Original Research Article

EXPLORING KNOWLEDGE, ATTITUDE AND PRACTICE (KAP)TOWARDS VITAMIN D AMONG ARTS & COMMERCE STUDENTS IN VISTAS CHENNAI

ABSTRACT

Introduction: Vitamin D is an essential nutrient and a group of fat-soluble pro-hormones with multiple functions in the body including bone health, regulation of serum calcium and phosphate levels, as well as roles in immune function, cell proliferation, differentiation, and apoptosis. The two major biologically inert precursors of vitamin D are vitamin D3 (cholecalciferol) and vitamin D2 (ergocalciferol). Vitamin D3 is also formed when the skin is exposed to solar ultraviolet B and then converted to pre-vitamin D3 (Sunshine Vitamin). The deficiency in adults may cause muscle weakness and fractures. Not only! It depends on the extent of deficiency. Seasonal variations!

Aim?

Methods and Materials: The study was a prospective cross-sectional, carried out in the department of arts and commerce students in VISTAS Chennai. IEC in formed ethical consent? abbreviation should be explained was obtained before conducting the study. Self-online questionnaires link was sent via mail after registration. The questionnaire was divided based on Knowledge, Attitude and Practice with 5 questions each. Completed questionnaires were reviewed, entered into a database (SPSS) and analysed using descriptive and inferential statistics.

Results and Discussion: In our study, a total of 362 students were included where majority were males from first year commerce department around 18 to 19 years of age. Majority of the students had knowledge on vitamin D, attitude towards every day sun exposure and practice of using sun screens.

Conclusion: Our study concluded that the students' knowledge on vitamin D is good. There was an inconsistent practices towards managing its deficiency. Despite widespread, concern about vitamin D, still attitude and practice towards Vitamin D is yet to known for young generations.

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

KEYWORDS

Vitamin D, Ergocalciferol, Cholecalciferol, Solar ultraviolet B(UVB).

INTRODUCTION

Vitamin D is also known as Cholecalciferol, Ergocalciferol or Sunshine Vitamin. It is an essential nutrient and a group of fat-soluble pro-hormones with multiple functions in the body including bone health, regulation of serum calcium and phosphate levels, as well as roles in immune function, cell proliferation, differentiation, and apoptosis [1]. It was identified after the discovery of anti-rachitic effect of cod liver oil in the early 20th century. The vitamin found in cod liver oil was designated "D" [2]. The two major biologically inert precursors of vitamin D are ergocalciferol from plants (vitamin D2) and cholecalciferol from animal sources (vitamin D3) [3,4,5]. Vitamin D3 is formed when 7-dehydrocholesterol in the skin is exposed to solar ultraviolet B (UVB, 290-320 nm), and then converted to pre-vitamin D3 (Sunshine Vitamin). It also assists in supporting immune, brain, and nervous system health, regulating insulin levels and supporting diabetes management, supporting lung function and cardiovascular health influencing the expression of genes involved in cancer development [6,7].

There are few foods which naturally contain vitamin D like oily fish, such as sardines, herring, tuna, mackerel, salmon, and cod liver oil, egg yolks, shiitake mushrooms, liver or organ meats. About 90% of the vitamin D replenishment was mainly obtained by dermal synthesis after UVB radiation [8] with wavelength of 290-315 nm

by cholesterol-like precursor (7-dehydrocholesterol) in skin (epidermal cells) into pre-vitamin D, which also isomerizes to vitamin D3.

Both inert precursors Vitamin D2 and D3 are biologically inactive and further require an enzymatic process to convert into its active forms. Although there was no census regarding the vitamin D optimal levels, most of the experts reported that a deficiency in vitamin D as level less than 20 ng/ml (50 mmol/l) [9, 10, 11, 12]. A level of 21 to 29 ng/millilitre (52 to 72 nmol per litre) is considered as an insufficiency of vitamin D and sufficient vitamin D should reach a level of 30 ng/millilitre or greater [13]. In 1997, the Institute of Medicine of the US National Academy of Sciences recommended new adequate intakes for vitamin D in children and adults up to 50 years of age as 200 IU, adults 51 to 70 years of age as 400IU and elderly 71 years of age or older as 600 IU [14]. Old information! Recent data is needed to be provided.

