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AWARENESS OF VITAMIN D DEFICIENCY AMONG TRIPOLI UNIVERSITY STUDENTS IN LIBYA

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Abstract:

Introduction: Vitamin D deficiency considered to be the most popular, widespread problem and undiagnosed medical conditions around the world. It appears to be related to many of health consequences.

Aim: This study is conducted to assess level of knowledge and create good awareness about vitamin D among Tripoli university students.

Method: A Cross sectional study was conducted between May and June of 2016 among male and female students of Tripoli University they were of different ages, classes and faculties.

Results: The majority have good knowledge about vitamin D, it appears that the education was commonest source of knowledge, most of them (87%) are taking vitamin D rich foods, about (28%) did not expose their bodies to the sun, while most of the others exposed to the sun in period less than 15 minutes, additionally only 17% tested 25(OH) D level in their body, 25% have a family member suffering from vitamin D deficiency.

Conclusion: The results of this study show students level regarding the knowledge and attitude toward main sources of vitamin D, nevertheless and based on results of laboratories data, we still require more awareness about this problem.

Key words: Tripoli University; 25-hydroxyvitamin D; Awareness; vitamin D deficiency.

INTRODUCTION

Vitamin D is a group of fat-soluble prohormones which were identified after the discovery of the anti-rachitic effect of cod liver oil in the early part of the 20th century [1]. Vitamin D is essential for natural bone metabolism [2], controls calcium absorption, mediate skeletal mineralization with parathyroid hormone (PTH), maintains calcium and phosphorous homeostasis and sustains a wide variety of metabolic and physiological functions, such in cell differentiation, inhibition of cell growth as well as immune modulation [3, 4].

Vitamin D refers to two precursors, cholecalciferol and ergocalciferol. Vitamin D₂ also known as ergocalciferol, is obtained from dietary vegetable sources and oral supplements. Vitamin D₃ also known as cholecalciferol, is obtained primarily from skin exposure to ultraviolet B (UVB) radiation in sunlight, ingestion of food sources such as oily fish and variably fortified foods (milk, juices, margarines, yogurts, cereals, and soy), and oral supplements [5]. Both D₂ and D₃ are biologically inert, these inert precursors are transported to the liver, where they are converted to 25-hydroxyvitamin D₃ (25OHD₃). Which in the kidney, 25OHD₃ is hydroxylated by the enzyme 25OHD₃ 1 α -hydroxylase (1 α -OHase) to form 1,25-dihydroxyvitamin D₃ (1,25(OH)₂ D₃), the most active vitamin D metabolite [6].

It is estimated that one billion people worldwide have Vitamin D insufficiency or deficiency, and hypovitaminosis D has been reported in both genders [7]. Vitamin D deficiency is considered a major public health problem globally that affects individuals across all life stages including otherwise healthy men and women as well as pregnant women, neonates, infants, children, adolescents, adults and the elderly even in sunny countries [8].

Vitamin D deficiency results from several factors including inadequate sun exposure, reduced cutaneous vitamin D synthesis, poor nutrition and certain disease and medications such as anticonvulsants [10]. Other Multiple factors, such as season, duration, and timing of sun exposure, latitude, clothing, and skin pigmentation, are the possible contributors of this deficiency [11], also chronic liver and renal diseases, are common in general medical inpatients, and therapy with drugs that impair vitamin D activation or accelerate its clearance, such as phenytoin, carbamazepine, and rifampin [12].

Vitamin D has been associated primarily with bone health, and it is well understood that vitamin D deficiency leads to rickets in children and osteomalacia and vitamin D deficiency in adults [13]. Also, it has been reported to be linked to depression, autism, type-I-diabetes [14].

Hypovitaminosis D, defined by certain authors as a 25-hydroxyvitamin D [25(OH)D] level below 12 ng/ml which severe hypovitaminosis D levels below 5 ng/ml leads to osteomalacia, a rare metabolic bone disease characterized by bone pain and weakness, while vitamin D insufficiency (levels between 5 and 12 ng/ml) is more common and leads to calcium malabsorption and secondary hyperparathyroidism [15]. In this regard, expert opinion suggests that this serum concentration is approximately 80 nmol/liter (32 ng/ml) [16].

The daily requirement of vitamin D is about 200-600 units, which the skin produces 10,000 units of vitamin D after total body exposure to UV light, so vitamin D toxicity is extremely rare, but may be occur at excessively high doses, or can be iatrogenic, due to self-medication or accidental with over fortification of milk or contamination of

common dietary constituents like table sugar or cooking oil, these factors may be associated with hypercalcemia and hyperphosphatemia [17] [18].

The aims of the current study are to assess and improve the level of knowledge of Tripoli University students, about vitamin D deficiency, their behavior, attitudes toward the main sources of vitamin D as sunlight exposure, vitamin D intake, and to create awareness about vitamin D sources and factors that may influence vitamin D level in the body among healthy individuals.

METHODS

Study setting

The study was ethically approved and proceeds in accordance to the Tripoli University requirements. This study was a cross-sectional conducted between May and June of 2016 among of both male and female students of Tripoli University. The participants were of undergraduate students, they were of different ages, classes and faculties.

