
EPIDEMIC OF VITAMIN-D DEFICIENCY AND ITS MANAGEMENT

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ABSTRACT:

Vitamin-D deficiency is prevalent across all age groups in epidemic proportions. The purpose of this study was to acquire a baseline assessment and create awareness among students regarding vitamin-D. A cross-sectional, voluntary survey was conducted among post graduate students. Data were collected using a questionnaire which assessed the level of knowledge students had with regard to where vitamin-D comes from, what it does for health, how much is recommended, factors that affect its levels, and deficiency management. Majority of students were unaware that vitamin-D deficiency has attained epidemic proportions. Though bone and skeletal disorders as a complication of vitamin-D deficiency were known, a large number were unaware of systemic consequences. Study highlighted a lack of knowledge about the importance of vitamin-D, worldwide prevalence of vitamin-D deficiency, and its management among post graduate students. Promoting vitamin-D health awareness, if replicated across populations, could lead to positive health outcomes globally.

Key Words: Epidemic, Vitamin-D, Deficiency, Management

INTRODUCTION-

Vitamin-D deficiency is a worldwide epidemic and yet, it is a problem that is largely unknown by majority of population. Widespread prevalence in all age groups including toddlers, school children, men, women, elderly, pregnant women, and their neonates in both rural and urban areas has been documented. Young adults are also potentially at high-risk for vitamin-D deficiency. During childhood, this deficiency can cause growth retardation and skeletal deformities, while in adults, muscle weakness and fractures may ensue. In addition to its importance for bone health, recent evidence suggests that vitamin-D is also useful in promoting cardiovascular health and preventing chronic diseases.

One of the major reasons for the worldwide spread of this nutritional disorder has been lack of awareness about the importance of vitamin-D, its health benefits, and prevention of deficient states across populations. It has been suggested that awareness and educational campaigns about vitamin-D at the community level targeting both general and high-risk populations could help prevent long-term health consequences. Primary education targeting younger populations is known to increase the likelihood of positive health behaviour that persists throughout and protect from disease development and progression later in life. Apart from targeting young adults at the community level, young post graduate students also need to be a focus for group interventions, as staggeringly low rates of awareness have been reported among them. Selection of young students in this study provides a twofold opportunity of targeting a section of the general population that would also be future health providers of the community. Students are an integral part of future health-related progress of the community at large and should therefore be the target for inducing such long-term changes. It is crucial to have a thorough understanding of student's motivation, knowledge, and attitudes towards health behaviour before being able to create effective and targeted health promotion programs. Gaining a baseline understanding of students' current vitamin-D related knowledge may be first step in programme development and is the purpose of this study. The findings from this assessment will provide important information to determine what next steps will

be necessary to promote sufficient levels of vitamin-D among students and health professionals. Thus, this study is an attempt for sensitization of post graduates early in their training regarding vitamin-D and prevention and treatment of its deficiency.

MATERIALS AND METHODS

Study Design and Settings:

This study was conducted among the post graduate students about one and half year after enrolment in post graduate college, at the Department of Physics, Meerut College Meerut. This research was conducted as a cross-sectional, voluntary survey over a period of one and a half year.

Data Collection and Questionnaire:

The questionnaire was given to 300 post graduate students. Before filling the questionnaire, necessary information was given by the researchers. Data were collected using a questionnaire composed of two parts. First part included questions on age and gender and second half focused on vitamin-D. The main objective of the study was to assess vitamin-D knowledge among students. The 16-questions, predominantly multiple-choice survey took approximately 15 minutes or less to complete. The survey questions assessed the level of knowledge students had with regard to where vitamin-D comes from, what it does for health, how much is recommended, factors that affect vitamin-D levels, and the prevalence of vitamin-D deficiency.

DATA ANALYSIS:

Statistical analysis was carried out using SPSS. Descriptive statistics were used to characterize the population and to identify the frequencies of participant's knowledge of vitamin-D deficiency. A $p > 0.05$ was considered significant.

FINDINGS

Knowledge of Importance of Vitamin-D and Its Deficiency-

Only 17.8% of participants correctly identified that vitamin-D deficiency has achieved epidemic proportions, while less than half of the students believed that it is prevalent only in urban population (47.2%) or limited to high-risk groups (23.8%). Majority of the participants (76.1%) correctly identified infants, pregnant, and lactating women as high-risk groups. However, they were not aware (92%) that elderly and diabetics were also at a greater risk to develop vitamin-D deficiency than the general population. Though bone and skeletal disorders as a complication of deficiency were known (94.4%), majority were unaware of the other systemic consequences.

SOURCES OF VITAMIN D-

Approximately 48% of participants incorrectly identified that sunlight that passed through glass is a source of vitamin-D. Milk/dairy products (22.6%) and eggs (8.33%) were recognised as vitamin-D rich foods by few students. Although many were able to identify at least one correct source (30.9%), 17% of respondents also believed that green leafy vegetables are rich in vitamin-D. Adequate sunlight exposure, an important source of vitamin-D, was recognised by 42.4% of participants. As for adequate duration of sun exposure required for vitamin-D synthesis in Indian population, only one-third (32%) of respondents were aware of it.

RECOMMENDED DAILY ALLOWANCE AND VITAMIN-D SUPPLEMENTS:

About a quarter of our study population (24.6%) was aware of the recommended daily allowance of vitamin-D (600 IU) for adult men and women. Among the post graduate students, majority (77%) had taken vitamin-D supplements at some point of their life, though only few of them (24.2%) had been diagnosed with vitamin-D deficiency before administration.

