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Original Research Article

A study to assess the knowledge regarding vitamin D deficiency among teaching staff working in KGiSL Educational Institutions, Coimbatore

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ABSTRACT

Background: Vitamin D deficiency is a major public health issue worldwide, particularly among indoor working professionals who have limited sun exposure. This study aimed to assess the knowledge regarding vitamin D deficiency among teaching staff working in KGiSL Educational Institutions, Coimbatore.
Methods: A quantitative cross-sectional descriptive survey was conducted among 120 teaching staff members selected through stratified random sampling from KGiSL Educational Institutions. A validated structured questionnaire was used to evaluate socio-demographic characteristics and knowledge regarding vitamin D synthesis, sources, risk factors, and toxicity. Data were manually analyzed using descriptive statistics and the Chi-square test at a 5% level of significance.
Results: The overall assessment showed that 58.3% (n=70) of the teaching staff possessed moderately adequate knowledge, 32.5% (n=39) had inadequate knowledge, and only 9.2% (n=11) had adequate knowledge, with a mean score of 14±4.57. While most participants recognized sunlight as the main source of vitamin D (91.7%), significant knowledge gaps were noted regarding normal serum levels and symptoms of toxicity. Chi-square analysis demonstrated a statistically significant association between knowledge levels and regular exercise (c^2=8.542, $p<0.05$) as well as frequency of sunscreen use (c^2=6.485, $p<0.05$).
Conclusions: Teaching staff exhibited a moderate level of knowledge regarding vitamin D deficiency, with notable deficiencies in specific clinical and practical aspects. Institutional health education programs and awareness campaigns are recommended to encourage safe sun exposure and regular health monitoring among academic faculty.

Keywords: Knowledge, Vitamin D deficiency, Teaching staff, Coimbatore

INTRODUCTION

Vitamin D, a fat-soluble prohormone, plays a vital role in maintaining bone health, regulating calcium-phosphate homeostasis, and supporting systemic immune function. Beyond its classic musculoskeletal functions, optimal serum Vitamin D concentrations are linked to lower risks of cardiovascular diseases, autoimmune disorders, and metabolic conditions. Public health standards define vitamin D deficiency as serum 25-hydroxyvitamin D [25(OH)D] concentrations below 20 ng/mL, while levels between 20-30 ng/mL reflect insufficiency.[1]

Globally, over one billion people suffer from Vitamin D deficiency or insufficiency. In India, despite abundant geographical sunshine, population-based studies report deficiency rates ranging between 70% and 100%.[2] Studies across South India report deficiency rates exceeding 50% in urban institutional populations. Occupational transition toward indoor environments limits daily ultraviolet B (UVB) exposure, making academic and corporate personnel vulnerable.[3]

Teaching staff in higher educational institutions routinely undergo prolonged indoor duty schedules, sedentary work

habits, and limited outdoor exposure. While baseline awareness studies exist for health personnel, limited research evaluates knowledge levels among academic staff in Coimbatore.

Therefore, this study was conducted to assess knowledge regarding Vitamin D deficiency among teaching staff at KGiSL Educational Institutions and examine associations with demographic variables.[4]

METHODS

A quantitative research approach with a cross-sectional descriptive survey design was utilized to assess the knowledge regarding Vitamin D deficiency among teaching staff. The study period was April 2026 - May 2026 The study was conducted at KGiSL Educational Institutions, Coimbatore, Tamil Nadu, India. The target population comprised 401 active teaching faculty members across six constituent colleges, including Nursing, Physiotherapy, Allied Health Sciences, Institute of Information Management, Institute of Technology, and Arts and Science. A stratified random sampling technique was employed to select 30% of the faculty from each institution, resulting in a total sample size of 120 teaching staff members selected using the simple random lottery method.

The inclusion criteria specified full-time teaching faculty who were present during the data collection period, willing to participate, and able to read English. Faculty members with a prior clinical diagnosis of Vitamin D deficiency, those currently taking therapeutic supplementation, or those involved in the pilot study were excluded. Data were collected using a validated, structured self-administered questionnaire consisting of two parts: Section A gathered socio-demographic details, while Section B comprised 25 structured items evaluating knowledge on vitamin D synthesis, dietary sources, deficiency risk factors, and toxicity symptoms.

Data were compiled and analyzed manually using standard mathematical and statistical formulas. Descriptive statistics such as frequency, percentage, mean, and standard deviation were calculated by hand, and the Chi-square test was computed manually to evaluate associations between knowledge levels and demographic variables at<0.05 significance level. Ethical approval and informed oral consent were obtained prior to data collection.