After inappropriate supplementation of vitamin D especially with serum above 100-150 ng/mL, Vitamin D intoxication occurs [15]. Excessive vitamin D3 is not caused by prolonged sunlight exposure as photo conversion occurs for pre-vitamin D3 and vitamin D3 to its inactive metabolites [16]. Vitamin D deficiency is an epidemic worldwide and yet, it's a problem which is largely unknown by majority of the population [17]. In all age groups (neonates, toddlers, school children, men, women, elderly and pregnant women) in both rural and urban areas a widespread prevalence was documented [18]. When there is no proper dietary intake or exposure to UVB rays, vitamin D deficiency occurs. Other factors that should be taken into account for the development of vitamin D deficiency – seasonal variations, latitude, ethnic/religious factors.

It is universally accepted that the circulating level of 25-hydroxyvitamin D should be used as an indicator of vitamin D status due to its ease of measurement, long half-life in circulation (approximately 2 or 3 weeks), and the correlation of its level with clinical disease states [2,19,20]. 25OHD levels are not affected by the levels of PTH. In adults, the vitamin D deficiency causes muscle weakness and fractures whereas during childhood, it can cause growth retardation and skeletal deformities [21,22].

Due to lack of awareness on the importance of vitamin D, its health benefits, and prevention of deficiency, it is considered as one of the major reason for worldwide spread of this nutritional disorder [23,24,25]. Suggestive of awareness and educational campaigns about vitamin D among general and high-risk populations at community level could help to prevent long-term health consequences [26]. Targeting the younger populations for primary education on vitamin D could increase the likelihood of positive health behaviour which persists throughout and protect from disease development and progression later in life [27,28]. Hence, the aim of our study is to explore the knowledge, attitude and practice towards Vitamin D among arts and commerce students in VISTAS Chennai.

METHODS AND MATERIALS

The study was a prospective cross-sectional study carried out in the department of arts and commerce in Vels Institute of Science, Technology & Advanced Sciences. The study was carried out using online questionnaires which includes 15 questions under Knowledge,Attitude and Practice. These questions were divided into 3 sections with each 5 questions.

IEC was obtained before conducting the study. A total of 362 students who have registered and between the age group of 17 to 21 years were included in the study. Self-online questionnaires were sent as a link via mail after registration. The completed questionnaires were reviewed for accuracy, entered into a database in the SPSS and analysed using descriptive and inferential statistics. All the obtained results were expressed in the form of percentages in results.

Ethical issues: The protocol/ decision number of the Ethical approval issued by the local Ethics Committee should be cited in the text. Is written informed consent taken from each student?.

RESULTS AND DISCUSSION

Our study is one of the very few which aim at understanding at knowledge, attitudes and practices towards vitamin D among arts and commerce students in VISTAS Chennai. Among 362 students, majority of the students were in the age group of 18 years (25%), followed by 19 years (25%) and 20 years (24%). This makes 70%. What age are the rest 26% of the students? 21 years? What is the mean age of the students? Out of 362 students, majority were males (66.85%) when compared to females (52.48%) which was similar to the study conducted by NazmaSaleem et al (2021)[29].

Table 1. Baseline characteristics of sample population

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

Characteristics	Number of samples (n=362)	Percentage (%)
Age (years)		this makes 99%
17 years	56	15
18 years	92	25
19 years	90	25
20 years	88	24
21 years	36	10
Gender		
Male	242	66.85
Female	120	52.48
Year of education		
first year	148	40.88
second year	90	24.86
third year	88	24.30
	326 in total which year are the rest 36 students?	
Department		
Arts Students	172	47.51
Commerce Students	190	52.48

Among 362 arts and commerce students, arts students were 47.51% and commerce students were 52.48%. Based on year of education, first year students were 40.88%, second year students were 24.86% and third year students 24.30%. 326 in total, which year are the rest 36 students?

