

## Vitamin D Deficiency among Patients Presenting to Outpatient Department of Medicine of a Tertiary Care Centre: A Descriptive Cross-sectional Study

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### ABSTRACT

**Introduction:** Vitamin D deficiency is a global health concern with over billions of people worldwide being vitamin D deficient or insufficient. Many epidemiological studies have reported cardiovascular diseases, autoimmune diseases and neoplastic diseases to be associated with vitamin D levels. This study aims to find out the prevalence of vitamin D deficiency in patients presenting to the outpatient Department of Medicine of a tertiary care centre.

**Methods:** This was a descriptive cross-sectional study done among 362 patients in the outpatient Department of Medicine of a tertiary care centre between May, 2016 and August, 2016. Ethical Approval was taken from Institutional Review Committee (Reference number: 21082015). Convenience sampling was done. Informed consent was obtained and data were collected. Data were analysed using the Statistical Package for the Social Science version 25.0. Point estimate at a 95% Confidence Interval was calculated along with frequency and percentages for binary data.

**Results:** Out of 362 patients, vitamin D deficiency was found in 215 (59.39%) (54.33-64.45 at 95% Confidence Interval) patients.

**Conclusions:** The prevalence of vitamin D deficiency was found to be lower to the other studies done in similar settings. Physicians should be aware of the growing prevalence of vitamin D deficiency.

**Keywords:** *avitaminosis; prevalence; vitamin deficiency.*

### INTRODUCTION

Vitamin D is a steroid hormone that helps in the metabolism of minerals, especially calcium, and is essential for healthy bones.<sup>1</sup> Vitamin D is also important for growing children and adolescents, especially for extraskeletal functions such as improvement of glycaemic control through augmentation of insulin production,<sup>2</sup> reductions of fasting plasma glucose and insulin resistance,<sup>3</sup> improvements in cardiovascular function<sup>4</sup> and both innate and adaptive immune system.<sup>5</sup>

Over billions of people worldwide are vitamin D deficient or insufficient.<sup>6</sup> Vitamin D levels have been associated with various diseases.<sup>7-9</sup>

The objective of our study is to find out the prevalence of vitamin D deficiency in patients presenting to the outpatient Department of Medicine of a tertiary care centre.

### METHODS

This was a descriptive cross-sectional study done in the Outpatient Department of Medicine of Kathmandu Medical College and Teaching Hospital between May,

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2016 to August, 2016. Ethical Approval was taken from the Institutional Review Committee (IRC) (Reference number: 21082015). Convenience sampling was done. Informed consent was obtained once participants agreed to the study. The sample size was calculated using the following formula:

$$n = (Z^2 \times p \times q) / e^2$$

$$= (1.96^2 \times 0.74 \times 0.26) / 0.05^2$$

$$= 296$$

Where,

n= minimum required sample size

Z= 1.96 at 95% Confidence Interval (CI)

p= prevalence of vitamin D deficiency, 73.6%<sup>10</sup>

q= 1-p

e= margin of error, 5%

The total sample size is 296. Adding a 10% non-response rate, the sample size was found to be 326. However, 362 sample size was taken. Data was collected using a proforma focusing on the socio-demographic profile of patients such as age, marital status, occupation, education, religion, caste, socio-economic status, personal history of medical illness, alcohol use, and tobacco use.

Vitamin D deficiency was defined as 25(OH)D of <20 ng/ml; vitamin D insufficiency as 25(OH)D of 20 to 29.9 ng/ml and vitamin D sufficiency as 25(OH)D of ≥30 ng/ml.<sup>11</sup> Data were analysed using the Statistical Package for the Social Science version 25.0. Point estimate at a 95% Confidence Interval was calculated along with frequency and percentages for binary data.

## RESULTS

Out of 362 patients, vitamin D deficiency was found in 215 (59.39%) (54.33-64.45 at 95% Confidence Interval) patients. Among them, 117 (54.41%) were below 53 years of age and 98 (48.58%) were below 53 years of age. Vitamin D deficiency was more common among females 112 (52.09%). The sociodemographic details of the patients with vitamin D deficiency are tabulated below (Table 1).

