Advanced Research Journal
Volume 1, Number 1, 2025, 1-8
DOI: 10.71350/3062192511

OPEN ACCESS
Article

Level of awareness about vitamin D among adolescent college students

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Abstract

Vitamin D deficiency is a significant health problem for men and women in certain South Asian countries due to a lack of vitamin D-rich diets, dark skin color, cultural and spiritual practices that encourage the wearing of concealing garments. The aim of this study was to assess the level of awareness about vitamin D among adolescent college students in Dhaka City. This descriptive type of Cross-sectional study was carried out at the Department of Public Health, North South University, Dhaka from June 2022 to August 2022. 16 to19 years adolescent college students (n=384) were the study population. Purposive sampling was done according to availability of the subjects. All the data were compiled and sorted properly and the quantitative data was analyzed statistically by using Statistical Package for Social Science. Most of the participants (n=265, 69%) belongs between the age group 17-18 years of age. Most of the participants (85%) were female. Most of the respondents (97.4%) were from the Muslim community. Most of the participants (72%) were HSC first-year students in college. In our study about half (47.9%) of respondents' family income was between 21,000 BDT to 30,000 BDT. In our study 100% participants heard about Vitamin D. 90.1% participants knows about Vitamin D deficiency. 95.8% of participants know about sources of vitamin D. 92.5% of participants know about the symptoms of vitamin D deficiency. One relationship was found where a good knowledge of Vitamin D deficiency was found among the participant whose family incomes were higher and it is statistically significant (p-value <0.000). This study revealed that there is a tremendous opportunity to raise students' awareness about vitamin D.

Article History
Received 04.09.2024
Accepted 28.11.2024

Keywords
Level of awareness; vitamin D; adolescent college students

Introduction

Vitamin D, a fat-soluble steroid hormone, is essential for preserving optimal blood levels of calcium and phosphorus. It promotes bone mineralization and is considered an important determinant of bone health through calcium absorption and parathyroid hormone secretion (Mahmood et al., 2017). Vitamin D is synthesized in vivo when solar ultraviolet B (UVB)

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radiation interacts with 7-dehydrocholesterol, a precursor molecule in the skin. While endogenous production accounts for approximately 90% of total vitamin D in healthy individuals, dietary intake and supplements also contribute significantly. However, activities that minimize sun exposure can lower vitamin D levels (Sowah et al., 2017).

Vitamin D deficiency is a significant issue for women in certain South Asian countries due to a lack of vitamin D-rich diets, dark skin pigmentation, and cultural practices that encourage the wearing of concealing garments. Despite its importance, statistics on vitamin D levels among South Asian subpopulations are scarce. Factors such as limited sun exposure and low egg consumption have been identified as strong predictors of vitamin D deficiency. Globally, vitamin D deficiency affects up to 1 billion people (Kiggundu et al., 2015).

The health threats associated with vitamin D deficiency have been evident for over a century. It is a recognized risk factor for various diseases, including rickets, growth retardation, muscle weakness, skeletal deformities, hypocalcemia, tetany, and seizures in children, as well as osteomalacia and hip fractures in adults (Kaddam et al., 2017). Additionally, type 1 diabetes mellitus, multiple sclerosis, rheumatoid arthritis, cardiovascular diseases, and certain malignancies have been linked to vitamin D insufficiency. Maintaining blood levels of 25-hydroxyvitamin D above 80 nmol/L (approximately 30 ng/mL) may also play a crucial role in supporting extrarenal 1-alpha-hydroxylase activity for producing 1,25-dihydroxyvitamin D3, essential for overall health (Holick, 2004).

Previous studies assessing the micronutrient status of local populations indicate that Bangladeshis are particularly vulnerable to the health issues associated with hypovitaminosis D and calcium deficiency. This vulnerability is attributed to a lack of awareness and insufficient understanding of the importance of these nutrients (Uddin et al., 2013).

The broad objective of this study is to assess the level of awareness about vitamin D among adolescent college students in Dhaka City. The specific objectives include:

1. To describe the socio-demographic and economic characteristics of the respondents.
2. To assess the perception of the respondents about vitamin D and its deficiency symptoms.