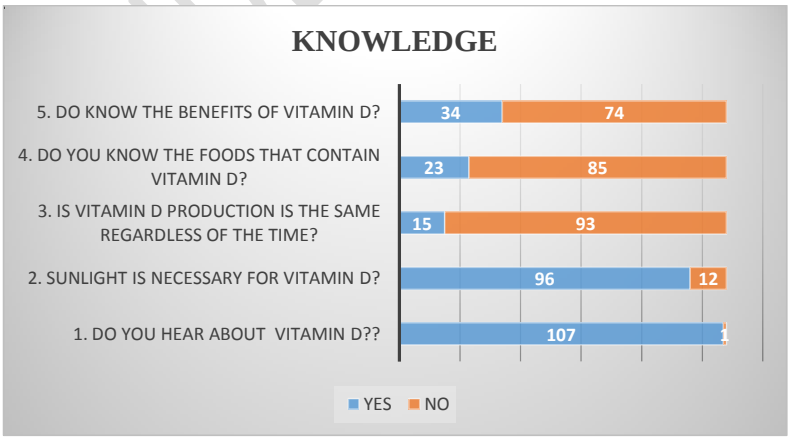

Fig 1. Histogram showing knowledge of respondents for use of Vitamin D supplements Q 3 is not correctly asked. You probably mean is seasonal variability in vitamin D synthesis.

You should calculate the percentage of 'yes/no' answers and to compare them seeking statistical difference.

Based on the knowledge, majority were unaware of the benefits of vitamin D, foods containing vitamin D and vitamin D production is the same regardless of the sunlight exposure time. Students were aware of vitamin D and also sunlight is necessary for vitamin D production.

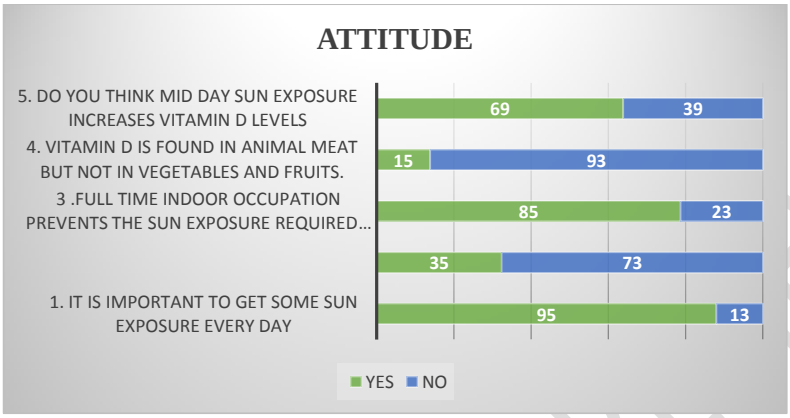

Fig 2. Histogram showing attitude of respondents for use of Vitamin D supplements

Based on the Attitude towards Vitamin D, majority of the students know that it is important to get some sun exposure every day, mid-day sun exposure increases vitamin D levels and full time indoor occupation prevents the sun exposure required for production of vitamin D. Students were unaware that people living in city are having less vitamin D levels due to less sun exposure and vitamin D is found in animal meat but not in vegetables and fruits. You should calculate the percentage of 'yes/no' answers and to compare them seeking statistical difference

