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Original article

A Survey of Vitamin D Awareness in Libyan Adults Attending Zawiya Teaching Hospital's Outpatient Department, 2021

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Abstract

Background and aim. *Vitamin D deficiency is a widespread and serious problem that affects one billion people worldwide. However, its prevalence and determinants in Libya are unknown. This study aimed to assess the knowledge of vitamin D among patients attending OPD at Zawiya Teaching Hospital.* ***Methods***. *a cross-sectional study of 400 patients aged 18 years or older, selected by systematic random sampling. Data were collected using an interview-based questionnaire on demographic information and knowledge about vitamin D benefits and sources. Data were analyzed using SPSS software, version 25.0. The knowledge score was compared between demographic groups using statistical tests.* ***Results***. *All the participants had heard about vitamin D, but had variable source of information and level of knowledge. Media was the most common source of information, which may be unreliable or inaccurate. The participants knew more about the benefits than the sources of vitamin D. The mean overall knowledge score percentage was 51.21%, with 55% having good knowledge. Age, sex, and having children were significant factors influencing the knowledge score. Older participants, female participants, and participants who had children had higher knowledge than younger participants, male participants, and participants who did not have children respectively.* ***Conclusion***. *The study suggested that there is a need to enhance the awareness and education of the patients about vitamin D, especially its sources and deficiency prevention or treatment.*

Keywords. *Vitamin D, Knowledge, Patients, Libya.*

Introduction

Vitamin D is important for bone and non-bone health. It can be produced by the skin from sunlight, or obtained from food and supplements [1-3]. It becomes active after two hydroxylation reactions in the liver, kidneys or other tissues [1,4-6]. Serum 25-hydroxyvitamin D (25(OH)D) reflects both cutaneous synthesis and dietary intake of vitamin D [7]. However, there is no consensus on the optimal serum 25(OH)D level for vitamin D status, as different methods and outcomes may influence the cut-off values [8,9-11]. Vitamin D binds to a nuclear receptor (VDR) that regulates gene expression in various tissues [12,13]. Its main role is to maintain calcium and bone homeostasis by enhancing intestinal calcium absorption, mobilizing calcium from bone, and conserving calcium in the kidney [4,14,15]. It can also affect hormone secretion, cellular proliferation and differentiation, and immune function [1,16]. Vitamin D deficiency can cause bone disorders and muscle weakness and pain [17,18], and may increase the risk of cardiovascular disease, immune disorders, and several cancers [16]. Vitamin D deficiency is a widespread and serious problem that affects one billion people worldwide [19,20]. It is prevalent in different regions and populations, regardless of the sunshine. For example, the Middle East and Africa have the highest rates of rickets worldwide [21], a condition caused by vitamin D deficiency. However, its prevalence and determinants in Libya are unknown [22]. The main factors that contribute to low vitamin D levels are low ambient UVB radiation levels [23-24], limited sun exposure due to clothing, sunscreen, shade, or window panes [24,25], inadequate vitamin D intake from food or supplements [26-28], physiological characteristics such as skin pigmentation, age, disease, or obesity[29,30], and medication that interferes with vitamin D metabolism[31]. To prevent vitamin D deficiency, people need to balance sun exposure and skin cancer risk [32], as dietary sources of vitamin D are scarce and fortification is inadequate [33]. Four studies from Malaysia, Saudi Arabia, and Pakistan assessed the knowledge and practices of vitamin D among different populations [34-37]. They reported that most people had low or insuffi-

cient knowledge, negative attitude, low testing, and low supplement use of vitamin D. However, physically active people had higher awareness and preference of vitamin D than non-physically active people. These studies suggested increasing vitamin D education and awareness to prevent deficiency and improve health. Supplements may be a feasible option to increase vitamin D intake, but public awareness of vitamin D is also essential.

Methods

Study design and setting

The researchers conducted a cross-sectional study to assess the knowledge of vitamin D among patients attending OPD at Zawiya Teaching Hospital. They randomly selected 400 patients aged 18 or older from the outpatient department of Zawiya Teaching Hospital and collected data from February to June 2021.

Data collection procedure

The researchers collected and analyzed data on demographic and vitamin D knowledge variables from 400 patients using a questionnaire and SPSS software. They used a scoring method to assess the knowledge level and compared it across demographic groups. They followed ethical guidelines and obtained consent and permission.

