Original Research Article Journal of National Heart & Lung Society Nepal

Vol-4. No. 2, Jul-Dec 2025 DOI: 10.3126/jnhls.v4i2.87929 ISSN: 2091-0657 (Online & Print)

Status of Vitamin D among Patients Attending Internal Medicine Department in a Tertiary Care Centre of Rural Nepal: A Hospital Based Cross-Sectional Study

Rajendra Mani Giri[1], **Sanjeev Joshi**[1], **Ram Chandra Panthi**[1], **Sanjeev Gautam**[1], **Kushal Raj Joshi**[1], **Sandip Kumar Sharma**[2], **Manish Rokaya**[3]

[1]Department of Internal Medicine, Karnali Academy of Health Sciences, Jumla, Nepal, [2]Department of Obstetrics and Gynaecology, Institute of Medicine, Maharajgunj, Kathmandu, Nepal, [3]Department of Public Health, Karnali Academy of Health Sciences, Jumla, Nepal.

Received: 5th October, 2025 Accepted: 8th November, 2025 Published: 31st December, 2025

ABSTRACT

Background: Vitamin D deficiency is a pandemic with global prevalence estimated to be 47.9%. Many factors like sunlight exposure, seasonal and geographic variability affect vitamin D levels. This study, conducted in a high altitude location of the mountainous region of western Nepal helps to identify prevalence and associated factors of vitamin D deficiency.

Methods: This was a hospital based observational, cross sectional study done on 372 patients attending internal medicine outpatient department of Karnali Academy of Health Sciences, Jumla during June to September 2025. Serum vitamin D levels were assessed and the distribution of vitamin D levels with age, sex, ethnicity, occupation and education studied. Vitamin D levels were characterised as 5(OH)D concentration 50nmol/L or 20ng/ml as vitamin D deficiency, serum 25(OH)D levels of 51-74 nmol/L or 21-29ng/ml as insufficiency, and levels ≥30 ng/ml as sufficient.

Results: Prevalence of vitamin D deficiency was 34% and insufficiency was 43%. The prevalence of vitamin D deficiency was significantly higher among females (38%, compared to 26% in males), those with indoor activity (53%) and those with university education (53%). There was no difference in vitamin D levels between age or ethnicity.

Conclusion: Overall 77% had inadequate vitamin D levels. Most affected groups were female, those with indoor activity and those with university education.

Keywords: prevalence; vitamin D deficiency; Nepal.

INTRODUCTION

Vitamin D deficiency is pandemic, yet one of the under-diagnosed and under-treated deficiency in the world.[1] Vitamin D is a fat-soluble micronutrient, involved in the regulation of various physiological processes that helps in the maintenance of calcium homeostasis as well as bone mineralization and reabsorption.[2] Concerns regarding vitamin D deficiency have been rising as it can lead to a spectrum of consequences ranging from bone diseases, diabetes mellitus, cardiovascular diseases, and autoimmune diseases as well as play a part in the prognosis of various cancers.[3] As per study reports, global prevalence of vitamin D deficiency is estimated to be 47.9%.[4] Data from neighboring countries of Nepal including India and China also report a high prevalence of vitamin D deficiency.[5,6] Various studies in Nepal have shown prevalence of vitamin D deficiency.[5,7,8] A number of factors have been implicated for this deficiency which ranges from the degree of sunlight exposure as well as geographical location.[3] This is the first study conducted in a tertiary level hospital of Karnali

Correspondence: Dr. Rajendra Mani Giri, Department of Internal Medicine, Karnali Academy of Health Sciences, Jumla, Nepal. Email: rajendramanigiri1989@gmail.com, Phone: +977-9868336254.

province that will provide vitamin D status to rural people in the upper hilly and mountainous region of mid western Nepal.

