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Vitamin D Deficiency Among Indoor Students

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Background	Vitamin D deficiency has become a significant public health problem among university students who spend most of their time indoors. Poor sunlight exposure, prolonged study times, and poor Vitamin D nutrition contribute to deficiency risk and related health issues.
Objective	To determine the prevalence of Vitamin D deficiency among indoor university students and identify lifestyle habits that may contribute to deficiency.
Methods	A descriptive cross-sectional survey was conducted on 151 university students aged 18–22 years using a structured Google Forms questionnaire. Variables assessed included indoor study duration, sunlight exposure, dietary habits, supplementation, and symptoms.
Results	The majority of students studied indoors for 2–4 hours daily and received approximately 30 minutes of sunlight daily. While awareness and supplementation rates were high (91.4%), nearly one-third (29.1%) reported symptoms associated with Vitamin D deficiency including fatigue, bone pain, and muscle weakness.
Conclusion	Despite high awareness and supplementation use, limited sunlight exposure remains prevalent among indoor students. Increasing outdoor activity opportunities and promoting healthy lifestyle behaviors may reduce deficiency risk and improve student health outcomes.

Keywords: *Vitamin D deficiency; Indoor students; Sunlight exposure; University students; Lifestyle factors; Public health; Nutrition; Supplementation*

1. Introduction

Vitamin D is an essential fat-soluble vitamin responsible for calcium and phosphorus metabolism, bone mineralization, immune regulation, muscle function, and overall health. The primary source of Vitamin D is endogenous synthesis in the skin following exposure to ultraviolet B (UVB) radiation from sunlight.

In recent years, the lifestyle of university students has changed considerably. Academic commitments, online learning, prolonged screen time, and sedentary behaviors have increased the amount of time students spend indoors. Consequently, exposure to sunlight has decreased significantly, increasing the likelihood of Vitamin D deficiency.

Several international studies have reported high prevalence rates of Vitamin D deficiency among university students, particularly in urban populations and among individuals with limited outdoor activities. Deficiency has been associated with fatigue, musculoskeletal pain, weakened immunity, depression, and poor academic performance.

The present study was conducted to assess Vitamin D deficiency-related risk factors among indoor students at Osh State University and to evaluate awareness, dietary habits, supplementation practices, and symptoms associated with deficiency.

2. Materials and Methods

Study Design

Cross-sectional survey study.

Study Population

University students aged 18–22 years engaged in indoor academic activities.

Data Collection

Data were collected using a structured Google Form questionnaire distributed electronically. Prior to participation, all respondents were provided with an informed consent form. Participation was voluntary and all responses remained anonymous and confidential.

Sample Size

Total respondents: 151 students.

Variables Assessed

- Indoor study duration
- Daily sunlight exposure
- Awareness of Vitamin D deficiency
- Dietary intake of Vitamin D-rich foods
- Vitamin D supplementation practices
- Symptoms associated with Vitamin D deficiency

Ethical Considerations

Participation was voluntary. Informed consent was obtained electronically before participation. All responses remained anonymous and confidential. Data were used only for research purposes.

3. Results

3.1 Demographic Characteristics

A total of 151 university students aged 18–22 years participated in the study. All participants were engaged in indoor-based academic activities at Osh State University.

Table 1. Demographic Characteristics

Variable	Value
Total Participants	151
Age Group	18–22 years
Study Setting	Indoor-based university education

3.2 Indoor Study Duration and Sunlight Exposure

The vast majority of students (91.4%, n=138) reported studying indoors for 2–4 hours per day. Regarding daily sunlight exposure, 65.6% (n=99) received approximately 30 minutes of sunlight daily, 27.2% (n=41) received approximately 1 hour, and only 7.2% (n=11) had other exposure durations. These findings indicate that most students receive considerably less sunlight than recommended for adequate Vitamin D synthesis.

Table 2. Indoor Study and Sunlight Exposure

Variable	Number (n)	Percentage (%)
Study indoors 2–4 hours/day	138	91.4
Sunlight exposure ~30 min/day	99	65.6
Sunlight exposure ~1 hour/day	41	27.2
Other exposure durations	11	7.2

3.3 Awareness and Preventive Practices

Awareness of Vitamin D deficiency was high among participants. A total of 91.4% (n=138) believed that their indoor study habits affected their Vitamin D levels. Nearly all respondents (96.7%, n=146) reported consuming Vitamin D-rich foods such as fish, eggs, and dairy products, and 91.4% (n=138) reported taking Vitamin D supplements.

