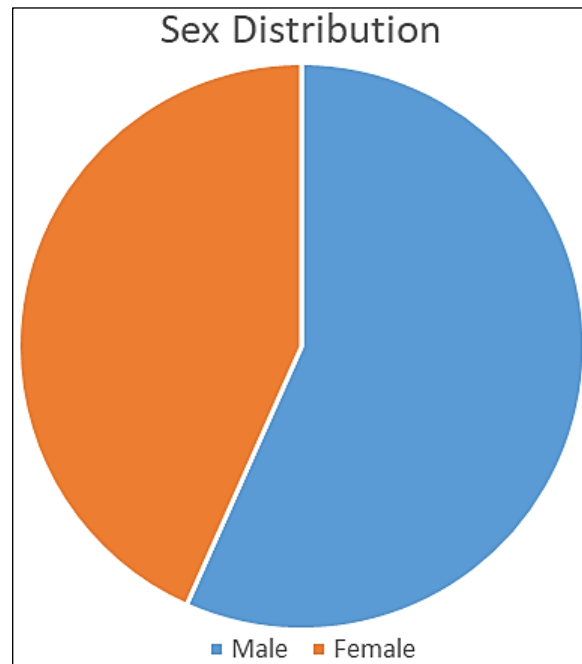
This study was done from Jan 2022 to Jan 2023.

The study was conducted in 30 babies aged between 5 to 6 years.

The height was measured at the beginning of the study and the serum Vitamin D was measured by collecting the blood taking all aseptic measures and was sent to the Department of Biochemistry.

At the end of one year the height of the children and the Vitamin D was measured again. The short stature of the children who were out of negative 2SD were measured and reported.

Results



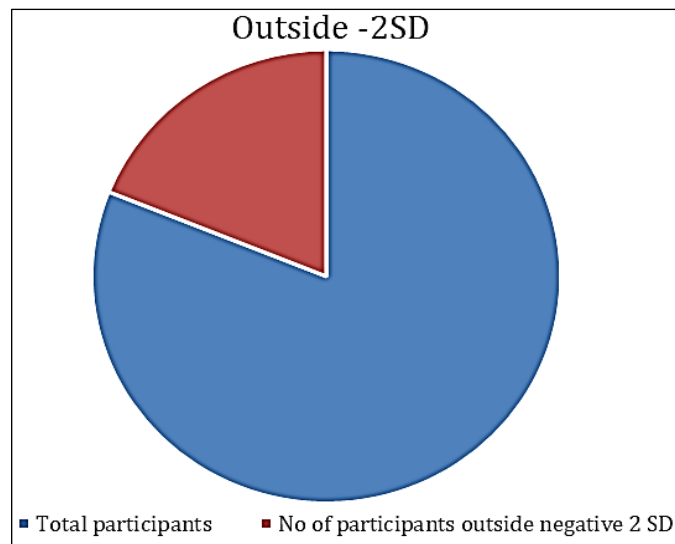
Graph 1: Sex Distribution

Table 1: Vitamin D levels at the beginning of the study

Vitamin D levels (mean) (n=30)	Standard Deviation
23.87ng/ml	±2.89 ng/ml

Table 2: Number of children outside of negative 2SD

Total participants	30
No of participants outside negative 2 SD	07



Graph 2: Number of children outside of negative 2SD

Table 3: Vitamin D levels in this group

Vitamin D levels (mean) (n=30)	Standard Deviation
16.48ng/ml	±1.06 ng/ml

Discussion

The process of growing involves an increase in the dimensions of organs as well as their development, which ultimately results in a shift in the proportions of the body from those that are characteristic of children to those that are typical of adults. The sequence of developmental stages is predetermined

genetically, and each new stage can only begin once the one that came before it has been completed. The pituitary gland's production of growth hormone (GH) occurs in pulsing impulses; the frequency and intensity of these impulses are determined by the individual's age as well as their gender. Hunger, physical effort, sleep deprivation, and psychological stress are some of the physiological responses that might influence the secretion of GH. During sleep, the pituitary gland is responsible for releasing around 70-80% of the total quantity of hormone that is produced in a twenty-four-hour period. The hormone somatotropin has its influence on tissues, which in turn stimulates the healthy growth of all organs. Hence, short stature (SS) is defined as having a body height that is less than the third percentile on a percentile grid or less than two standard deviations (-2SD) from the mean for a certain group. Around three percent of children are affected by this issue. It is well established that GH can influence metabolic processes like cholesterol and glucose management in addition to bone mineralization and body composition. The illness known as GH deficiency, sometimes known as GHD, has been recognized as a distinct disorder, and the clinical and biochemical abnormalities that are associated with GHD patients are common knowledge. These primarily affect the cardiovascular system, the metabolism of lipids, the composition of the body, the metabolism of minerals and one's quality of life. Absorption of nutrients is directly proportional to the rate of growth. The improper consumption of a wide variety of minerals, such as calcium, phosphorus and vitamin D, has been shown to have a deleterious impact on the mineralization and growth of bones. Because there is a great deal of concern regarding calcium, phosphorus, and vitamin D intake, as well as biochemical changes in children and adolescents, the current investigation is looking into the levels of calcium, phosphorus, and vitamin D during growth. These levels are being investigated because there is a great deal of concern regarding biochemical changes in children and adolescents. Calcium plays a significant part in the formation and preservation of peak bone mass during childhood and adolescence, as well as in the prevention of osteoporosis later in life. This is especially true in the case of girls. Both the absorption of calcium and the accumulation of calcium in the bones are influenced by the amount of calcium and vitamin D in the diet. The food history can be used to evaluate the former, while the concentration of 25(OH) D<sub>3</sub> in the serum can be used to evaluate the latter. Because phosphorus may be obtained through diet, deficiency in the body is an extremely unusual occurrence. Rickets, decalcification of the bones and other growth abnormalities can result from a deficiency that goes untreated for an extended period of time.

### Conclusion

Vitamin D levels in the group was observed to be low when compared to the normal group.

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