METHODS

This was an observational, quantitative, cross-sectional study conducted during June 2025 to September 2025 among patients presenting to the Internal Medicine outpatient department of Karnali Academy of Health Sciences, Jumla. The sample size was calculated by considering the estimated proportion of Vitamin-D deficiency as 59% from the study done by Karki A et al[7], a 95% confidence interval and allowable error 5% using Cochran's formula: $n = [Z^2*P*(1 - P)]/E^2$, where, n=Minimum sample size, Z=Z-score (95% confidence level)=1.96, P=expected prevalence rate = 59%(10) and E=Margin of error = 5%. All patients presenting to the Internal Medicine outpatient department of Karnali Academy of Health Sciences during June 2025 to September 2025 were included. Patients already taking vitamin D supplements, known chronic illnesses like Chronic Kidney Disease (CKD), parathyroid disorders, malignancy, any chronic inflammatory conditions and pregnancy, and those who refuse to provide consent were excluded. Ethical approval was taken from the Institutional Review Committee (IRC-KAHS reference number 2025/061) of Karnali Academy of Health Sciences. A written informed consent was taken from all consenting patients. Data regarding demographic information and presenting symptoms were collected using structured proforma. Serum levels were obtained and Vitamin D levels measured using a LIAISON analyzer with chemiluminescence immunoassay (CLIA) technology from DiaSorin, Italy at Karnali Academy of Health Sciences (KAHS).Vitamin D deficiency was categorized as levels of 25(OH)D concentration 50 nmol/L or 20 ng/ml as vitamin D deficiency, serum 25(OH)D levels of 51-74 nmol/L or 21-29 ng/ml as insufficiency, and levels ≥30 ng/ml as sufficient.[9] Data was entered in Microsoft Excel spreadsheet. Categorical variables are presented as frequencies and percentages. Analytical tests were done using SPSS version 29.

RESULTS

A total of 372 participants were included in the study. The baseline demographic characteristics are listed in Table 1.

Table 1. Baseline demographic characteristics among study participants. (n=372)

Characteristic	Frequency (%)
Age of the Patient in years (mean ±SD) = 45.12±16.93	
Serum level of Vitamin D in ng/ml (mean ±SD)= 24.67±11.40	
Sex	
Male	117(31)
Female	255(69)
Ethnicity	
Chhetri	191(51)
Brahmin	62(17)
Janajati	25(6.7)
Dalit	52(14)
Others	42(11)
Occupation	
Indoor work	75(20)
Outdoor work	9(2.4)
Mixed work	288(77)
Bone pain	214(58)
Muscle pain	112(30)
Fatigue	115(31)
Depression	10(2.7)
Any Symptoms	246(66)

Overall, vitamin D deficiency was found in 128(34%) participants. Insufficiency was observed in 159(43%) patients, while 85(23%) participants had sufficient vitamin D levels. The mean serum vitamin D level was 24.67±11.40 ng/ml with a median of 23.25 ng/ml (interquartile range: 18.00-29.50 ng/ml). Notably, 287 participants (77%) had inadequate vitamin D levels, defined as either deficiency or insufficiency combined. The mean age of the participants was 45.12±16.93 years. The majority were females. The study included 117(31%) males and 255 (69%) females. There was a statistically significant difference in vitamin D status between male and female (p-value=0.040). Among males, 30(26%) had deficiency, 54(46%) had insufficiency, and 33 (28%) had sufficient levels. In contrast, females showed higher deficiency rates with 98(38%) being deficient, 105(41%) insufficient, and only 52(20%) having sufficient vitamin D levels. The

age-wise distribution of vitamin D levels is listed in Table 2. No significant differences were observed between different age groups.

Regarding ethnicity, the majority were Chhetri (191 participants, 51%), followed by Brahmin (62 participants, 17%), Dalit (52 participants, 14%), Others (42 participants, 11%), and Janajati (25 participants, 6.7%). However, no significant association was found between ethnicity and vitamin D status (p-value=0.8).

Occupation showed significant association with vitamin D levels (p-value<0.001). Most participants performed mixed work (288 participants, 77%), while 75 (20%) did indoor work and only 9(2.4%) did outdoor work. Indoor workers had the lowest mean vitamin D level at 20.13 ± 10.95 ng/ml, followed by outdoor workers at 19.22±6.97 ng/ml, while mixed workers had significantly higher levels at 26.02±11.30 ng/ml. Deficiency rates were highest among outdoor workers with 5 patients (56%), indoor workers with 40 patients (53%), compared to mixed workers with 83 patients (29%). The distribution of education with vitamin D deficiency is listed in Table 3. Lower mean vitamin D levels were observed in those with higher education qualification.