RESULTS

The socio-demographic evaluation of the study participants (n=120) revealed that 45.8% (n=55) of the teaching staff were aged between 31-0 years, while 35.8% (n=43) were between 41-50 years, 14.2% (n=17) were≤30 years, and 4.2% (n=5) were between 51-60 years. The majority of participants were female (66.7%, n=80), whereas males accounted for 33.3% (n=40). Most of the staff resided in urban areas (60.8%, n=73), followed by suburban (25.8%, n=31) and rural areas (13.3%, n=16). A large majority reported no history of chronic disease (95.8%, n=115), and none of the participants (100%, n=120) were taking vitamin D supplements. Regarding health habits, 80% (n=96) exercised 3 times per week, while 20% (n=24) exercised more than 3 times per week. The vast majority had no smoking habit (98.3%, n=118) and did not consume alcohol (98.3%, n=118).

In terms of service duration, 28.3% (n=34) had 0–6 years of employment, 24.2% (n=29) had 11-15 years, 20% (n=24) had 16-20 years, 15% (n=18) had 6-10 years, and 12.5% (n=15) had >20 years of experience. Low job stress was reported by 62.5% (n=75), while 37.5% (n=45) reported high job stress. Skin type distribution showed light to moderate brown skin in 42.5% (n=51), brown skin in 39.2% (n=47), fair/white skin in 13.3% (n=16), and dark brown skin in 5% (n=6). Regarding sun protection, 51.6% (n=62) never used sunscreen, 25% (n=30) used it rarely, 16.7% (n=20) used it daily, and 6.7% (n=8) used it for planned exposure. Among sunscreen users, application was mostly on the face (17.5%, n=21) or multiple areas (12.5%, n=15). Additionally, 37.5% (n=45) experienced suntan in the past 6 months. Daily sun exposure was distributed as 10-20 minutes (27.5%, n=33), 20–30 minutes (26.7%, n=32), ≤10 minutes (23.3%, n=28), and >30 minutes (22.5%, n=27) (Table 1).

Item-wise evaluation of knowledge showed that 91.7% (n=110) recognized sunlight as the best natural source of vitamin D, 88.3% (n=106) knew its importance for bone health and teeth, 85.8% (n=103) understood that deficiency causes fatigue during work hours, and 83.3% (n=100) knew vitamin D is synthesized in skin via sunlight. Furthermore, 77.5% (n=93) agreed that indoor workers are at higher risk and that vitamin D boosts immunity. Conversely, significant knowledge deficits were noted: 45% (n=54) did not know the normal serum vitamin D level (50-80 ng/mL), 43.3% (n=52) were unaware of infertility links, and nearly half did not know that vitamin D toxicity causes nausea/vomiting (47.5%, n=57), heart rhythm disruption (47.5%, n=57), or kidney damage (48.3%, n=58) (Table 2).

Categorization of overall knowledge levels revealed that 58.3% (n=70) of teaching staff possessed moderately adequate knowledge, 32.5% (n=39) had inadequate knowledge, and only 9.2% (n=11) demonstrated adequate knowledge regarding Vitamin D deficiency (Table 3). The overall mean knowledge score was 14±4.57 (Table 4).

Manual inferential analysis using the Chi-square test revealed that the calculated values for regular exercise (c^2=8.542) and frequency of sunscreen use (c^2=6.485) exceeded the critical tabulated value (c^2=3.84) at a 5% significance level ($p<0.05$). This confirms a statistically significant association between the level of knowledge scores and both regular exercise and frequency of sunscreen use among teaching staff (Table 5).

Table 1: Distribution of the demographic variables regarding the vitamin D deficiency among teaching staffs, (n=120).

