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THE PREVALENCE OF VITAMIN D DEFICIENCY RISK FACTORS AND ITS CORRELATION WITH MOOD AND ENERGY LEVELS

Introduction

Vitamin D deficiency represents a pervasive public health concern, currently impacting an estimated one billion individuals across the globe. Its clinical significance now extends far beyond its established role in calcium homeostasis and bone health, implicating a broader spectrum of chronic disease pathology [1].

Beyond its classical involvement in calcium regulation, vitamin D is now recognized as an integral component of musculoskeletal integrity, immune modulation, and neuropsychological function. Consequently, insufficient levels have been implicated in the elevated risk of autoimmune conditions, cardiovascular pathology, and affective disorders [2].

Medical students represent a particularly susceptible group for vitamin D insufficiency, given their rigorous academic commitments that necessitate protracted indoor study, restrict opportunities for sun exposure, and often contribute to disrupted or inadequate nutritional intake [3].

Investigations conducted within medical student populations have pinpointed female sex, adherence to vegetarian diets, low consumption of dairy products, and the habitual use of sun protection as key predisposing factors for hypovitaminosis D throughout this formative period of professional development [4].

The presence of vitamin D receptors within central nervous system structures involved in mood regulation provides a plausible basis for its role in neuropsychological function; accordingly, deficient states have been correlated with manifestations such as fatigue, reduced energy, and depressive symptomatology [5].

Goal

The present study aimed to determine the frequency of vitamin D deficiency risk factors among medical students and examine their association with self-reported mood and energy levels. This investigation was conducted through a survey of 113 medical students, with the objective of identifying at-risk subgroups to guide targeted preventive measures within the medical training environment.

Material and methods of research

This investigation employed a cross-sectional design involving 113 medical students who completed an online survey. The questionnaire was specifically developed to evaluate risk factors for vitamin D insufficiency alongside self-reported measures of mood and energy.

Demographic variables, including age, sex, and academic year were recorded, as were routine lifestyle factors relevant to vitamin D status: duration of sun exposure, frequency of sunscreen application, dietary practices, and physical activity levels. Mood and energy states were assessed using a validated self-report instrument.

All data were processed in Microsoft Excel. Descriptive statistics were calculated to establish the prevalence of deficiency-associated risk factors, and bivariate analyses were performed to examine their association with mood and energy ratings among participants.

The results of the research and their discussion

The analysis examined the prevalence of vitamin D deficiency risk factors and their association with mood and energy levels among medical students stratified by climate zone, as presented in Tables 1 and 2.

Table 1 – Prevalence of Key Vitamin D Deficiency Risk Factors by Climate Zone (n = 112, %)

Climate Zone	n (%)	Limited Sun Exposure (< 15 min/day)	Rarely/Never Use Sunscreen
Tropical	59 (52.7)	7 (11.9)	33 (55.9)
Temperate	34 (30.4)	13 (38.2)	14 (41.2)

Table 1 summarizes participant distribution according to climate region. The majority resided in tropical zones (n=59, 52.7%), followed by temperate regions (n=34, 30.4%). Among tropical climate residents, only 7 individuals (11.9%) reported sun exposure of less than 15 minutes daily, whereas 33 students (55.9%) indicated rare or no sunscreen use. Conversely, within the temperate cohort, 13 participants (38.2%) reported limited sun exposure, while 14 students (41.2%) noted infrequent sunscreen application. This distribution indicates that geographical location influences behavioral risk patterns: temperate zone students demonstrated higher rates of inadequate sun exposure, likely attributable to reduced sunlight availability, whereas tropical zone students exhibited greater prevalence of sunscreen non-use despite higher ambient UV radiation.