Regarding clinical symptoms, 246(66%) participants reported at least one symptom. Bone pain was the most prevalent symptom, affecting 214(58%) participants, followed by fatigue in 115(31%) participants and muscle pain in 112(30%) participants. Depression was relatively uncommon, present in only 10(2.7%) participants. Among the 128 deficient patients, 18 had severe deficiency (vitamin D <10 ng/ml) while 110 had moderate deficiency (vitamin D 10-19.9 ng/ml). Symptoms were present in 116(91%) of all deficient patients. Muscle pain showed a statistically significant association with the severity of deficiency (p-value=0.002), being present in 16 patients (89%) with severe deficiency compared to 51 patients (46%) with moderate deficiency.

Table 2. Age related distribution of vitamin D levels in study participants. (n=372)

Characteristic	Overall n=372[1] n(%)	<20 n=128[1] n(%)	20-30 n=159[1] n(%)	>30 n=85[1] n(%)	p-value[2]
Age categories (years)					
<15	5 (1.3%)	2 (1.6%)	2 (1.3%)	1 (1.2%)	0.8
15-30	88 (24%)	33 (26%)	32 (20%)	23 (27%)	
31-46	108 (29%)	37 (29%)	44 (28%)	27 (32%)	
47-62	109 (29%)	37 (29%)	49 (31%)	23 (27%)	
>62	62 (17%)	19 (15%)	32 (20%)	11 (13%)	

[1] n (%)

[2] Pearson's Chi-squared test

Table 3. Education related distribution of vitamin D levels among study participants. (n=372)

Vitamin D category/ Education	Education					p-value[2]
	No formal n=1691 n(%)	Primary n=731 n(%)	Secondary n=611 n(%)	Higher n=311 n(%)	University level n=381 n(%)	
Vitamin D level						
<20	59 (35%)	21 (29%)	15 (25%)	13 (42%)	20 (53%)	0.014
(≥ 20-<30)	77 (46%)	25 (34%)	32 (52%)	13 (42%)	12 (32%)	
≥30	33(20%)	27(37%)	14 (23%)	5 (16%)	6 (16%)	

[1] n (%)

[2] Pearson's Chi-squared test

DISCUSSION

The observed prevalence of vitamin D deficiency in our population (34% of 372 participants) increased vitamin D synthesis due to increased vitamin D exposure as compared to those with lower altitudes of Nepal.[10] However, a study done by Zargar, A H et al. in Kashmir (altitude average 1800 meters), showed prevalence of vitamin D deficiency to be 83% (n=92) albeit with a smaller sample size (92).[11] Arun Sedhain et al. has also noted lower prevalence of vitamin D levels in hills than in plains.[8] Further studies are required in that regard since other factors like nutrition, habit may also be of consequence. The higher prevalence of vitamin D deficiency in females than males concur with most other studies.[12] No significant differences in prevalence of vitamin D deficiency was found between age or ethnicity in our study. Higher mean vitamin D levels in those with mixed work as compared with indoor work is also consistent with other studies.[13] This can be explained by increased exposure to sunlight. Interestingly lower mean vitamin D levels were seen in those with higher levels of education. This finding is similar to the study done by Tiffany K Gill et al.[14], presumably due to lifestyle being more sedentary and indoor with education. Bone pain, fatigue and muscle pain were commonly reported symptoms (58%, 30%, 31% out of 373 patients consistent with commonly reported vitamin D symptoms.[15,16]

CONCLUSIONS

The prevalence of vitamin D deficiency (serum vit D <20 nm/ml) for patients visiting medicine outpatient department of Karnali Academy of Health Sciences was 34% (n=372) and prevalence for insufficiency was 43% (n=372) during survey done from June to September 2025. The mean vitamin D levels were lower in females, those with mostly indoor activity, higher level of education. Vitamin D levels were unrelated to ethnicity or age. Bone pain was the most common presenting symptom.

ACKNOWLEDGEMENTS

We acknowledge the help provided by Dr. Rashmi Subedi, Dr. Kusum Lama, Dr. Rakesh Kumar Yadav, Dr. Akshay Singh and all members of the internal medicine department of Karnali Academy of Health Sciences for their help in data collection.

