A Survey of University Students' Vitamin D–Related Knowledge

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ABSTRACT

Objective: To survey Canadian university students' vitamin D–related knowledge.

Methods: Undergraduate university students (n = 1,088) were surveyed as to their vitamin D–related knowledge, including its sources, health benefits, and recommended intake.

Results: Overall, students answered 29% of questions correctly on the knowledge test. In addition, the overall test was subdivided into 3 subtests, and students scored 26% on vitamin D source knowledge, 23% on factors affecting vitamin D levels, and 37% on health effects of vitamin D. Only 8% of participants correctly identified the recommended vitamin D intake; 14% correctly identified the amount of time in the sun required to produce adequate vitamin D.

Conclusions and Implications: These results suggest that Canadian university students have poor knowledge concerning vitamin D. Program planners should consider improving vitamin D knowledge as a component of future health promotion programs for university students.

Key Words: vitamin D, knowledge assessment, university students, health promotion program development (*J Nutr Educ Behav*. 2015;47:99-103.)

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INTRODUCTION

Vitamin D deficiency is a worldwide epidemic, yet most individuals are largely unaware of the problem.[1] Currently, it is estimated that over 1 million Canadians are vitamin D deficient.[2] In addition to its importance for bone health,[3] recent evidence suggests that vitamin D is useful in promoting musculoskeletal health[3,4] and immune functioning,[4-6] as well as preventing and managing cardiovascular disease,[7] several types of cancer,[4,8] and many other diseases.[4,9,10] The Institute of Medicine[11] recently increased the Recommended Dietary Allowance of vitamin D from 400 to 600 International Units (IU) for those aged 1-70 years, and approximately 25% to 67% of Canadians are not meeting the new mandate.[2] Furthermore, about 13% of Canadians (aged 6-79 years) are not even getting the 400 IU of vitamin D required to maintain proper bone health.[2,11] These findings are alarming because vitamin D is relatively easy to access from several food sources, as well as the sun and inexpensive supplements.[4,12] Of particular concern is that young adults aged 20-39 years are at highest risk of deficiency.[2] The health behaviors of young adults are of primary concern because they are forming behaviors that will contribute to the quality of their lives for many years to come.[13] In fact, current evidence indicates that adequate vitamin D early in life has been shown to help prevent osteoporosis,[14-16] multiple sclerosis,[17] cardiovascular disease,[7] rheumatoid arthritis,[18] some types of cancer,[19] and several other diseases later in life.[4]

Although knowledge is not the only factor that influences behavior, it has an effect and is therefore important to consider when developing a health promotion program.[20] As von Bothmer and Fridlund[21] pointed out, it is crucial to have a thorough understanding of students' health-related behaviors, motivation, knowledge, and attitudes before creating effective and targeted health promotion programs. Therefore, gaining a baseline understanding of university students' current vitamin D–related knowledge may be a crucial first step in program development, and was the purpose of this study. To date, no other studies have investigated the level of vitamin D knowledge in a group of Canadians.

METHODS

Procedure and Participants

Potential participants in this study were sent an e-mail invitation including a link to an online survey on vitamin D–related knowledge, administered via SurveyMonkey (SurveyMonkey.com, LLC, Palo Alto, CA). The sampling frame consisted of the entire undergraduate cohort at a large urban Canadian university. The Health Sciences Research Ethics Board at Western University approved all procedures and consent documentation.

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Measures

The Vitamin D Knowledge Survey (Supplementary Data) included 7 questions that evaluated vitamin D–related knowledge. The survey took approximately 5 minutes to complete and was developed specifically for the current study, based on previous studies of vitamin D–related knowledge.[22-24]

Knowledge score calculation. Because each question was intended to investigate different aspects of vitamin D knowledge, all 7 questions were weighted equally in the calculation. Each question was worth 1 point, producing a maximum score of 7 points. Questions that demanded only 1 response were simply marked as correct (1 point) or incorrect (0 points), but for questions that included multiple correct responses, each correct response was worth a fraction of the overall question. For example, if a question included 4 correct answers, each correct answer was worth 0.25 points. In addition, equally weighted points were deducted for incorrect answers. This penalty for guessing was implemented to prevent participants from scoring 100% on multiple response questions by selecting all possible responses to that question. For this reason, the response "I don't know" was not penalized within the knowledge score. The final knowledge score was recorded as a percentage (of the total score of 7).