Table 3. Awareness and Preventive Practices

Variable	Number (n)	Percentage (%)
Believe indoor study affects Vitamin D	138	91.4
Consume Vitamin D-rich foods	146	96.7
Take Vitamin D supplements	138	91.4

3.4 Dietary Intake and Reported Symptoms

Despite high dietary awareness, 29.1% of participants (n=44) reported experiencing at least one symptom associated with Vitamin D deficiency. The most commonly reported symptoms were fatigue (18.5%, n=28), bone pain (12.6%, n=19), and muscle weakness (11.9%, n=18). The remaining 70.9% (n=107) reported no symptoms.

Table 4A. Consumption of Vitamin D-Rich Foods

Response	Number (n)	Percentage (%)
Yes (fish, eggs, dairy etc.)	146	96.7
No	3	2.0
Not Sure	2	1.3
Total	151	100

Table 4B. Symptoms Associated with Vitamin D Deficiency

Symptom	Number (n)	Percentage (%)
Fatigue	28	18.5
Bone Pain	19	12.6
Muscle Weakness	18	11.9
No Symptoms	107	70.9

Symptom	Number (n)	Percentage (%)
Total	151	100

4. Discussion

The findings demonstrate that indoor study habits may contribute substantially to reduced sunlight exposure among university students. Although awareness regarding Vitamin D deficiency was high and most participants reported consuming Vitamin D-rich foods and supplements, nearly one-third experienced symptoms associated with deficiency.

The high prevalence of limited sunlight exposure observed in this study is consistent with previous research reporting that indoor lifestyles significantly reduce endogenous Vitamin D synthesis. Similar findings have been reported by Holick and Mithal et al., who identified insufficient sunlight exposure as the primary determinant of Vitamin D deficiency worldwide.

The discrepancy between high awareness and continued symptom prevalence suggests that knowledge alone may not be sufficient to prevent deficiency. Behavioral factors, lifestyle patterns, and environmental conditions likely play important roles. Students may be aware of the importance of Vitamin D yet remain unable to modify their academic schedules to allow sufficient outdoor time.

Universities should consider implementing health promotion initiatives that encourage outdoor physical activities, improve nutritional awareness, and support healthy lifestyle practices among students. Structured outdoor breaks, campus-wide Vitamin D awareness campaigns, and accessible supplementation programs may help bridge the gap between awareness and behavior.

5. Conclusion

Vitamin D deficiency-related risk factors are common among indoor university students. Although awareness and supplementation rates were high, limited sunlight exposure remains prevalent. The majority of students received only approximately 30 minutes of sunlight daily, well below recommended levels for adequate Vitamin D synthesis.

Despite high dietary awareness and widespread supplement use, nearly one-third of participants experienced symptoms associated with Vitamin D deficiency, including fatigue, bone pain, and muscle weakness. These findings highlight the importance of maintaining adequate sunlight exposure, continuing balanced nutrition, and promoting healthy lifestyle habits to support sufficient Vitamin D status among students.

Increasing opportunities for outdoor activities and promoting healthy lifestyle behaviors may help reduce deficiency risk and improve student health outcomes. Universities should encourage outdoor activities and implement awareness programs to help students prevent deficiency-related health issues.

References

1. Holick MF. Vitamin D deficiency. N Engl J Med. 2007;357(3):266–281.
2. Forrest KY, Stuhldreher WL. Prevalence and correlates of vitamin D deficiency. Nutr Res. 2011;31(1):48–54.
3. Mithal A, Wahl DA, Bonjour JP, et al. Global vitamin D status and determinants of hypovitaminosis D. Osteoporos Int. 2009;20(11):1807–1820.
4. Al-Ajlan BY, Al-Turki HA, Al-Daghri NM, et al. Vitamin D deficiency among young adults. Saudi Med J. 2015;36(3):316–320.

5. Cashman KD, Dowling KG, Škrabáková Z, et al. Vitamin D deficiency in Europe: pandemic? Am J Clin Nutr. 2016;103(4):1033–1044.
6. Pludowski P, Holick MF, Grant WB, et al. Vitamin D supplementation guidelines. J Steroid Biochem Mol Biol. 2018;175:125–135.
7. Lanham-New SA, Buttriss JL, Miles LM, et al. Vitamin D and health outcomes. Nutr Bull. 2011;36(1):99–107.
8. Palacios C, Gonzalez L. Is vitamin D deficiency a major global public health problem? J Steroid Biochem Mol Biol. 2014;144:138–145.
9. van der Mei IAF, Ponsonby AL, Engelsen O, et al. The high prevalence of vitamin D insufficiency across populations. Clin Endocrinol. 2007;67(3):362–368.