Method

This descriptive cross-sectional study was conducted at the Department of Public Health, North South University, Dhaka, between June and August 2022. The study population comprised adolescent college students aged 16 to 19 years (n = 384). Participants were selected using purposive sampling based on availability. Data were collected through structured interviews with respondents. All questions were closed-ended, with predefined response options to ensure consistency.

Likert scale items were utilized to evaluate participants' attitudes and perceptions. A Likert item involves a statement that respondents assess numerically, typically on a scale reflecting degrees of agreement or disagreement. Properly designed Likert scales feature both "symmetry" (equal numbers of positive and negative options) and "balance" (equal spacing between points around the neutral value). For this study, a standard five-point Likert scale was used: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1).

The collected data were entered into a computer and analyzed using SPSS software (version 20.1). Descriptive and inferential statistics were applied to assess awareness levels about vitamin D among the participants. The study received approval from the institutional ethical committee at North South University.

Results or Findings

A descriptive cross-sectional study was conducted with 384 students. The majority of participants (n = 265, 69%) were aged between 17 and 18 years. Most participants were female (85%), and 97.4% identified as part of the Muslim community. Additionally, 72% of the respondents were first-year HSC students. Approximately half of the participants (47.9%) reported a family income ranging from 21,000 to 30,000 Bangladeshi Taka (BDT; see Table 1).

A descriptive type of Cross-sectional study was carried out among 384 students. Most of the participants (n=265, 69%) belongs between the age group 17-18 years of age. Most of the participants (85%) were female. Most of the respondents (97.4%) were from the Muslim community. Most of the participants (72%) were HSC first-year students in college. In our study about half (47.9%) of respondents' family income was between 21,000 BDT to 30,000 BDT. (Table 1)

Table 1. Socio-Demographic Characteristics of the study subjects (n= 384)

Parameter	Number	Percentage
Age		
16-17 years	9	2.3
17-18 years	265	69.0
18-19 years	110	28.6
Sex		
Male	58	15
Female	326	85
Religion		
Muslim	374	97.4
Hindu	10	2.6
Educational Status		
HSC 1st year	275	72
HSC 2nd year	109	28
Family Income		
10000-20000 taka	75	19.5
21000-30000 taka	184	47.9
>30000 taka	125	32.6

In our study, 100% of participants were aware of Vitamin D, 90.1% were aware of Vitamin D deficiency, 95.8% knew about the sources of Vitamin D, and 92.5% were familiar with the symptoms of Vitamin D deficiency (see Table 2).

Table 2. Distribution of subjects according to level of awareness about Vitamin D

Indicators	Yes (%)	No (%)
Have you ever heard/learned about Vit-D	100	0
Have you ever heard/learned about Vit-D deficiency:	90.1	9.9
Do you know the sources of vitamin D?	95.8	4.2
Do you know about the symptoms of vitamin-D deficiency?	92.5	7.5

In our study, about half (52%) of the respondents reported obtaining information by reading books. Approximately 21% stated that they receive information from their college (i.e., teachers and other students), 15% mentioned their parents as a source, 8% cited friends, and 4% referred to other sources (see Figure 1).