Questionnaire

The questionnaire consisted of 3 sections: First section was about socio-demographic profile of the students, second was designed to assess their attitude and behavior towards vitamin D sources and factors which may influence its level in the body, and third section was included questions to evaluate their knowledge regarding the vitamin D and its deficiency.

Data collection and statistical analysis

Random sampling technique was used for the data collection, as this study is ethically approved and proceeds in accordance to the Tripoli University requirements. Questionnaire regarding the study was filled in by (277) student, then the collected data

are entered in Microsoft Excel 2007, and statistically analyzed using Statistical Package of Social Science (SPSS) 16.0 software.

RESULTS

As shown in Table 1, a total of students 277 which (63.9%) of them were female (n=177) and (36.1%) were male (n=100), their ages (93.9%) were between 18 and 28, (2.9%) below 18 and (3.2%) over 28 years.

Table 1: Number and percentage of socio-demographic profile of students

Variables	N	(%)
Sex		
Female	177	63.9
Male	100	36.1
Age		
<18	8	2.9
18-28	260	93.9
>28	9	3.2
College		
Pharmacy	37	13.4
Medicine	34	12.2
Medical Technology	30	10.8
Dentistry	29	10.5
Science	30	10.8
Engineering	31	11.2
Agriculture	33	11.9
Law	3	1.1
Arts & media	2	0.7
Veterinary	17	6.1
Information Technology	31	11.2
Class		
First year	32	22.4
Second year	69	14.1
Third year	67	24.2
Fourth year	85	30.7
Fifth year	24	8.7

We found that (53%) are belonged to different medical colleges (Pharmacy, Medicine, Medical technology, Dentistry and Veterinary), whereas (53%) are to different non-medical colleges (Science, Engineering, Agriculture, Law, Arts and Media, and

Information Technology), (30.7%) of them studying in the fourth year, (24.2%) in the third year, (22.4%) in the first year, (14.1%) in the second and about (8.7%) in the fifth year.

Table 2: shows the number and percentage of student attitude and behavior toward vitamin D.

Variables	N	(%)	Median	Mean \pm SD	P value
Consume of vitamin D rich food					
Yes	242	87.4		1.1 \pm 0.30	<0.001
No	28	10.1	1		
No Answer	7	2.5			
Taking of vitamin D supplements					
Yes	69	24.9		1.7 \pm 0.44	<0.001
No	190	68.6	2		
No Answer	18	6.5			
Sun exposure					
-Yes	198	71.5	1	1.2 \pm 0.45	<0.001
-No	79	28.5			
Duration of sun exposure					
<15min	112	40.4		1.6 \pm 0.76	
15-30min	71	25.6	2		
>30min	42	15.2			
No Answer	52	18.8			
Sunscreen use					
Yes	96	34.7	2	1.6 \pm 0.47	<0.001
No	181	65.3			
Think vitamin D is important for health					
Yes	256	92.4	1	1.0 \pm 0.10	<0.001
No	3	1.1			
Don't know	18	6.5			

The analyzed data show that 242 (87.4%) out of 277 student are consuming vitamin D containing foods like milk, fish or eggs ($p < 0.001$), on the other hand 28 (10.1%, $p < 0.001$) did not consume any of these foods. We also come to know the percentage of students who taking supplements, where was (68.6%) were not taking while (24.4%)

were taking, there were statistical differences in supplements intake between two groups ($p < 0.001$, Table 2).

As well, when we analyzed the data that related to their habits toward the sun exposure, we found about (71.5%) have been exposed to the sun. On the other hand, the percentage of students who did not exposed to the sun was about (28.5%), ($p < 0.001$, Table 2). About (40.4%) were exposed to sun in duration less than 15 minutes, however (26.6%) of participants were exposed within 15 to 30 minutes, (15.2%) exposed to more than half an hour.

Table 3: shows the number and percentage of vitamin D knowledge

Variables	n	(%)	Mean \pm SD	P-value
1. Heard about vitamin D deficiency.				
Yes	242			
No	35	87.4%	1.1 \pm 0.33	<0.001
		12.6%		
2. Know the symptoms of vitamin D deficiency.				
Yes	194	70%		
No	83	30%	1.3 \pm 0.45	<0.001
3. Vitamin D level test.				
Yes	49	17.7%		
No	228	82.3%	1.8 \pm 0.35	<0.001
4. Vitamin D deficient.				
Yes	23	8.3%		
No	26	9.4%	1.5 \pm 0.50	<0.001
No Answer	228	82.3%		
5. Member of family is deficient				
Yes	71	25.6%		
No	206	74.4%	1.7 \pm 0.43	<0.001
Number of member				
1	34	15.5%		
2	18	6.5%		
3	4	1.4%		
4	3	1.1%		
5	1	0.4%		
6	2	0.7%		
6. Sources of information about vitamin D deficiency.			1.6 \pm 0.48	
Family & friends	105	37.9%	1.3 \pm 0.48	<0.001
Curriculum	174	62.8%	1.9 \pm 0.25	<0.001
Newspapers & magazines	20	7.2%	1.8 \pm 0.39	<0.001
TV	53	19.1%	1.9 \pm 0.21	<0.001
Radio	13	7.4%	1.5 \pm 0.49	<0.001
Internet	113	40.8%	1.9 \pm 0.14	<0.001
Other sources	6	2.2%		<0.001