Demographic variables	Groups	
	N	%
Age (in years)		
<30	17	14.2
31-40	55	45.8
41-50	43	35.8
51-60	5	4.2
>60	-	-
Gender		
Male	40	33.3
Female	80	66.7
History of chronic disease		
Yes	5	4.2
No	115	95.8
If yes, specify		
Taking vitamin D supplements		
Yes	-	-
No	120	100
Regular exercise (times per week)		
≤3	96	80
>3	24	20
Smoking		
Current smoker	2	1.7
Ex-smoker	-	-
No smoking habit	118	98.3
Alcohol consumption		
Yes	2	1.7
No	118	98.3
Years of employment		
0-6	34	28.3
6-10	18	15
11-15	29	24.2
16-20	24	20
>20	15	12.5
Job stress		
Low	75	62.5
High	45	37.5
Residence		
Urban	73	60.8
Suburban	31	25.8
Rural	16	13.3
Skin type		
White/fair	16	13.3
Light to moderate brown (wheatish)	51	42.5
Brown	47	39.2
Dark brown	6	5
Frequency of sunscreen use		
Daily	20	16.7
Rarely	30	25
Only for planned exposure	8	6.7
Never	62	51.6
Where do you apply sunscreen?		
Face	21	17.5
Back and shoulders	1	0.8
Hands	6	5

Continued.

Demographic variables	Groups	
	N	%
Legs	2	1.7
All of the above	15	12.5
No, I don't use sunscreen	75	62.5
Have you received suntan in the past 6 months?		
Yes	45	37.5
No	75	62.5
Approximately how much sun exposure you get for a day?		
10 minutes per day	28	23.3
10-20 minutes per day	33	27.5
20-30 minutes per day	32	26.7
More than 30 minutes per day	27	22.5

Table 2: Distribution of knowledge regarding vitamin D deficiency among teaching staff (n=120).

Questionnaires	Group	
	N	%
Is vitamin D produced inside the body by itself?		
Yes	55	45.8
No	37	30.8
Don't know	28	23.3
Is vitamin D important for bone health and strong teeth?		
Yes	106	88.3
No	4	3.3
Don't know	10	8.3
Is vitamin D synthesized in the skin on exposure to sunlight?		
Yes	100	83.3
No	7	5.8
Don't know	13	10.8
Is 50-80 ng/ml considered a normal vitamin D level?		
Yes	52	43.3
No	14	11.7
Don't know	54	45
Are people working indoor at higher risk of vitamin D deficiency?		
Yes	93	77.5
No	12	10
Don't know	15	12.5
Does vitamin D deficiency cause tiredness and laziness during the working hours?		
Yes	103	85.8
No	4	3.3
Don't know	13	10.8
Does vitamin D deficiency cause infertility problem?		
Yes	46	38.3
No	22	18.3
Don't know	52	43.3
Does vitamin D deficiency affect calcium level?		
Yes	87	72.5
No	11	9.2
Don't know	22	18.3
Is seasons can affect vitamin D absorption?		
Yes	82	68.3
No	21	17.5
Don't know	17	14.2
Is skin pigmentation can affect vitamin D absorption?		
Yes	67	55.8
No	27	22.5
Don't know	26	21.7

Continued.

Demographic variables	Groups	
	N	%
Is sun block can affect vitamin D absorption?		
Yes	63	52.5
No	24	20
Don't know	33	27.5
Is pollution can affect vitamin D absorption?		
Yes	63	52.5
No	30	25
Don't know	27	22.5
Does vitamin D decrease muscle pain and muscle weakness?		
Yes	71	59.2
No	21	17.5
Don't know	28	23.3
Does vitamin D support lung function and cardio vascular health?		
Yes	48	40
No	34	28.3
Don't know	38	31.7
Does vitamin D help boost immunity?		
Yes	93	77.5
No	16	13.3
Don't know	11	9.2
Can vitamin D reduce risk of infection?		
Yes	80	66.7
No	15	12.5
Don't know	25	20.8
Are cod liver oil, mushroom and spinach the sources of vitamin D?		
Yes	74	61.7
No	14	11.7
Don't know	32	26.6
Is march to September is the best time to get vitamin D?		
Yes	73	60.3
No	15	12.5
Don't know	32	26.7
Can vitamin D obtain through supplements?		
Yes	85	70.8
No	20	16.7
Don't know	15	12.5
Is sunlight the best natural source of vitamin D?		
Yes	110	91.7
No	3	2.5
Don't know	7	5.8
Should vitamin D supplements be taken without advice?		
Yes	19	15.8
No	85	70.8
Don't know	16	13.3
Is vitamin D toxicity caused by excess sunlight exposure?		
Yes	38	31.7
No	39	32.5
Don't know	43	35.8
Are nausea and vomiting symptoms of vitamin D toxicity		
Yes	34	28.3
No	29	24.2
Don't know	57	47.5
Can vitamin D toxicity affect heart rhythm?		
Yes	48	40
No	15	12.5

Continued.