Survey validity. To ensure face validity, the researchers reviewed each question in the survey, and a knowledgeable individual in the field of vitamin D[25] conducted an expert review to assess the appropriateness of the survey questions and response options. In addition, a pilot-test of the tool was completed with a sample of 12 undergraduate university students to ensure that the target audience understood what each question was asking, as well as what each response meant. In groups of 3, the students were asked to also discuss their ideas on how to make the survey easier to read and understand. The student feedback and the expert review feedback were used to edit the survey accordingly.

Data Analysis

The researchers conducted data analysis using SPSS version 20 (SPSS, Inc, Chicago, IL, 2012). Descriptive statistics were computed for age, sex, and academic faculty in which students were registered. (In Canadian universities, a student's major cannot be determined by the faculty of registration; as such, the term "academic faculty" is used in this article, correlating most directly with the term "major" in US colleges.) Vitamin D knowledge was similarly summarized and compared across students' academic faculty using a 1-way independent-groups ANOVA ($\alpha = .05$).

RESULTS

The researchers sent e-mail invitations to 30,051 undergraduate students; approximately 4% of this sampling frame participated in the survey. Of the 1,088 students who participated, 217 were male and 777 were female. Most (74%) were white, 17% were Asian or Indian (17%), and 9% were of 5 other ethnicities. The remaining 94 students did not specify gender. Although participants were between the ages of 17 and 66 years (mean, 21.6; SD, 6.4), the vast majority were aged 17-21 years (74.9%). Of the 943 participants who identified their academic faculty, 89% were from the social sciences (n = 315), health sciences (n = 221), sciences (n = 166), arts (n = 95), and medical sciences (n = 42). Approximately 99% of the sample (n = 1,078) had heard of vitamin D before taking part in this survey. Most respondents (n = 659) reported not taking any form of vitamin D supplement, but 155 subjects reported taking a multivitamin that contained vitamin D and 91 participants took vitamin D supplements.

The primary outcome measure for this study was vitamin D knowledge, as measured by a knowledge test that was created for this study (Supplementary Data). Internal consistency reliability was calculated on the dichotomized (ie, correct vs incorrect) variables on this test, using Kuder–Richardson Formula 20. The reliability of the entire measure was thus calculated to be 0.77, which suggested that the test demonstrated adequate reliability. Overall, scores on the knowledge test ranged from 0.49% to 88.95% (mean, 29.38%; SD, 15.54%). In addition, the overall test was subdivided into 3 subtests: vitamin D source knowledge (mean, 25.69%; SD, 20.32%), factors affecting vitamin D levels (mean, 23.42%; SD, 20.89%), and health effects of vitamin D (mean, 36.66%; SD, 22.14%). Only 8% of participants identified the recommended vitamin D intake and 14% correctly identified the amount of time in the sun required to produce adequate vitamin D.

The authors assesses differences in vitamin D knowledge among the 5 faculties with the most responses (ie, social sciences, health sciences, sciences, arts, and medical sciences) using 1-way independent-groups ANOVA. There was a significant difference among the academic faculties on the knowledge score ($F[4,833] = 8.19$; $\eta^2 = 0.038$; $P < .001$). Table lists multiple comparisons (using Tukey honestly significant difference test). Results suggested that students in the medical sciences were not statistically different from those in the health sciences, and there were no differences among students within the faculties of science, arts, and social sciences. Students in the medical sciences demonstrated significantly more vitamin D knowledge than those in the faculties of science, arts, and social sciences. Students in the health sciences demonstrated significantly more vitamin D knowledge than those in the faculties of arts and social sciences.

DISCUSSION

The overall low knowledge found in the current study is particularly concerning because Kolodinsky and colleagues[26] found that nutrition-related knowledge of US college students in a 2007 survey correlated with healthy food choices; as such, low knowledge may point to a lack of purposeful vitamin D–related choices. Furthermore, although generalizations cannot be made beyond Canadian undergraduate students at a large urban university, findings from Georgiou and colleagues[25] indicating that non-students/non-graduates