Table 2 – Correlation of Deficiency Risk with Mood and Energy (n =112, %)

Risk Factor Group	n (%)	Low Energy or Fatigue (Often/Constantly)	Notable Mood Change in Winter
Limited Sun Exposure	47 (42.0)	15 (31.9)	18 (38.3)
No Supplement Use	81 (72.3)	27 (33.3)	27 (33.3)

Table 2 presents mood and energy correlates among the cohort. Of the 47 students (42.0% of total) reporting limited sun exposure, 15 individuals (31.9%) experienced frequent fatigue or low energy, and 18 students (38.3%) noted substantial mood changes during winter months. Among the 81 participants (72.3%) not taking vitamin D supplements, 27 (33.3%) reported persistent fatigue, and an equal proportion described seasonal mood fluctuations. These findings suggest that both inadequate sun exposure and absence of supplementation are associated with diminished energy and seasonal affective symptoms. The high prevalence of supplement non-use represents a particularly modifiable target for intervention.

Collectively, these observations highlight the substantial burden of modifiable vitamin D deficiency risk factors within this medical student population and their potential relationship with adverse psychological outcomes, supporting the need for targeted educational initiatives within medical training environments.

Conclusions

Deontological challenges were frequently documented among the medical students and early-career physicians participating in this oncology-focused investigation. Breaking bad news constituted the most commonly reported difficulty (78.8%), followed by communication with terminally ill patients (72.6%) and maintenance of professional boundaries (62.8%). This pattern indicates that ethical dilemmas pertaining to patient communication represent the predominant deontological burden in oncological practice, with medical students experiencing greater difficulty than young doctors during clinical interactions.

Marked disparities emerged between the two professional cohorts. Medical students demonstrated significantly lower perceived preparedness for ethical challenges (4.8±1.9 vs. 6.7±1.8; p=0.001) and elevated emotional distress scores (7.9±1.5 vs. 6.2±1.7; p=0.003) relative to their

more experienced colleagues. These observations suggest that accumulated clinical exposure may strengthen physicians' capacity to navigate deontological complexities, while underscoring the particular vulnerability of trainees during early patient contact.

Integration of structured ethics education and communication skills training within medical curricula is imperative for adequate preparation of future oncology practitioners. Simulation-based modules for breaking bad news, supervised clinical encounters, and regular reflective practice sessions may help reconcile theoretical knowledge with practical application. Early identification of students experiencing pronounced emotional distress, coupled with implementation of targeted support mechanisms, could mitigate burnout risk and foster professional development. Enhanced deontological preparation throughout undergraduate and postgraduate training may ultimately contribute to improved physician well-being and elevated quality of patient care in oncology.

LITERATURE

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THE EFFECTS OF VITAMIN C ON HUMAN HEALTH

Introduction

Vitamin C, also known as ascorbic acid, is a water-soluble vitamin that is essential for carrying out various bodily functions. It is essential for the formation of blood vessels, cartilage, muscles and collagen in bones, and in healing processes. It is widely being used as a skincare product over the past decades and have been praised by dermatologists for its benefits on skin. It is a powerful antioxidant, that can ptrotect cells from damage caused by free radicals. Most adults require about 75–90 mg of Vitamin C per day, and it is found in various fruits and vegetables, particularly citrus fruits [1]. According to the NIH, fruits and vegetables are the best sources of vitamin C. A person who eats a variety of these foods should meet their RDA of vitamin C through diet alone.

Ascorbic acid, the most common type of Vitamin C, is found naturally in citrus fruits and tomatoes and can be produced in a synthetic form. Sodium ascorbate and calcium ascorbate are called the "buffered" forms of ascorbic acid, as they are less acidic and less likely to cause stomach irritations, still providing the same benefits as ascorbic acid [2]. Some other derivatives of Vitamin C include sodium ascorbyl phosphate, ascorbyl glucoside and Tetrahexyldecyl ascorbate, which also provide various benefits to our body.

A severe case of deficiency of Vitamin C causes scurvy, which leads to bleeding gums, bruising and even organ failure. According to a 2022 review, blood tests to check plasma and