Research Article

iMedPub Journals
http://www.imedpub.com

Medical Case Reports
ISSN 2471-8041

2021
Vol. 7 No. 7: 193

Prevalence of Vitamin D Deficiency in Nepalese Population

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Received date: July 05, 2021; **Accepted date:** July 19, 2021; **Published date:** July 26, 2021

Citation: Satish CY, Dev SY (2021) Prevalence of Vitamin D Deficiency in Nepalese Population. Med Case Rep Vol.7 No.7.193

Abstract

Introduction: Vitamin D deficiency is a global health issue. Dietary vitamin D deficiency combined with insufficient exposure to the sun causes vitamin D scarcity. The Low level of Vitamin D is linked to various diseases such as Hypertension, musculoskeletal, cardiovascular, and autoimmune diseases. The main objective of this study is to find out the prevalence of vitamin D deficiency in the adult's Nepalese population.

Patients and Methods: This is a descriptive cross-sectional study that was carried out in Kathmandu; Nepal.7075 patients were included in this study whose age was between 18 to 70 years. Vitamin D level was analyzed by quantitative chemiluminescent immunoassay (CLIA) methods and Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) 16.0 software.

Results: Out of 7075 patients, vitamin D deficiency was found in 53.17% population, whereas male's had 11.85% and females had 37.31% deficiency.

Conclusion: The prevalence of vitamin D deficiency was high in the overall population. Vitamin D deficiency was found to be higher in females than males. The early detection of deficiency plays important role in the prevention of diseases.

Keywords: Prevalence; Male; Female; Vitamin D deficiency

Introduction

Vitamin D deficiency is a global health issue and estimated one billion individuals worldwide, of all races and ages are either deficient or insufficient of vitamin D level [1]. Dietary vitamin D deficiency combined with insufficient exposure to the sun causes vitamin D scarcity. Low level of vitamin D leads to poor bone mineralization and destruction, which result in skeletal softening diseases, such as rickets and osteomalacia in kids and adults respectively [2]. Normally, intestinal absorption of dietary calcium in healthy individual is 60 to 80%, whereas in vitamin D deficient its only 15% [3]. Vitamin D deficient causes loss of bone density, which causes osteoporosis and fractures (broken bones). vitamin D deficiency can also lead to various other diseases. In children, it can cause rickets. Rickets is a rare disease that causes the bones to become tender and fragile. African and American infants and children are at more risk of getting rickets. In elderly, vitamin D deficiency leads to osteomalacia. Osteomalacia leads to weakening of bones, bone pain, and muscle weakness.

Researchers through their studies have revealed that vitamin D has possible connections to several medical conditions, including diabetes, high blood pressure, cancer, and autoimmune conditions such as multiple sclerosis. They are required to do more research work before they can understand the effects of vitamin D on these conditions.

Vitamin D deficiency is linked to autoim¬mune diseases, hypertension, and infectious diseases [4]. In addition it may cause metabolic syndrome, cardiovascular disease, musculoskeletal disorder and osteopo¬rosis [5].

The reference Daily Intake (RDI) recommendations of daily vitamin D intake are 20 µg [6]. However, it may vary according to exact definition, age, pregnancy and lactation, and the assumptions are made regarding the skin synthesis of vitamin D.

The main aim of this research was to find out prevalence of vitamin D deficiency in adults Nepalese population in Kathmandu.

Patients and Methods

This is a descriptive cross-sectional study, conducted at Grande International Hospital, Kathmandu, from 1st Jan 2019 to 31st December 2019. Data were randomly collected from all patients who visited to the hospital for health checkup. Prior to the study, consent was taken from Institutional Review Committee. 7075 patients are included in this study whose age was between 18 to 70 years. Patients below 18 years above 70 years, chronic disease and malignancy were excluded.

Levels of vitamin D were analyzed by quantitative chemiluminescent immunoassay (CLIA) methods by using Vitros 5600 integrated system (Ortho clinical diagnostics, Raritan, New jersey, USA). The value less than 20 ng/ml were considered as deficient, 20-29 ng/ml insufficient, 30-100 ng/ml sufficient and

above >100 potential toxicity [7].