Conflict of interest: None

Funding: None

REFERENCE

1. Para D, Unnikrishnan A, Gupta D, Raveendran K, Singh L, Manchanda M. Vitamin-D Deficiency: An Emerging Epidemic-Meeting the Challenge. In: First National Conference on Food Science and Technology [Internet]. Delhi: Shaheed Rajguru College of Applied Sciences for Women; 2016. p. 27. [Link]
2. Alam S, Ahmad J, Osama M, Khan AR, Kalam M, Sameer M, et al. Overview of the Vital Role of Vitamin D: Functions, Deficiency Syndromes, and Impact Throughout Life. Current Pharmaceutical Research. 2025 June 25;163–74. [Google Scholar]
3. Holick MF. Vitamin D Deficiency. New England Journal of Medicine. 2007 July 19;357(3):266–81.
4. Cui A, Zhang T, Xiao P, Fan Z, Wang H, Zhuang Y. Global and regional prevalence of vitamin D deficiency in population-based studies from 2000 to 2022: A pooled analysis of 7.9 million participants. Front Nutr [Internet]. 2023 Mar 17 [cited 2025 Nov 30];10. [DOI]
5. Yadav S. Citation: Satish CY, Dev SY (2021) Prevalence of Vitamin D Deficiency in Nepalese Population. 2021 Dec 31;7:1–3. [Link]
6. Siddiqee MH, Bhattacharjee B, Siddiqi UR, MeshbahurRahman M. High prevalence of vitamin D deficiency among the South Asian adults: a systematic review and meta-analysis. BMC Public Health. 2021 Oct 9;21(1):1823. [DOI]
7. Karki A, Vaidhya S, Kunwar D, Kunwar R. Vitamin D Deficiency among Patients Presenting

to Outpatient Department of Medicine of a Tertiary Care Centre: A Descriptive Cross-sectional Study. JNMA J Nepal Med Assoc. 2022 May;60(249):465–8. [PubMed]

8. Sedhain A, Bhattarai GR, Yadav SR, Pandey BR, Pant TP. Geographic and Seasonal Variation of Vitamin D: A Retrospective Study in Two Centers of Nepal. 2020 [cited 2025 Nov 30]; [DOI]
9. Holick MF. The vitamin D deficiency pandemic: Approaches for diagnosis, treatment and prevention. Rev Endocr Metab Disord. 2017 June 1;18(2):153–65. [DOI]
10. Hayes DP. Cancer protection related to solar ultraviolet radiation, altitude and vitamin D. Medical Hypotheses. 2010 Oct 1;75(4):378–82. [DOI]
11. Zargar AH, Ahmad S, Masoodi SR, Wani AI, Bashir MI, Laway BA, et al. Vitamin D status in apparently healthy adults in Kashmir Valley of Indian subcontinent. Postgrad Med J. 2007 Nov 1;83(985):713–6. [DOI]
12. Daly RM, Gagnon C, Lu ZX, Magliano DJ, Dunstan DW, Sikaris KA, et al. Prevalence of vitamin D deficiency and its determinants in Australian adults aged 25 years and older: a national, population-based study. Clinical Endocrinology. 2012;77(1):26–35. [DOI]
13. Sowah D, Fan X, Dennett L, Hagtvedt R, Straube S. Vitamin D levels and deficiency with different occupations: a systematic review. BMC Public Health. 2017 June 22;17(1):519. [DOI]
14. Gill TK, Hill CL, Shanahan EM, Taylor AW, Appleton SL, Grant JF, et al. Vitamin D levels in an Australian population. BMC Public Health. 2014 Sept 26;14(1):1001. [DOI]
15. Arnljots R, Snaebjörnsson Arnljots E, Thorn J, Elm M, Moore M, Sundvall PD. Are long-lasting nonspecific symptoms related to vitamin D deficiency among older adults living in nursing homes? BMC Geriatr. 2025 June 24;25(1):428. [DOI]
16. Bouillon R, Carmeliet G. Vitamin D insufficiency: Definition, diagnosis and management. Best Pract Res Clin Endocrinol Metab. 2018 Oct;32(5):669–84. [DOI]

Citation: Giri RM, Joshi S, Panthi RC, Gautam S, Joshi KR, Sharma SK, Rokaya M. Status of Vitamin D among Patients Attending Internal Medicine Department in a Tertiary Care Centre of Rural Nepal: A Hospital Based Cross-Sectional Study. JNHLS. 2025; 4(2):128-132.