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KNOWLEDGE, ATTITUDE AND PRACTICE OF VITAMIN D AMONG NURSING STUDENTS AT A TERTIARY CARE HOSPITAL IN NORTH INDIA

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ABSTRACT

Introduction: Vitamin D deficiency is highly prevalent in North India. Besides its role in calcium homeostasis, it is associated with various disorders like cardiovascular diseases, Alzheimer's disease, autoimmune diseases, diabetes mellitus and cancers etc. **Material and methods**: This study was planned to assess the knowledge, attitude and practice regarding Vitamin D among nursing students in a tertiary care hospital in North India. 247 subjects were enrolled in study after receiving informed consent. The questionnaire contained open ended questions regarding knowledge and yes/no questions on attitude and practice. **Results**: About 98% knew that vitamin D is essential for health and sunrays are the main source of vitamin D. Only 36% knew about animal origin. About 82% had no idea regarding prevalence of vitamin D deficiency in India. 75% did not know about its recommended daily allowance. Only 39% knew two or more risk factors for its deficiency. 45% knew at least two symptoms of its deficiency. 68% did not have any knowledge about hypervitaminosis D. Only 4% knew about its health benefits other than bone health. 80% had never taken any vitamin D supplement. Only 45% knew that vitamin D is assessed by its serum/blood levels. None knew about doses of Vitamin D supplements for the prophylaxis and treatment of its deficiency. **Conclusion**: This study shows limited knowledge and gap in knowledge, attitude and practice regarding Vitamin D among nursing students. They need to be given proper education on Vitamin D as they are the health care providers of society.

KEYWORDS: Vitamin D, KAP, Knowledge, Attitude, Practice.

INTRODUCTION

Vitamin D deficiency is the most under diagnosed and undertreated nutritional deficiency in the world. It is a pandemic affecting individuals irrespective of age, gender, race and geography.

Vitamin D is essential for maintaining healthy bones and teeth. Apart from these it is known to assist in overall health as it promotes immunity, brain and central nervous system health, cardiovascular health and lung functions. It regulates insulin level and supports diabetes (both type I and type II) management.[1,2] It is known to regulate gene expression involved in cancer development.[3] Also in this corona pandemic, Vitamin D deficiency is found to be one of the risk factors for SARS-CoV2 infection and strong association has been found between Vitamin D deficiency and mortality with this infection.[4]

Around one million people worldwide have vitamin D deficiency or insufficiency.[5] Prevalence of Vitamin D deficiency in India range from 84.9 to 100 per cent among school-going children, 42 to 74 percent among pregnant women, 44.3 to 66.7 per cent among infants, 70 to 81.1 per cent among lactating mothers and 30 to 91.2 per cent among adults.[6]

Vitamin D deficiency results in rickets in children, osteomalacia in adults which contributes to osteoporosis in adults.[7,8] Vitamin D is inversely associated with deadly cancers like breast,[9] colorectal[10] and lung cancers.[11] infectious disease like flu,[12] autoimmune diseases like type I diabetes,[13] multiple sclerosis,[14] inflammatory bowel disease (IBD),[15] systemic lupus erythematosus (SLE)[16] and rheumatoid arthritis.[17] Deficiency can also result in type II diabetes mellitus,[18] dementia and Alzheimer's disease,[19] depression,[20] asthma,[21] obesity[22] and overall mortality.[23,24]

Although sunlight is the main source of Vitamin D and there is ample amount of sunlight in India still there is high prevalence of vitamin D deficiency in India. The reasons for this may be inadequate sun exposure, using sunscreens while outdoors, religious cause (wearing burkha), dark skin, obesity, smoking, diet deficient in fortified food and animal products, special conditions like pregnancy, lactation, infancy and medical conditions

like inflammatory bowel disease, cystic fibrosis, celiac disease, malabsorption syndrome.[25]

A KAP study conducted by Al-Amri et al among primary health care physicians in Riyadh city, Saudi Arabia found a gap in knowledge and practice among them.[26] In India, Arora et al have evaluated knowledge, attitude and practice toward sunlight among university students and concluded lack of consistency between knowledge and attitude and negative approach to sun exposure.[27] Kavitha D conducted study on antenatal women in India and found that the majority of the study participants had limited knowledge, poor practices, and negative attitude towards benefits of vitamin D supplements.[28]

Our study was conducted to evaluate the knowledge, attitude and practice of Vitamin D among nursing students in a tertiary care hospital in North India as the nursing fraternity are the pillars of the health care system of India and they need to have proper education regarding vitamin D and its deficiency, and measures to improve the vitamin D status of the body.