Statistical analysis was performed using SPSS 16.0 software (IBM Corp., Armonk, NY, USA). Data are presented as means ± standard deviation, percentage, Bar graph and Pie chart.

Results

A total 7075 patients are included in this study, among them 2289 are male (Mean age ± SD: 46.9 ± 16.57) and 4786 are female (Mean age ± SD:45.19 ± 15.22). Out of total male patients 1122 (49.01%) were supplemented with Vitamin D, among them 321(14.02%) were deficient, 801(34.99%) were insufficient while, 1167(50.98%) patient had normal vitamin D level. Out of total female patients 4786(55.9%) were found to have Vitamin D deficit, among them 981(20.49%) were deficient, 1659(35.41%) were insufficient and 2148(44.85%) patient had normal vitamin D level.

The prevalence of vitamin D among total population 7075: 3762(53.17%) was found to have deficient, needed supplements and 3313(46.83%) patients had normal level. Among total population none of them had potential toxicity that is more than 100 ng/ml.

The prevalence of vitamin D in Different Gender is shown in (Table 1). The prevalence of vitamin D; deficient (D), insufficient (I) and sufficient (S) in among total population are shown in pie chart (Figure 1). The prevalence of vitamin D in male and female are shown in (Figure 2).

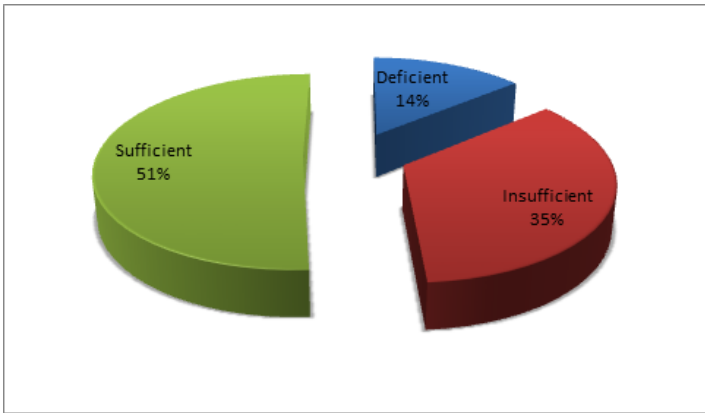

Figure 1 Prevalence of vitamin D among total population

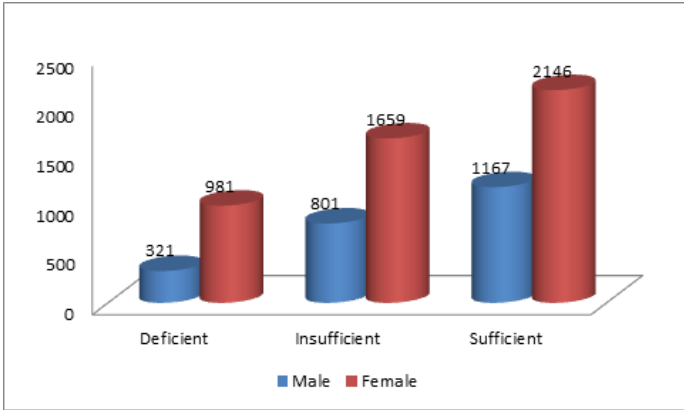

Figure 2 Prevalence of vitamin D in male and female population

Table 1 The prevalence of vitamin D in Different Gender

Gender	Vitamin D deficient (%)	Vitamin D insufficient (%)	Vitamin D sufficient (%)	Total No. (%)
Male	321 (4.53%)	801 (11.32%)	1167 (16.49%)	2289 (32.35%)
Female	981 (13.86%)	1659 (23.45%)	2146 (30.33%)	4786 (67.65%)
Total	1302 (18.40%)	2460 (34.77%)	3313 (46.83%)	7075 (100%)

Discussion

Vitamin D is cholesterol derived fat soluble steroid hormone that comes in two forms: ergocalciferol (vitamin D2) and cholecalciferol (vitamin D3), both of which are produced endogenously in the dermis from 7 dehydrocholesterol in response to ultraviolet light (UVB) from the sun. It is believed that 200 to 800 IU of vitamin D per day is needed, which tends to be difficult to achieve with diet such as fish, milk, eggs alone [8,9] therefore, exposure to UVB light is a major contributor in maintaining vitamin D levels. Modern indoor lifestyle, clothing and seasonal sunshine have a huge impact on sun exposure, which is why in the UK vitamin D levels in February are half that compared with September [8,9].