TREATMENT OF VITAMIN-D DEFICIENCY:

About half of the participants (52%) correctly identified calcitriol as the active form of vitamin-D for biochemical functioning in the body. Cholecalciferol was thought to be the active vitamin-D by

39.2% participants. More than 80% of the students were unaware of the serum levels of vitamin-D indicating insufficiency/deficiency that mandates treatment. With regard to the recommended forms of vitamin-D for treatment of vitamin-D deficiency, a similar number of participants identified cholecalciferol (40%) and calcitriol (41.6%). Only a quarter (27.3%) of students selected correct dosage regimen. Many students incorrectly associated cholecalciferol (41.6%) with hypocalcaemia. Also, 34.9% of the participants were aware that calcium supplementation is important in treatment of vitamin-D deficiency in cases of low dietary intakes of calcium.

DISCUSSION:

The present study demonstrates gaps in basic knowledge about vitamin-D, its benefits, and management of vitamin-D deficiency among post graduate students. Majority of the students believed that vitamin-D deficiency is prevalent only in high-risk groups confined to urban areas. They were unaware that vitamin-D deficiency has attained epidemic proportions across the world irrespective of age groups, populations, and geographical regions.

With regard to the amount of dietary intake of vitamin-D, only one-third of respondents correctly identified the recommended daily allowance of vitamin-D. Institute of Medicine, United States of America, recommends recommended daily allowance of 600 international units daily for adult male and females to optimise bone health. However, in absence of adequate vitamin-D intake, insufficiency or deficiency may result.

Treatment in the right form of vitamin-D supplement, adequate dose, and duration is imperative to prevent long-term health consequences of vitamin-D deficiency or toxicity. It is recommended that vitamin-D should be administered in a dose of 50,000 international units per week for 8 weeks in addition to bimonthly supplements to maintain adequate vitamin-D levels. However, we observed a lack of awareness among students regarding the various biochemical forms, dose, and duration of vitamin-D supplementation for treatment of nutritional deficiency. It is known that prolonged self-medication with high doses of vitamin-D supplements, without biochemical confirmation of deficient serum levels could pose a serious health hazard. Though vitamin-D toxicity is one of the rarest conditions, students need to be aware that adverse effects of treatment can be considerable, as nearly 52% of them had self-administered supplements without a confirmatory diagnosis of vitamin-D deficiency.

Results of the current study are largely consistent with those conducted in other countries when it comes to identifying a knowledge deficit. Despite widespread attention about vitamin-D deficiency, considerable gaps in knowledge of vitamin-D, its sources, required intake, factors affecting levels, and associated health benefits were evident. Though students at this stage of their training understand the physiological and biochemical roles of vitamin-D, its metabolism, and occurrence of deficient states in children and adults; their knowledge gap could be attributed to lack of emphasis on knowledge empowerment and opportunities to transfer what they have learnt to a real life practice setting. In addition, limited health awareness campaigns at the level of physicians, high-risk, and general populations mandate the need for policy and public health recommendations of the government and its agencies on easily accessible reliable information for the public about vitamin-D and sun exposure. This lack of initiative is evidenced by absence of any national health policies or programmes to improve vitamin-D related health in our population. In addition, an expert group of the Indian Government that gathered to revise and update the human nutrient requirements and the daily recommended dietary allowance for Indians concluded that outdoor physical activity is a means of not only achieving adequate vitamin-D but also controlling overweight and obesity in Indian population. Thus, only under situations of minimal exposure to sunlight, a daily supplement of 400 international units (10 μ g) was recommended.

This research evidence has reinforced the need for sensitization of post graduates early in their training regarding vitamin-D, its importance, and prevention and treatment of deficiency. Awareness about vitamin-D at this stage of profession would not only benefit their own health but also instil a health-related behaviour change and increased awareness and knowledge as future

practitioners. Well-aware health professionals are more likely to be vigilant about this disorder and identify and take corrective measures at the earliest to prevent long-term health consequences in the vulnerable population. Furthermore, evidence supports the importance of physician mediated knowledge translation, as people report higher rates of intention to use vitamin- D when they have been informed of the benefits via physician. In addition, the findings from this assessment will provide important information to determine what next steps will be necessary to promote awareness of vitamin-D among students. It could provide baseline data to design modules for training of professionals that would help them in identification, prevention, and treatment of vitamin-D deficiency.

In order to facilitate health-related behaviour change, program planners need to start with an exploration of the target population's needs, which includes understanding of their knowledge about the specific issue of interest. It is unlikely that people would identify with and take corrective measures to resolve an issue they are unaware of. Thus, community levels awareness is essential to stop this silent outbreak. Future health promotion programmes with effective educational campaigns are needed to increase awareness about vitamin-D so that they will inform and encourage people to adopt health-related behaviours to decrease rates of insufficiency, especially in at-risk groups, thereby improving overall health.

The key strengths of this study include an important research question, the outcome of which could not only affect the study population, that is, students but indirectly also impact the general population that they would treat as future practitioners. The results of this study will make an important contribution by defining and providing an evidence base for the existing knowledge deficit and instituting corrective measures at a crucial step of training. However, results may not be generalizable to all student populations as our sample was derived from a single super speciality tertiary health care centre in India. The cross-sectional nature of our study limited subsequent assessment and translation of the imparted knowledge into practice. In addition, the questionnaire was primarily developed for this study and was not used or validated beyond the context of the present study.

CONCLUSION-

In this study highlighted a lack of awareness about the importance of vitamin-D, worldwide prevalence of vitamin-D deficiency, and its management among students. This knowledge deficit could provide baseline data to design training modules for professionals that would help them in identification, prevention, and treatment of vitamin-D deficiency. Increased awareness at an early stage of training could instil adoption of health-related behaviours at personal and professional level. Effective educational campaigns targeted to specific populations would increase awareness about adequate intake of vitamin-D, thereby improving overall health.

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