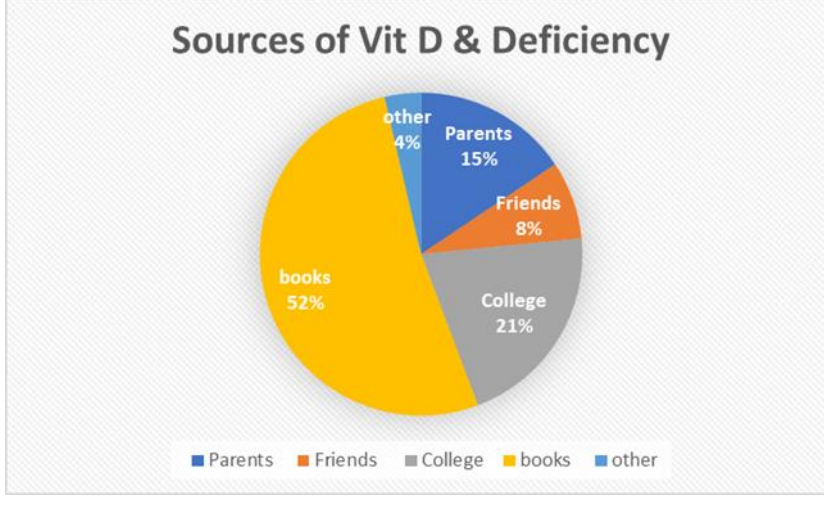

Figure 1. Distribution of subjects according to getting information about the source of Vitamin D and its deficiency

To measure the attitude of the respondents towards Vitamin D, a set of questionnaires, containing 20 questions was asked. Responses have been taken using 5 points Likert scale and analyzed accordingly. Respondents have expressed their strong agreement and agreement with the questions; Vitamin D is highly needed for us (62.5%), Vitamin D should be included in your daily diet (47.6%), Children need Vitamin D (54.9%) and Vitamin D can be obtained from sunlight (56.3%). In response to the question; Vitamin D is necessary for bones (50.3%), Vitamin D deficiency causes multiple sclerosis (55.2%), Vitamin D deficiency causes lupus (40.2%), Vitamin D deficiency causes Rheumatoid arthritis (37.6%), Vitamin D deficiency causes autoimmune thyroid disease (40.6), and Vitamin D deficiency causes obesity (38.5%). On the other hand, 38.3%, and 36.5% of respondents have expressed strong disagreement and disagreement accordingly to the statement "Vitamin D deficiency causes diabetes". 60.4%, 53.6%, 55.7%, and 42.2% of the respondents were neutral to the question; Vitamin D can be attained from food, Vitamin D can only be obtained from medicine, Vitamin D deficiency causes cancer, and Vitamin D deficiency causes heart disease accordingly. "Lack of sun

exposure is causing Vitamin D deficiency", 77.9% of the respondents have expressed their strong agreement with the statement and 48.4% with the statement "Vitamin D is not needed to be healthy". 72.9% of the respondents have expressed their agreement with the statement "We should eat Fish to obtain Vitamin D" and, 45.6% with the statement "Milk is a good source of Vitamin D" (see Table 3).

Table 3. Distribution of subjects according to knowledge about Vitamin D (n=384)

Statement (s)	Strongly disagree	Disagree	Neutral/ Unbiased	Agree	Strongly agree
Vitamin D is highly needed by us	0	0.5	3.6	33.3	62.5
Vitamin D should be included in your daily diet	0	0	8.1	44.3	47.6
Children's need Vitamin D	0	0	8.9	54.9	36.2
Vitamin D can be obtained from food	6.8	3.4	60.4	18	11.4
Vitamin D can be obtained from sunlight	5.7	5.2	7.8	25.0	56.3
Vitamin D can only be obtained from medicine	10.7	19.5	53.6	14.6	1.6
Vitamin D is necessary for bones	3.4	11.4	0	50.3	34.9
Vitamin D deficiency causes diabetes	38.3	36.5	23.2	2	0
Vitamin D deficiency causes multiple sclerosis	6.8	0	24.7	55.2	13.3
Vitamin D deficiency causes lupus (rashes)	8.3	26.8	17.4	40.2	7.3
Vitamin D deficiency causes Rheumatoid arthritis	6.0	20.5	22.9	37.6	13.0
Vitamin D deficiency causes autoimmune thyroid disease	12.5	13.3	21.6	40.6	12.0
Vitamin D deficiency causes cancer	26	11.2	55.7	7	0
Vitamin D deficiency causes heart disease	17.7	18.7	42.2	14.6	6.8
Vitamin D deficiency causes obesity	8.9	26.6	19.0	38.5	7.0
Lack of sun exposure is cause for Vitamin D deficiency	2.1	4.1	0	15.9	77.9
We should eat Fish to obtain Vitamin D	0	13.5	1.0	72.9	12.5
We should Eat Eggs regularly to obtain Vitamin D	2.3	1.0	3.1	84.4	9.1
Milk is a good source of Vitamin D	1.0	2.1	9.1	45.6	42.2
Vitamin D is not needed to be healthy	2.1	4.4	10.4	34.6	48.4