Demographic variables	Groups	
	N	%
Don't know	57	47.5
Can vitamin D toxicity damage kidneys?		
Yes	43	35.8
No	19	15.8
Don't know	58	48.3

Table 3: Distribution of level of knowledge regarding vitamin D deficiency among teaching staff, (n=120).

Knowledge scores	Group	
	N	%
<50%	39	32.5
51-75%	70	58.3
>75%	11	9.2

Table 4: Mean and SD of level of knowledge regarding vitamin D deficiency among teaching staff, (n=120).

Knowledge scores	Group	
	Mean	Standard deviation
Level of knowledge	14	4.57

Table 5: Association of level of knowledge scores with selected demographic variables regarding vitamin D deficiency among teaching staff, (n=120).

Demographic variables	Below mean ≤14	Above mean >14	Calculated value of chi square	Tabulated value of chi square at 5% LOS p<0.05
Age (in years)				
≤40	38	24	0.89	
>40	34	24		
Gender				
Male	23	39	0.81	
Female	17	41		
History of chronic disease				
Yes	3	59	0.0058	3.84
No	5	115		
Regular exercise (times per week)				
≤3	56	6	8.542	
>3	40	18		
Smoking				
smoking habit	1	61	0.4434	
No smoking habit	1	57		
Alcohol consumption				
Yes	1	61	0.4434	
No	1	57		
Years of employment				
≤15	40	22	0.5206	
>15	41	17		
Job stress				
Low	38	24	0.080	
High	37	21		
Residence				
Urban	55	7	0.463	
Rural	49	9		
Skin type				
Fair skin	30	32	2.884	
Dark skin	37	21		

Continued.

Demographic variables	Below mean ≤14	Above mean >14	Calculated value of chi square	Tabulated value of chi square at 5% LOS p<0.05
Frequency of sunscreen use				
Sunscreen user	23	39	*6.485	
Non user	35	23		
Where do you apply sunscreen?				
Applies sunscreen	20	42	1.503	
Non use	25	33		
Have you received suntan in the past 6 months?				
Yes	23	39	0.008	
No	22	36		
Approximately how much sun exposure you get for a day?				
≤20 minutes per day	30	32	0.307	
≥20 minutes per day	31	27		

DISCUSSION

The present study evaluated knowledge levels regarding vitamin D deficiency among 120 teaching staff members at KGiSL Educational Institutions, Coimbatore. The overall knowledge categorization revealed that 58.3% of participants had moderately adequate knowledge, 32.5% had inadequate knowledge, and only 9.2% demonstrated adequate knowledge, with overall mean score of 14±4.57. These findings align with earlier institutional assessments in South India showing widespread partial awareness among non-medical academic personnel regarding vitamin D physiology and deficiency complications.[5]

While basic concepts such as sun exposure as a primary Vitamin D source (91.7%) and bone health benefits (88.3%) were well recognized, significant gaps existed regarding normal serum levels (only 43.3% correct) and systemic manifestations of toxicity (less than 30% correct).[6]

The analysis also demonstrated significant associations between knowledge scores and lifestyle behaviors, specifically frequency of sunscreen use (c^2=6.485, p<0.05) and regular physical exercise (c^2=8.542, p<0.05). Teachers who engaged in regular physical activity and held structured sun-safety practices demonstrated higher knowledge retention.[7]

In contrast, variables such as age, gender, duration of employment, and daily duration of sun exposure showed no statistically significant association with knowledge levels. These findings highlight the need for targeted institutional health education programs to address specific knowledge deficits and promote safe sun exposure practices among indoor working professionals.[8]

The study is limited to teaching staff working in selected KGiSL educational institutions, Coimbatore; therefore, the findings may not be generalized to all teaching staff. The sample size is limited, which may affect the generalizability of the study findings. The study focuses only on assessing the knowledge regarding Vitamin D deficiency and does not assess the actual vitamin D levels of the participants. The study is conducted within a limited period; hence, long-term changes in knowledge regarding vitamin D deficiency cannot be assessed. The study does not include an assessment of the dietary habits, sun exposure patterns, and lifestyle practices of the participants in detail. The study is restricted to teaching staff and does not include non-teaching staff working in the selected educational institution

CONCLUSION

From the analysis and findings, it is concluded that only a small percentage possessed adequate knowledge. Therefore, there is a need to implement health education programs and awareness campaigns to improve knowledge and promote preventive practices related to vitamin D deficiency among teaching staff.

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