MATERIAL AND METHODS

Study Area

This study was conducted at Pandit B.D. Sharma PGIMS, a tertiary care hospital in Rohtak, Haryana, India.

Study design and population

The study participants consisted of nursing students who are studying at the nursing college in the same institute. A structured and pretested questionnaire was used to collect the information 247 subjects were enrolled in study after receiving informed consent.

Data collection and management

The study was planned to assess the knowledge, attitude and practice regarding Vitamin D among nursing students. There were 22 questions in all (one general question, fifteen related to knowledge, two related to attitude and four related to practice). The questionnaire contained open ended questions regarding knowledge; yes/no questions in attitude and both types of questions in practice session. They were handed the correct answers of questionnaire (based on guidelines) at the end of study. The collected variables included sociodemographic data i.e. age, gender, ethnicity and address of the students.

Data analysis

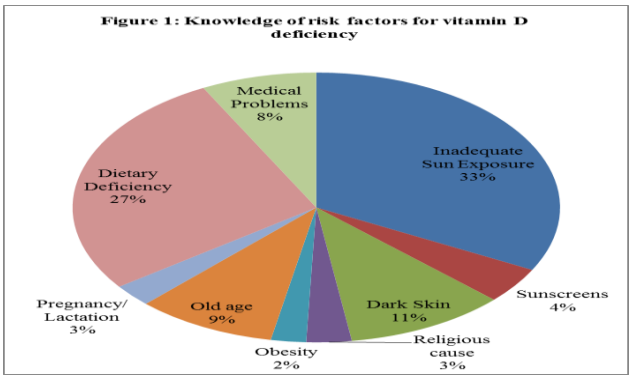
The collected data was entered in Microsoft Excel and checked for any typographical error prior to analysis. The analysis was done by calculating percentages of participant's responses on knowledge, attitude and practice questions regarding Vitamin D.

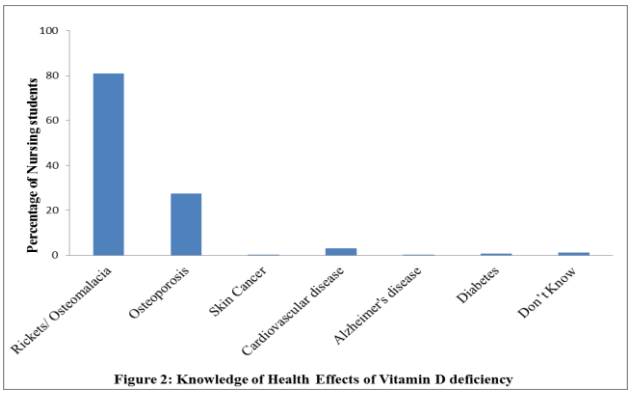
RESULTS

The participants were all females with mean age 20 (Range 18-24 years).

Knowledge about vitamin D

All 247 partocipants have heard about Vitamin D. The majority (98.4%) had heard about it via school/teachers/books. Out of these, school accounts as a source for 50.6% study participants, books as a source for 47.7% study participants. Only 6.8% account for media/ internet as source. Around 4.8% had friends/parents as the source of information. About 98% had idea that sunlight is the main source of vitamin D. 2% felt both sunlight and milk as the main source of Vitamin D. Regarding other sources of vitamin D, 35% believed it is obtained from fish, 36% from egg/egg yolk, 5% from beef liver, 8.9% from cod liver oil. Only 18% had correct knowledge of its high prevalence (40-90%). 68% knew about major forms (D_2, D_3) of vitamin D. Only 39% knew ≥ 2 risk factors of vitamin D deficiency and 61% knew only one risk factor for vitamin D. The risk factors mentioned by them are shown in **Figure 1**. 75% did not know about recommended daily allowance. Around 79% could tell about deficiency causing bone disease like rickets/osteomalacia/osteoporosis. Only 4% of the participants had partial knowledge of other health benefits of Vitamin D like skin cancer, Alzheimer's disease, cardiovascular diseases and diabetes as shown in **Figure 2**. Around 45% knew at least two symptoms of vitamin D deficiency like bone/ joint pain, fractures, fatigue and weight loss. Distribution of participants having knowledge of symptoms is shown in **Figure 3**. Around 76% did not know about various vitamin D preparations available in the market. Only 45% knew that vitamin D is assessed by its serum/blood levels. None knew about the prophylactic and treatment regimen of Vitamin D deficiency. 68% had no knowledge regarding hypervitaminosis D and its treatment.