Results

The table 1 shows the demographic characteristics of the 400 participants in the study. The table provides information on the mean and standard deviation of age, the distribution of age groups, gender, marital status, graduation level, occupation, and having children among the participants. The table reveals that the majority of the participants were female, married, university graduates, and working in the educational field. The participants were almost equally divided between those who had children and those who did not. The mean age of the participants was 35.61 years, and most of them were younger than 45 years.

Table 1. Characteristics of patients attending general outpatient department

Age Mean ± SD (years) 35.61 ± 11.70		
Variable	**N**	**%**
Age group (years)		
< 35 years	172	43.0%
35 - 45 years	133	33.3%
> 45 years	95	23.8%
Gender		
Male	172	43.0%
Female	228	57.0%
Marital status		
Single	167	41.8%
Married	221	55.3%
Others	12	3.0%
Graduation level		
Illiterate	5	1.2%
Primary school	18	4.5%
Intermediate school	138	34.5%
University or above	239	59.8%
Occupation		
Housewife	45	11.2%
Retired	14	3.5%
Student	62	15.5%

Educational field	117	29.2%
Health field	69	17.3%
Others	93	23.3%
Have children		
Yes	198	49.5%
No	202	50.5%

The table 2 shows the sources of information about vitamin D reported by the 400 participants in the study according to their gender, age group, and graduation level and in overall group. The table indicates that the most common sources of information about vitamin D were media followed by physician, with 29.3% and 28.7% of the participants respectively. The friends represent 16.3% of the participants. The least common sources of information were radio, school/university and TV, with 10.0%, 8.0% and 7.8% of the participants respectively. The table reveals that there were some differences in the sources of information about vitamin D among the participants based on their gender, age group, and graduation level. For example, female participants were more likely than male participants to obtain information from their physician or from school/university, while male participants were more likely to obtain information from media, radio, or TV. Participants who were older than 45 years were more likely to obtain information from radio than those who were younger. Participants who were illiterate or had primary school education were more likely to obtain information from media or radio than those who had higher education levels.

Table 2. Sources of information about vitamin D reported by general outpatient department according to their gender, age group, and graduation level

Categories	**Gender**		**Age group**			**Graduation level**				**Over all**	
Subcategories / Sources	**Male**	**Female**	**< 35 years**	**35-45 years**	**> 45 years**	**Illiterate**	**Primary school**	**Intermediate school**	**University or above**	**N**	**%**
Physician's	22.1%	33.8%	33.8%	23.8%	25.0%	0.0%	38.9%	32.6%	26.4%	115	28.7%
Media	31.4%	27.6%	27.7%	30.9%	29.2%	60.0%	11.1%	23.2%	33.5%	117	29.3%
Radio	12.8%	7.9%	6.7%	10.5%	33.3%	40.0%	22.2%	12.3%	7.1%	40	10.0%
T. V	10.5%	5.7%	5.6%	9.4%	12.5%	0.0%	0.0%	10.9%	6.7%	31	7.8%
School/university	6.4%	9.2%	13.3%	3.3%	0.0%	0.0%	0.0%	5.8%	10.0%	32	8.0%
Friends	16.9%	15.8%	12.8%	22.1%	0.0%	0.0%	27.8%	15.2%	16.3%	65	16.3%

The table 3 shows the frequency of various responses to questions regarding the benefits of vitamin D among the 400 participants in the study. The table indicates that the participants had different levels of knowledge about the benefits of vitamin D. The highest percentage of correct answers was for the question about vitamin D being important in maintaining bone and teeth (73.5%), followed by the question about vitamin D helping strengthen immunity (70.7%), and Vitamin D helps strengthen muscles (69.7%) respectively. The lowest percentage of correct answers was for the question about vitamin D being used to treat rickets (47.0%), followed by the question about vitamin D being important in maintaining calcium and phosphate (61.5%).