Vitamin D levels in the blood can last only a few weeks, whereas vitamin D deposited in adipose tissue can last up to three months [10] Physiological and environmental factors also cause significant variance in 25 hydroxyvitamin D levels within populations [11] Vitamin D3 from dermal amalgamation because of UVB-radiation is a significant wellspring of Vitamin D3, and as often as possible revealed reason for Vitamin D3. Inadequacy is aversion of the sun additional social components. In Nepal there is no social aversion of the sun and rather a custom of sunbathing. In certain spaces of Nepal there is a practice of outside breastfeeding, with resulting baby sun-openness, and these propensities have recently been believed to be related with Vitamin D3 status in Nepalese youngsters. Outside breastfeeding propensities could be a potential clarification for the great Vitamin D3 status in the newborn children. Furthermore, the practice in the Bhaktapur space of sunbathing the children while kneading them in oil would likewise unquestionably add to the skin-union of Vitamin D3 in the babies. Sun-openness was not exactly researched, yet contrasts in sun-openness are a potential justification Vitamin D3 adequacy among newborn children and deficiency among the moms [12]. The limit of Vitamin D3 combination has additionally been accounted to be somewhat reliant of the age of the skin, which could add to contrasts Pollution, more obscure skin tone, maturing, and prior comorbidities like heftiness would all be able to raise the danger of Vitamin D3 lack. In fact, dietary Vitamin D3 admission might vary contingent upon the kind taken, with nourishing exploration recommending that cholecalciferol is more successful than ergocalciferol, but this is yet far from being obviously true. The qualities of this investigation are the high reaction rate from a huge delegate test of lactating ladies

and their breastfed newborn children, just as the quantity of examples acquired. There are a few limits in any case. Sun-list information and related components incorporating time spent in the sun, covering with garments and skin pigmentation, were not gathered. Albeit definite sun-openness records are hard to get, this might have added valuable data in regards to Vitamin D3 sources. The IOM report suggest that Vitamin D3 admission should cover the every day prerequisites of Vitamin D3, and debilitate to depend on daylight openness to deliver Vitamin D3 in the skin in any populace, and even in southern environments with plentiful daylight. The Vitamin D3 substance of food sources and enhancements couldn't be resolved because of lacking food tables. As indicated by the proposal of covering Vitamin D3 prerequisites from dietary sources, we subsequently can't make any inferences with respect to the need of Vitamin D3 supplementation from these outcomes. At last, the diverse tests utilized for estimating plasma-or serum-25(OH) have various qualities and shortcomings. As most business LC-MS/MS-measures, examines the utilization in this investigation and didn't gauge C3-epimers, and an overestimation in the 25(OH) focus due to dormant C3-epimers cannot be prohibited [13].

Traditional and religious dressing practices and lifestyles are believed to be the cause of vitamin D deficiency, especially among women. Due to religious beliefs or beauty concern, the majority of people in Nepal, particularly women, dress up that shields the bulk of their skin from sunlight, affecting vitamin D synthesis. The current study found that females had lower vitamin D levels than males, which was consistent with earlier research.

The study's limitation is that it was conducted at only one hospital and so cannot be applied to other hospitals. If the personal history of sun exposure and eating habits were included, the research would be more beneficial.

Conclusion

In comparison to prior studies, the prevalence of Vitamin D deficiency is higher. Females have a higher percentage of Vitamin D deficiency than males. If the deficiency can detected early on, and prompt treatment could be given, it would prevent complications.

Conflict of Interest

None

Acknowledgement

The authors would like to thank all the participating centers and corresponding staff member involved in this trial.

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