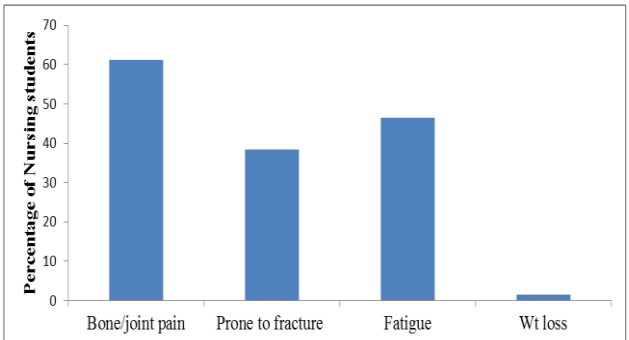


Figure 3: Knowledge of Symptoms of Vitamin D deficiency

Attitude towards vitamin D

Around 98% of participants felt that vitamin D is essential for health. Around 44% did not respond to the question on what they think about their vitamin D levels. Around 36% did not think that their Vitamin D levels might be low.

Practice towards vitamin D

About 94.4% expose themselves to sun daily and 51% do not usually use sunscreen while exposed to sun. 79.8% never took Vitamin D supplement. Majority (76%) would advice their family members and friends on exposing themselves to sun light, taking proper diet rich in Vitamin D and getting their vitamin D levels checked.

DISCUSSION

This is the study to assess knowledge, attitude and practice about vitamin D and its deficiency among the nursing students at a tertiary care hospital as they are the pillars of the health care system anywhere around the globe. Vitamin D is not only responsible for maintaining bone health but also it is responsible for general well being in all ages. Vitamin D deficiency is a public health problem globally.

Our study was conducted on nursing students as they are the pillars of healthcare system in India and it is important for them to have clear knowledge on all aspects of vitamin D. In our study it was found that books and school teachers are the main source of knowledge for the students regarding this Vitamin and this is in contrast to previous study on health professionals by Al-Amri Fahad as their main source was continuous medical education followed by media/internet.[26] This study did not find any relation between media and vitamin D knowledge.

The students had good knowledge of main source of vitamin D (98%) which is in line to previous Indian study by Arora et al.[27] Regarding other sources, the students could identify diet as another source but specific knowledge regarding fortified food (vegetable oil, fortified dairy products, fortified orange juice) was poor. Although around 36% knew about animal sources of vitamin D but again specific knowledge (like egg yolk, red meat, fatty fish-tuna, mackerel, salmon, beef liver, cod liver oil) was poor. Around 36% had incorrect knowledge regarding vegetables and fruits. 76% mentioned it to be obtained from dairy products but none mentioned about its fortification which is necessary for it to be rich source. Similarly 6.8% thought it to be obtained from orange juice (no mention regarding fortification).

The knowledge regarding prevalence of vitamin D is poor among participants as 81% had no idea regarding prevalence of vitamin D deficiency which points towards their poor attitude towards vitamin D. A significant proportion of participants (68%) knew about the various forms of vitamin D which was not studied in the previous studies. Regarding risk factors 61% could tell only one risk factor for vitamin D. Although 40% of the study participants told about inadequate sun exposure as risk factor this is ironically very low percentage as compared to their knowledge of sun as the main source of vitamin D.

Our study showed that overall knowledge of vitamin D for bone health is good (79%) which is in agreement to another Indian study[27] but regarding other health benefits the knowledge is very poor. Only small percentage (25%) could tell about correct recommended daily allowance of vitamin D which is partially in line with the previous study on UK population[29] where 39% could tell the correct amount. This again points towards their limited knowledge of vitamin D.

Regarding symptoms of Vitamin D deficiency only 45% of participants knew at least two symptoms of vitamin D deficiency. A considerable percentage (76%) of participants did not know about various Vitamin D preparations available in market. Majority (68%) had no knowledge regarding hypervitaminosis D. The considerable percentage (55%) did not know about the investigations done to assess vitamin D levels in body. No participant had knowledge regarding prophylactic and treatment regimens of Vitamin D. Majority (68%) did not know about the treatment of hypervitaminosis D. After literature search we could not find the studies where these parameters were studied and analyzed.

This limited knowledge however does not relate to the attitude regarding vitamin D as they regard Vitamin D to be essential for health (98%) and majority (94.4%) expose themselves to sun and do not use sunscreens (51%). However, only small percentage of participants (20%) believed that they may have less vitamin D in their bodies.

