

Prevalence of vitamin D deficiency in Lalitpur, Nepal

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ABSTRACT

Introduction: Sunlight exposure is the most important source of vitamin D for human beings. We can get vitamin D from other sources such as diet and dietary supplements as well. Human body synthesizes most of the vitamin D from exposure to direct ultraviolet sunlight. The deficiency of vitamin D is a major public health problem worldwide. It is deficiency of vitamin D level when blood serum which is below 30ng/ml. The deficiency is associated with various musculoskeletal diseases and autoimmune diseases. The early detection of deficiency plays an important role to prevent those diseases. The aim of the study is to find the prevalence of vitamin D deficiency.

Method: A retrospective study was conducted in Star Hospital Sanepa, Lalitpur, Nepal, from first January 2018 to 31 December 2018. All patients attended outpatient door with multiple complaints like; backache, muscle pain, leg pain was tested for Vit D3.

Result: A total of 786 patients had tested vitamin D levels, where 717 (91.2%) had deficiency and 69 had normal levels. Adult females were found to be vitamin D deficient than the adult male population.

Conclusion: Vitamin D deficiency was found to be higher in females than males in Lalitpur district Nepal.

Keywords: Nepal, prevalence, sunlight, vitamin D deficiency

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INTRODUCTION

Vitamin D deficiency is recognized as a major public health problem in the world. Vitamin D maintains calcium homeostasis of bone. Low concentrations of vitamin D lead to alterations in calcium and phosphorus homeostasis and results in osteoporosis.¹ The deficiency is due to inadequate exposure to the sun and lack of vitamin D rich diet. It is associated with risk of autoimmune diseases, hypertension, and infectious diseases.² Inadequate/insufficient vitamin D is <75 nmol/l (30 ng/ mL).³

Vitamin D is not sufficiently available in dietary sources. We can get vitamin D from some fish products such as sardines, mackerel, salmon tuna, and fortified margarines, egg yolks and red meat. These vitamin D containing dietary sources can be recommended as part of a healthy balanced diet.⁴ Cholecalciferol which comes from the skin or from the diet, is converted in the liver to 25-hydroxycholecalciferol, which is used to determine a patient's vitamin D status. 25-hydroxycholecalciferol is then converted in the kidneys by the enzyme 1 α -hydroxylase to its active form, 1, 25-dihydroxycholecalciferol. The 1, 25-dihydroxycholecalciferol, also called Calcitriol is the hormonal form of vitamin D which is required for intestinal absorption of calcium.⁵ The rate of secretion of 1, 25-dihydroxycholecalciferol by kidneys is strictly regulated by blood parathyroid hormone level as well as blood calcium and phosphorus levels. Fibroblast growth factor 23 is another important regulating factor which is secreted from the bone. It facilitates sodium-phosphate co-transporters in the cells of kidneys and small intestine and also inhibits the synthesis of 1, 25-dihydroxycholecalciferol. The Calcitriol increases the rate of absorption of calcium from the renal tubules and of calcium and phosphorus from the intestine.⁶

Black people who have pigmented skin and people who have less sunlight exposure are at risk of vitamin D deficiency. Skin concealing garments or use of sunscreen prevents ultraviolet light exposure leading to vitamin D deficiency. Multiple, short interval pregnancies and elderly or housebound people, strict vegetarians or consumption of high phytate containing diet such as wheat bread, malabsorption syndrome and use of certain drugs such as phenytoin,

phenobarbitone, carbamazepine rifampicin, cholestyramine and antiretroviral drugs are other important risk factors for vitamin D deficiency.⁶ Increased deficiency level is the major indicator for metabolic syndrome, cardiovascular disease (CVD), musculoskeletal disorder and osteoporosis.⁷ Early finding of vitamin D deficiency and supplement can decrease the risk of many diseases and mortality rate.⁸

METHOD

A retrospective study was conducted in Star Hospital Lalitpur Nepal from first January 2018 to 31 December 2018. All patients aged seven months to 86 years to attend the outpatient door with multiple complaints like; backache, muscle pain, leg pain, poor appetite, weakness, constipation were included in the study and known cases of vitamin D deficiency were excluded from the study.

Vitamin D range in (ng/ml):

Deficient: less than 20; Insufficient:20-29; Sufficient:30-100; Potential toxicity: more than 100.

Data were collected in a predesigned proforma and analyzed in SPSS version 19.

RESULT

A total of 786 patients had tested vitamin D levels, where 717 (91.2%) had deficiency and 69 had normal levels. Among 786 adult females were 553, where 506 (64.35%) had deficiency among the females, 47 had normal and similarly adult male 222 where 203 (25.82%) had deficiency among the males, 19 had normal.

Out of 786 patients included female 556 (70.7%) and male 230 (29.2%)

Among 786, children less than 15 years were 11(1.3%).

Out of 11 children male eight where six (0.76%) had deficiency and two had normal, female there were two (0.25%) had deficiency and one had normal.

In our study, the lowest value was 6.04 and the highest value was 135.

Table 1. Prevalence of vitamin D in total patients

Total deficient N (%)	717 (91.22)
Total non-deficient N (%)	69 (8.75)
Total N (%)	786 (100)

Table 2. Prevalence of vitamin D deficiency in different groups

Groups	Vitamin deficient N (%)	Vitamin non deficient N (%)	Total N (%)
Adult female	506 (64.37)	47 (5.97)	553 (70.35)
Adult male	203 (25.82)	19 (2.41)	222 (28.24)
Child male	6 (0.76)	2 (0.25)	8 (1.01)
Child female	2 (0.25)	1 (0.12)	3 (0.38)

DISCUSSION

In our study, the prevalence of vitamin D deficiency in Lalitpur Nepal was found to be 91.2%, similar to the study of Ning Z, et al. 92.3%.⁹

Another study done in Beijing by Ning Z. et al. showed the prevalence of deficiency by 87.1%.⁹

Another study done in Nepal by Rai et al. showed the prevalence of deficiency by 73.6%.¹⁰ A study done by Forrest KY showed prevalence of 41.65% in US adults. Maximum 82.1% deficiency was seen black population.¹¹ Similar to this study, a study done in Beijing showed the higher rate of prevalence in female 89.0% and male was 84.9%.¹² A study of Saudi Arabia showed prevalence of male deficient was 87.8%.¹³ A study of Northern Vietnam showed the prevalence of vitamin D deficiency in women was 30%, almost two-fold higher than in men (16%).¹⁴

CONCLUSION

Vitamin D deficiency is on the rise globally. In our study, we can conclude that even with abundance of sunlight vitamin D deficiency is prevalent in Nepal. The leading cause of this can be attributed to lack of outdoor activities, pollution causing reduced exposure to ultraviolet B induced Vitamin D production in the skin.

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