Regarding the usage of sunscreens, the percentage of user and nonuser was (34.7%) and (65.3%) respectively this was significantly different ($p < 0.001$). Also, we noticed that a greater proportion (92.4%) of students were have a good knowledge that a vitamin D is very important for their health, while (1.1%) only were did not think that, there is significant difference regarding think vitamin D is important for health, and (6.5%) were have no idea about that.

Table 3 showed that about 242 (87.4%) of participants heard about vitamin D deficiency on the other hand 35 (12.6%) not heard were significantly different ($p < 0.00$). Out of 194 (70%) of students were aware of vitamin D deficiency symptoms, while 83 (30%) were not ($p < 0.001$), but when they asked if they tested the level of vitamin D in their body or not? 228 (82.3%) answered (No) and 49 (17.7%) answered (yes), so about (8.3%) out of those who answered (yes), were have vitamin D deficiency, while (9.4%) have not all were significantly different ($p < 0.001$, Table 3).

About 206 (74.4%) of students doesn't have a member of their families are suffering from vitamin D deficiency, but we found 71 (25.6%) were have, out of this percentage 34 (15.5%) of them, have only one member had a vitamin D deficiency and two students only, have only six members.

Upon the question regarding how they heard about vitamin D deficiency, the education was the most popular source cited by 174 (62.8%), followed by internet 133 (40.8%), family and friends were 53 (37.9%), also mentioned were television (19.1%), while (7%, 5% & 2%) were from the newspapers and magazines, the radio and other sources respectively.

DISCUSSION

In our study, we found that the female students are more than male students who participated in this survey, most of those students aged from 18 to 28 years, also we found there is no difference in faculties distribution except in law and arts & media faculties, as well we found that most of them are studying in fourth class, same findings were support by Aysha Zia et al. [19].

We noticed the percentage of students (87%) who consuming vitamin D rich foods was a great, while about (68%) are not taking any of supplements. Similar findings reported in a study from Pakistan Qidwai et al. [20].

In comparing our study with survey conducted among Hong Kong population [21], regarding the sun exposure, we observed there is a different between our and their study, which 198 students were exposed their bodies to the sun, on the other hand, 79 were not exposed, while in Hong Kong population showed that 62.3% did not like being exposed to sun. But when they asked how long they spent under the sun; the majority 112 answered less than 15 minutes, and about (71%) answered from 15 to 30 minutes, while only (42%) spent more than half an hour.

Moreover, many of the respondents did not using sunscreen products (65%), which is higher than those by Jilaine et al. [22].

Therefore, a significant number of students of both medical and non-medical faculties were aware about the importance of vitamin D and the deficiency symptoms and issues, that consistent with Saudi Arabia study by Abdulmoein et al. [23], may explain that, in our study the students received information about Vitamin D from the education (63%), even though in their study, we noticed that media was the most popular source of the information, while , in our and their study, family and friends were in the third source,

in comparing with Esubalew and Robert [24] , which in their study, family and friends were the most popular source and the use of internet was in fifth source, while in our study the internet came in the second source (41%).

When students were asked about vitamin D level test, we observed only 49 students out of 277, were tested serum 25-(OH)D level in their bodies, hence the ratio between the students who were deficient and not deficient was relatively equal.

As well when they asked about their family member suffering from vitamin D deficiency, we found that a great proportion of students answered does not have (74%), may be this indicates that they were not aware about vitamin D level in their families, on the other hand, we found the students who answered they have a family member suffering from vitamin D deficiency, most of them have only one member, totally does not exceed six members.

CONCLUSION

Vitamin D provide a wide variety of health benefits to human, one of the most important health benefits is calcium absorption and its deficiency related to many of disorders and diseases.

We concluded, the knowledge regarding vitamin D and attitude toward sunlight in college students was quite good. But in general, its prevalence among Libyan population is still very high, especially between females and one of the main causes of vitamin D deficiency is the lack of sun exposure due to indoor lifestyle in both children and adults, so the building of good awareness and education about vitamin D sources and importance among population is very important and require.

RECOMMENDATION

As we mentioned above, vitamin D is very important to our health, and its deficiency associated with different health problems, so we should to maintain serum 25-(OH)D level in our bodies, by exposing the skin to sunlight (as the main source of vitamin D) in time not less than 15 min, with avoiding sunscreen use during sun exposure especially before the noon time, as well as by eating and drinking food rich with vitamin D as fatty fish, tuna fish, cod liver oil, mushrooms, egg yolks and fortified milk, all of these can be good sources of vitamin D.

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COMPETING INTERESTS

Authors declare that there are no competing interests with others.

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