Table 3. Frequency of various response to questions regarding the benefits of vitamin D

Questions				
	No.	%	No.	%
Vitamin D is used to treat rickets	188	47.0%	212	53.0%
Vitamin D is important in maintaining calcium and phosphate	246	61.5%	154	38.5%
Vitamin D is important in maintaining bone and teeth	294	73.5%	106	26.5%

Vitamin D helps strengthen muscles	279	69.7%	121	30.3%
Vitamin D helps strengthen immunity	283	70.7%	117	29.3%

The table 4 illustrates the various responses to questions regarding sources of vitamin D among the 400 participants in the study. The table reveals that the participants had different levels of knowledge about the sources of vitamin D. The highest percentage of correct answers was for the question about vitamin D being internally made by the sun (90.3%), followed by the question about people residing in cloudy areas being more prone to vitamin D deficiency (63.5%). The lowest percentage of correct answers was for the question about vegetarians being more likely to have vitamin D deficiency than non-vegetarians (21.5%), followed by the question about frequent sun exposure leading to vitamin D poisoning (25.0%).

Table 4. Frequency of various response to questions regarding sources of vitamin D

Questions				
	No.	%	No.	%
Vitamin D is internally made by the sun	361	90.3%	39	9.75%
Vitamin D is found in animal meat but not in vegetables and fruits	197	49.4%	202	50.5%
People residing in cloudy areas are more prone to vitamin D deficiency	254	63.5%	146	36.5%
Frequent sun exposure does lead to vitamin D poisoning	100	25.0%	300	75.0%
Use of sunscreen creams may be a cause of vitamin D deficiency	125	31.2%	275	68.8%
A fat-free diet may be a cause of vitamin D deficiency	123	30.8%	277	69.2%
Dark skin is more prone to vitamin D deficiency than fairer skin	127	31.8%	273	68.2%
Vegetarians are more likely to have vitamin D deficiency than non-vegetarians	86	21.5%	314	78.5%

The table 5 shows the scores of patients' knowledge towards vitamin D among the 400 participants in the study. The table indicates that the participants had different levels of knowledge towards vitamin D. The mean overall knowledge score percentage was 51.21%, with 45% of the participants having poor knowledge and 55% having good knowledge. The mean sources knowledge score percentage was 42.16%, with 76.1% of the participants having poor knowledge and 23.9% having good knowledge. The mean benefits knowledge score percentage was 58.96%, with 29.8% of the participants having poor knowledge and 70.3% having good knowledge. The presented results suggest that the participants had more knowledge about the benefits of vitamin D than the sources of vitamin D. Also, suggests that there was a wide variation in the knowledge scores among the participants, as indicated by the high standard deviations. This implies that there is a need to improve the awareness and education of the patients about vitamin D, especially its sources and how to prevent or treat its deficiency.

Table 5. Scores of patients' knowledge towards vitamin D

Score percentage (%)	Mean ± SD	Number (%)
Overall knowledge score percentage	51.21 ± 20.54	
Poor knowledge (≤50%)		180 (45)
Good knowledge (>50%)		220 (55)
Sources knowledge score percentage	42.16 ± 26.60	
Poor knowledge (≤50%)		303 (76.1)
Good knowledge (>50%)		95 (23.9)
Benefits knowledge score percentage	58.96 ± 23.37	
Poor knowledge (≤50%)		119 (29.8)
Good knowledge (>50%)		281 (70.3)

The table 6 demonstrates the different factors affecting patients' overall knowledge score percentage and its significance among the 400 participants in the study. The table indicates that there were some significant differences in the overall knowledge score percentage among the participants based on some factors. The table reveals that gender, age, and having children were significant factors affecting the overall knowledge score percentage, with p-values of 0.039, 0.002, and 0.009 respectively. The table implies that female participants, older participants (> 45 years), and participants who had children had higher overall knowledge score percentage than male participants, younger participants (< 35 years), and participants who did not have children respectively. The table suggests that there were no significant differences in the overall knowledge score percentage among the participants based on marital status, graduation level, or occupation, with p-values of 0.192, 0.172, and 0.225 respectively.

Table 6. Factors affecting patients' overall knowledge score percentage.