The study has found that there is a strong association (p-value < 0.000) between the age and knowledge of the respondent. It was found that 69% has good knowledge of Vitamin D deficiency in the age group of 17-18 years and only 2.3 % of the respondent has good knowledge of Vitamin D deficiency in the age group of 16-17 years. 72% of the students with good knowledge of Vitamin D deficiency were from 1st-year HSC and the rest 28% were from 2nd-year HSC. Additionally, all students (100%) with poor knowledge of Vitamin D deficiency were from 1st-year HSC and there was significant statistical association (p-value 0.002). Another relationship was discovered where a good knowledge of Vitamin D deficiency was found among the participant whose family incomes were higher and it is statistically significant (p-value <0.000) (see Table 4).

Table 4. Association of participant's knowledge about Vitamin D and their socio-demographic parameter

Variable	Good knowledge about Vit D	Poor knowledge about Vit D	P value
16-17 Years	9 (2.3%)	0 (0%)	<0.001
17-18 Years	265 (69%)	38 (100%)	
18-19 Years	110 (28.6%)	0 (0%)	
Male	56 (15%)	0 (0%)	0.007
Female	290 (85%)	38 (100%)	
Muslim	374 (97.4%)	38 (100%)	0.288
Hindu	10 (2.6%)	0 (0%)	
HSC 1st year	275 (72%)	38 (100%)	0.002
HSC 2nd year	109 (28%)	0 (0%)	
10000-20000 taka	64 (19.5%)	25 (65.8%)	<0.001
21000-30000 taka	174 (47.9%)	3 (7.9%)	
Above 31000	110 (32%)	10 (26.3%)	

Discussion

In our study, most of the participants (85%) were female. Similar results were obtained in the study conducted by Gisrianti et al. (2021). In their study, most of the participants (76.3%) were female. In our study, 95.8% of participants knew about the sources of vitamin D. Bahrami et al. (2021) conducted a study in Iran about the knowledge of vitamin D in females. In their study, they stated that 9.3% of participants knew about the sources of vitamin D. In our study, 100% of participants had heard about Vitamin D. Similar results were obtained in the study conducted by Alfadly et al. (2024). In their study, 99.1% of people had heard about Vitamin D. In our study, 56.3% of participants knew that Vitamin D can be obtained from sunlight. Similar results were obtained in the study conducted by Alfadly et al. (2024). In our study, we found that there is a strong association (p-value < 0.000) between the age and knowledge of the respondents. We also discovered that good knowledge of Vitamin D deficiency was found among participants with higher family incomes, and this is statistically significant (p-value < 0.000). Dissimilar results were obtained in the study conducted by Shwetha et al. (2019). In their study, they stated that there is no association between knowledge scores and selected

baseline variables such as age, religion, monthly income, exercise, time spent outdoors, source of information, dietary pattern, use of sunscreen, and previous history with vitamin D deficiency.

Conclusion and Implications

This study showed that there is huge scope to make students aware of Vitamin D. They spend most of the in the college of the time they spend with their friends and family (parents). Therefore, college, teachers, friends, and parents may be the target people to make the students aware of Vitamin D deficiency. Economically, students from low socio-economic background lacks the related information compared to students from above-average and upper socio-economic background. So, need special care for them.

There is a need for special awareness programs on Vitamin D in educational institutions to disseminate information and raise awareness among students. This can include the installation of billboards on college premises about Vitamin D, distributing leaflets on Vitamin D among students and parents, and organizing debate competitions on Vitamin D. Additionally, awareness-raising programs should be conducted through electronic and print media to inform students, parents, and the general population. Further studies are also needed, covering all possible variables, including parents and teachers.

Declarations

Acknowledgments: Not applicable.

Authors' contributions: The authors contributed equally to the manuscript.

Competing interests: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Publisher's note: Advanced Research Journal remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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