In a study conducted by Al-Amri Fahad et al to evaluate KAP regarding Vitamin D among primary health care professionals in Riyadh city identified a gap in knowledge and practice among them.[26] In another study conducted in India by Kavitha D among antenatal women it was found that the majority of the study participants had limited knowledge, poor practices, and negative attitude towards benefits of vitamin D

supplements.[28] Another Indian study was conducted on university students also showed lack of consistency between knowledge and attitude.[27]

Our study agrees with the previous studies in that the study participants have limited knowledge regarding vitamin D and that there is a gap in knowledge, attitude and practice regarding vitamin D. However, our study is different from the two Indian studies[27,28] as our study was on nursing students. Moreover, we have evaluated on several parameters like knowledge regarding symptoms of vitamin D deficiency, preparations of vitamin D available in the market, hypervitaminosis D, investigations to detect deficiency, prophylaxis and treatment of vitamin D deficiency.

CONCLUSION

This study shows limited knowledge of vitamin D among nursing students and that there is a gap in knowledge, attitude and practice of Vitamin D deficiency. The nursing students are pillars and the future of health care system in India. They need to be given proper education on Vitamin D so that they can serve the society in a better way.

Appendix I

Questionnaire

Have you heard of Vitamin D? Yes No

Knowledge

1. From where did you hear about Vitamin D?
2. What is the main source of Vitamin D?
3. What are the other sources of Vitamin D?
4. What is the prevalence of Vitamin D deficiency in India?
5. What are the various forms of vitamin D?
6. What are the risk factors of vitamin D deficiency?
7. What are the health effects of vitamin D?
8. What is the recommended dietary allowance of vitamin D?
9. What are the symptoms of vitamin D deficiency?
10. What are the various vitamin D preparations available in market?
11. What are the investigations available to check your vitamin D level?
12. What is the prophylaxis of vitamin D deficiency?
13. What is the treatment of vitamin D deficiency?
14. What are the harmful effects of excess vitamin D?
15. What is the treatment of Vitamin D overdose?

Attitude (Tick the response)

1. Do you think Vitamin D is essential for health? Yes No
2. Do you think that your Vitamin D levels might be low? Yes No

Practice

1. Do you expose yourself to Sun? Yes No
2. Do you use sunscreen and sunshades to protect yourself from Sun? Yes No
3. Have you ever taken vitamin D supplements? Yes No
4. What will you advice your family and friends regarding vitamin D?

Appendix II

Guidelines

1. Main source of vitamin D is sunlight.
2. Expose yourself to sun (face and arms i.e. 12% of body surface area) preferably between 11 am to 2 pm for 30 minutes.
3. Other sources of vitamin D are egg yolk, beef liver, cod liver oil, fatty fish (tuna, mackerel, salmon).
4. Foods Fortified with Vitamin D are another source and includes bread (yeast), milk/curd/cheese, cereals, orange juice, soy milk.
5. Vitamin D deficiency results in- Rickets in children, osteomalacia in adults and osteoporosis.
6. The candidates for screening (risk factors) for Vitamin D deficiency are patients with hyperparathyroidism, deadly cancers, infectious disease like flu, autoimmune diseases like type I diabetes, multiple sclerosis, crohn's disease and rheumatoid arthritis, hypertension, type II Diabetes mellitus, Alzheimer's disease, autism, asthma and pregnant women.
7. Recommended Daily allowance of vitamin D are 400-600 IU for 1-70 year age group and 800 IU for >70 years age.
8. Symptoms of vitamin D deficiency are weak bones, brittle/fragile bones prone to fracture, bone pain, fatigue, muscle aches and weight loss.
9. Hypervitaminosis D occurs after chronic ingestion of >60,000IU/day. Signs and Symptoms include- hypercalcemia, ectopic deposition in various tissues- blood vessels, parenchymal organs and soft tissues, hypercalciuria (renal stones), weakness, fatigue, vomiting, diarrhoea, polyuria, and growth retardation.
10. Investigations to detect vitamin D deficiency is serum vitamin D levels (25 hydroxy vit D blood test) <20 ng/ml is deficiency, 20-29ng/ml is insufficiency, > 30ng/ml is sufficiency and >150ng/ml is toxicity.
11. Prophylactic dose to avoid vitamin D deficiency in predisposing conditions- 400 IU/d or 3,00,000-6,00,000 IU can be given orally/intramuscular once in 2-6 months.
12. To treat vitamin D deficiency in children -2000 IU/day for 6-8 weeks and in Adults- 3,000-4,000 IU/day for 8 weeks or 60,000 IU sachets/week mixed in milk/curd for 8 weeks.
13. To maintain vitamin D sufficiency- adults can take 60,000 IU of vitamin D once a month (equivalent to 2000 IU daily) for at least 6 years without concerns for vitamin D toxicity.
14. To treat vitamin D overdose withhold vitamin D supplements, low calcium diet, plenty of fluids and corticosteroids.

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