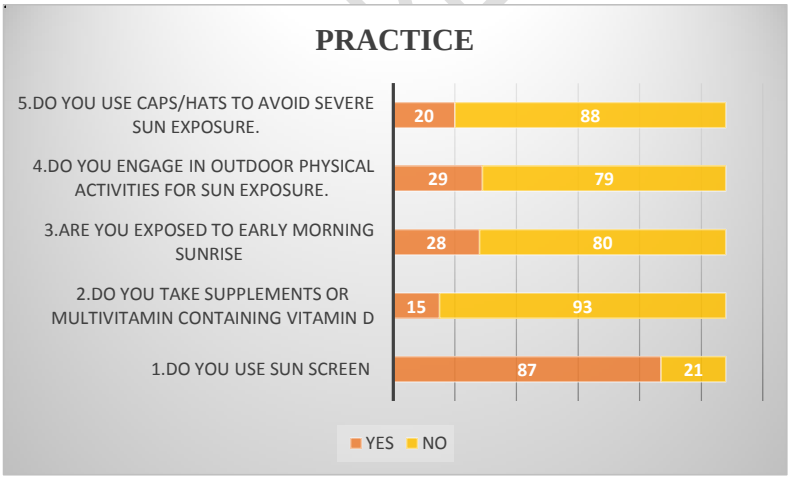

Fig 3. Histogram showing practice of respondents for use of Vitamin D supplements You should calculate the percentage of 'yes/no' answers and to compare them seeking statistical difference

Based on the Practice, majority of the students use ~~sun screens~~sunscreens and very few students take supplements containing vitamin D or multivitamin, get exposed to early morning sun rise, use caps/hats to avoid secere sun exposure and engage in outdoor physical activities for sun exposure.

CONCLUSION

Our study concluded that the students' knowledge on vitamin D is good. There was an inconsistent practices towards managing its deficiency. Despite widespread concern about vitamin D, still Attitude and Practice towards Vitamin D is yet to known for our young generation. Further research, on a larger scale, is needed in this area to enable a better understanding on the knowledge and attitudes about vitamin D, and its high risk in University Students populations (how interventions like fortified foods or sun exposure advices should be implemented for their long-term effectiveness).

REFERENCES

1. Karina Fischer, Chapter 32 - Vitamin D, Principles of Nutrigenetics and Nutrigenomics, Academic Press, 2020, Pages 245-254.

2. Wolpowitz D, Gilchrest BA: The vitamin D questions: how much do you need and how should you get it? J Am AcadDermatol 2006, 54:301-317.

3. Holick MF: The use and interpretation of assays for vitamin D and its metabolites. J Nutr 1990, 120(Suppl):1464-1469.

4. Vieth R: Why ''vitamin D'' is not a hormone, and not a synonym for 1,25dihydroxy-vitamin D, its analogs or deltanoids. J Steroid BiochemMolBiol 2004, 89-90:571-573.

5. World Health Organization. Vitamin and mineral requirements in human nutrition. 2nd ed. Geneva: World Health Organization; 2005.

6. R. P. Heaney, "Bone health," The American Journal of Clinical Nutrition, vol. 85, pp. 300S–333S, 2007.

7. M. F. Holick, "High prevalence of vitamin D inadequacy and implications for health," Mayo Clinic Proceedings, vol. 81, no. 3, pp. 353–373, 2006.

8. Antonucci R, Locci C, Clemente MG, Chicconi E, Antonucci L. Vitamin D deficiency in childhood: old lessons and current challenges. J PediatrEndocrinolMetab 2018;31:247-60.

9. Michael F: Vitamin D Deficiency. N Engl J Med 2007, 357:266-281.

10. Holick MF, Siris ES, Binkley N, Beard MK, Khan A, Katzer JT, Petruschke RA, Chen E, de Papp AE: Prevalence of vitamin D inadequacy among postmenopausal North American women receiving osteoporosis therapy. J ClinEndocrinolMetab 2005, 90:3215-3224.

11. Lips P, Hosking D, Lippuner K, Norquist JM, Wehren L, Maalouf G, Ragi-Eis S, Chandler J: The prevalence of vitamin D inadequacy amongst women with osteoporosis: an international epidemiological investigation. J Intern Med 2006, 260:245-254.