Knowledge scores percentage of vitamin D		
Variable	Mean ± SD	p- value
Gender		0.039a
Male	48.66 ± 24.08	
Female	53.14 ± 17.22	
Patients' age		0.002b
<35 year	48.28 ± 20.73	
35-45 years	52.91 ± 19.81	
>45 years	62.18 ± 20.15	
Marital status		0.192b
Single	49.01 ± 21.18	
Married	52.77 ± 19.86	
Others	53.21 ± 22.83	
Graduation level		0.172b
Illiterate	60.00 ± 19.91	
Primary school	48.72 ± 17.30	
Intermediate school	48.49 ± 23.67	
University or above	52.78 ± 18.66	
Occupation		0.225b
House wife	54.02 ± 19.85	
Retired	60.44 ± 25.22	
Student	48.51 ± 19.87	
Educational field	50.56 ± 21.43	
Health field	53.85 ± 22.47	
Others	49.13 ± 17.50	
Have children		0.009b
Yes	53.92 ± 20.08	
No	48.55 ± 20.70	

a: independent t-test. b: one-way analysis of variance test. P < 0.05 is statistically significant

Discussion

The aim of this study was to evaluate the knowledge of vitamin D among patients attending OPD at Zawiya Teaching Hospital. The results showed that all the participants had heard about vitamin D before. However, the source of information of vitamin D varied among the

participants, with media being the most common source. This is consistent with a previous study among medical students in China, which reported that 59.5% of them obtained information from media [38]. This finding is concerning, as the media may provide unreliable or inaccurate information about vitamin D. On the contrary, another study in Egypt found that physicians were the main source of information about vitamin D for 62.4% of the mothers [39]. Regarding the level of knowledge of vitamin D, this study revealed that nearly half of the participants had a good level of overall knowledge about vitamin D. This is similar to a study in UK, which found that 58% of the participants had a higher mean knowledge score [40]. However, other studies in Malaysia [34] and Egypt [39] reported that more than two-thirds and more than three quarters of the participants, respectively, had poor knowledge about vitamin D and its effects. Vitamin D is mainly synthesized by the skin upon exposure to sunlight for 10–15 minutes before applying sunscreen. However, some foods are also rich in vitamin D, such as fatty fish, beef liver, and dairy products [20]. The results of this study indicated that the participants needed to improve their knowledge about the sources of vitamin D, as only a quarter of them had accurate information about them. This is in line with a previous study in Saudi Arabia, which showed that only a third of the participants had correct information about vitamin D sources [37]. In contrast, another study in China reported that two-thirds of the students knew the source of vitamin D [38]. A study in Pakistan also showed that only 9% of male and 13% of female students were able to identify the correct sources of vitamin D [36]. Vitamin D is essential for skeletal health, bone mineralization, calcium homeostasis, and prevention of rickets, osteomalacia, autoimmune diseases, and cardiovascular diseases [41]. In this study, more than two-thirds of the participants were aware that vitamin D helps with bone health, tooth health, immune health, and muscle health. In general, the participants in this study had lower knowledge than those in a study by Deschasaux M. et al., [42] and higher knowledge than those in a study by Tariq A et al., [36] about the health benefits of vitamin D. The analysis of knowledge scores among socio-demographic groups showed a significant association between vitamin D knowledge scores and age and sex. Specifically, older participants (> 45 years) had higher knowledge about vitamin D than younger participants (< 35 years), and female participants had higher knowledge than male participants. Similar findings regarding age were reported in Franc and Australia by narrative study that included older people conducted by Christides T[43].This study did not find a significant association between the knowledge score and educational level or marital status. However, other studies have reported different results. For example, a study in Saudi Arabia found that low levels of knowledge about vitamin D were significantly associated with low education levels and being married [44]. Another study in United Arab Emirates also found a positive association between knowledge and education levels [45]. A study in Vietnam reported that younger age and higher education levels were associated with better knowledge of vitamin D [46]. Furthermore, a study in Saudi Arabia found that people with university degrees and those without children had better knowledge than the general public [37]. A limitation of this study is that the number of participants who were older than 45 years was lower than expected. This may limit the generalizability of the findings to other age groups or the broader population of emerging adults. A possible reason for this is that the study was conducted during the COVID-19 pandemic, which may have prevented elderly people from attending the OPD.

Conclusion

This research aimed to evaluate the knowledge of vitamin D among patients attending OPD at Zawiya Teaching Hospital. The results showed that all the participants had heard about vitamin D before, but their source of information and level of knowledge varied. The most common source of information was media, which may provide unreliable or inaccurate information. The participants had more knowledge about the benefits of vitamin D than the sources of vitamin D. The factors that significantly affected the overall knowledge score were age, sex, and having children. Older participants, female participants, and participants who had children had higher knowledge than younger participants, male participants, and participants who did not have children respectively. The results indicated that there is a need to improve the awareness and education of the patients about vitamin D, especially its sources and how to prevent or treat its deficiency.

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