Variables	n (%)	
<b>Age</b>	<53 years	117 (54.41)
	53 years and above	98 (45.58)
<b>Sex</b>	Males	103 (47.90)
	Females	112 (52.09)
<b>Education</b>	Non-formal	91 (42.32)
	Formal	124 (57.67)
<b>Working status</b>	Unemployed	101 (46.97)
	Employed	114 (53.02)
<b>Alcohol use</b>	Yes	51 (23.72)
	No	164 (76.27)

<b>Tobacco use</b>	Yes	23 (10.69)
	No	191 (88.83)
	Ex-user	1 (0.46)
<b>BMI</b>	<25	88 (40.93)
	25 and above	127 (59.06)

One hundred fifteen (53.48%) patients had hypertension and 55 (25.58%) had diabetes mellitus (Table 2).

**Table 2. Vitamin D deficiency in patient with comorbidities (n= 215).**

Variables	n (%)	
<b>Duration of hypertension</b>	Up to 8 years	75 (34.88)
	8 years and above	140 (65.11)
<b>Duration of diabetes mellitus</b>	Up to 9 years	37 (17.20)
	9 years and above	178 (82.79)
<b>Thyroid function test</b>	Normal	147 (68.37)
	Hyperthyroidism	14 (6.51)
	Hypothyroidism	54 (25.11)

## DISCUSSION

There is ample of evidence to prove that vitamin D deficiency is responsible for multiple chronic conditions like diabetes mellitus, hypertension, cardiovascular disease, and several other autoimmune disorders.<sup>9</sup> With the growing prevalence of vitamin D deficiency across the world, it has become more important than ever to study the prevalence of vitamin D and to pinpoint the risk factors for vitamin D deficiency.

The main finding from our study was that 59.39% had vitamin D levels less than 20 ng/ml. The study from Nepal reported the prevalence of vitamin D deficiency was 73.6% among patients presenting to tertiary care centre which is found to be slightly higher than our study.<sup>10</sup> A study reported that vitamin D levels lower than 20 ng/ml were seen in about 30% to 50% of children and adults, in the United Arab Emirates, Australia, Turkey, India and Lebanon.<sup>12</sup>

Various studies from Nepal have shown similar findings. A retrospective study was done in Star Hospital, Sanepa with a total of 786 patients whose vitamin D levels were tested showed 717 (91.2%) had deficiency which is higher than the finding of our study. Adult females were found to be vitamin D deficient than the adult male population whose finding is similar to that of this study.<sup>13</sup>

In a study conducted at Manipal College of Medical Sciences, the mean vitamin D level was low in the age group above 60 years as compared to other age group patients. Prevalence of low levels of vitamin D was seen more in females (90.3%) as compared to males (68.0%).<sup>14</sup>

A study done by showed diabetes mellitus was seen

present as a comorbidity with vitamin deficiency which is in agreement with this study.<sup>15</sup> One-fourth of the patient with Vitamin D deficiency in our study had hypothyroidism. Vitamin D deficiency is usually associated with hypothyroidism. Many studies supported this hypothesis.<sup>16</sup>

A cross-sectional study conducted in Kathmandu Medical College reported out of total of 384 patients, vitamin D deficiency was found among 283 (73.6%) patients at 95% of CI (68.6-78.6). Out of total female patients, 202 (52.61%) were deficient and out of total male patients, 81 (21.08%) were deficient which is similar to the findings of this study as 178 (82.8) with diabetes of longer duration than 9 years had vitamin D deficiency.<sup>10</sup>

A cross-sectional study done among 2158 patients in western Nepal showed that 1590 (73.68%) had vitamin D deficiency, whereas only 568 (26.32%) had optimum level of vitamin D. Females were more deficient than male by 5.29% which is similar to this study.<sup>17</sup> Similarly, a cross-sectional study based on the hospital registry of patients at College of Medical Sciences and Teaching

Hospital, Bharatpur showed higher level of vitamin D deficiency in the females than in the males (72.4% vs 64.2%) which is similar to the finding of this study.<sup>18</sup>

There has been several limitations in our study. First, as it was a cross-sectional study, we could not establish a causal relationship based on the results. The participants were regular patients presenting in the general medicine OPD, so the result could not be compared to the general population.

## CONCLUSIONS

The prevalence of vitamin D deficiency was found to be lower to the other studies done in similar settings. Physicians should be aware of the growing prevalence of vitamin D deficiency not only among patients and more research needs to be conducted to pinpoint the effects of socio-demographic factors on vitamin D deficiency. More research needs to be conducted to pinpoint the effects of socio-demographic factors on Vitamin D deficiency.

**Conflict of Interest: None.**

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