12. Thomas KK, Lloyd-Jones DM, Thadhani RI, Shaw AC, Deraska DJ, Kitch BT, Vamvakas EC, Dick IM, Prince RL, Finkelstein JS: Hypovitaminosis D in medical inpatients. N Engl J Med 1998, 338:777-783.

13. Dawson-Hughes B, Heaney RP, Holick MF, Lips P, Meunier PJ, Vieth R: Estimates of optimal vitamin D status. OsteoporosInt 2005, 16:713-716.

14. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes Food and Nutrition Board, Institute of Medicine. Vitamin D. Dietary reference intakes for calcium, phosphorus, magnesium, vitamin D, and fluoride Washington, DC: National Academy Press; 1999, 250-287

15. Weydert JA. Vitamin D in children's health. Children 2014;1: 208-26. https://doi.org/10.3390/children1020208.

16. Holick MF, MacLaughlin JA, Doppelt SH. Regulation of cutaneous previtamin D3 photosynthesis in man: skin pigment is not an essential regulator. Science 1981;211:590-3.

17. M. F. Holick and T. C. Chen, "Vitamin D deficiency: a worldwide problem with health consequences," The American Journal of Clinical Nutrition, vol. 87, pp. 1080S–1086S, 2008.

18. M. F. Holick, "Medical progress: vitamin D deficiency," New England Journal of Medicine, vol. 357, no. 3, pp. 266–281, 2007.

19. Adams JS, Clemens TL, Parrish JA, Holick MF: Vitamin-D synthesis and metabolism after ultraviolet irradiation of normal and vitamin-Ddeficient subjects. N Engl J Med 1982, 306:722-725.

20. Reichel H, Koeffler HP, Norman AW: The role of the vitamin D endocrine system in health and disease. N Engl J Med 1989, 320:980-991.

21. J. M. Pettifor, "Vitamin D Deficiency and nutritional rickets in children in vitamin D," inVitamin D, D. Feldman, J.W. Pike, and F. H. Glorieux, Eds., pp. 1065–1084, Elsevier Academic Press, Boston, Mass, USA, 2nd edition, 2005.

22. R. K. Marwaha, N. Tandon, D. R. H. K. Reddy et al., "Vitamin D and bone mineral density status of healthy schoolchildren in northern India," American Journal of Clinical Nutrition, vol. 82, no. 2, pp. 477–482, 2005.

23. A. Mithal, D. A. Wahl, J.-P. Bonjour et al., "Global vitamin D status and determinants of hypovitaminosis D," Osteoporosis International, vol. 20, no. 11, pp. 1807–1820, 2009.

24. J. M. Pettifor, "Vitamin D &/or calcium deficiency rickets in infants & children: a global perspective," Indian Journal of Medical Research, vol. 127, no. 3, pp. 245–249, 2008.

25. T. Hagenau, R. Vest, T. N. Gissel et al., "Global vitamin D levels in relation to age, gender, skin pigmentation and latitude: an ecologic meta-regression analysis," Osteoporosis International, vol. 20, no. 1, pp. 133–140, 2009.

26. M. I. K. von Bothmer and B. Fridlund, "Gender differences in health habits and in motivation for a healthy lifestyle among Swedish university students," Nursing and Health Sciences, vol. 7, no. 2, pp. 107–118, 2005.

27. E. T. Edmonds, Osteoporosis knowledge, beliefs, and behaviours of college students: utilization of the health belief model [dissertation], Abstracts International Section A: Humanities and Social Science, vol. 70, pp. 2908, 2009.

28. D. Von Ah, S. Ebert, A. Ngamvitroj, N. Park, and D.-H. Kang, "Predictors of health behaviours in college students," Journal of Advanced Nursing, vol. 48, no. 5, pp. 463–474, 2004.

29. NazmaSaleem, Sara Mariyum, Ibrahim Khan, UroojSaleem, Sajid Khan, Amjad Iqbal, "Assessment Of Knowledge Attitudes And Practice About Vitamin DAmong Medical And Dental Students In Peshawar".Multicultural Education. Volume 7, Issue 5, 427-433.