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Original article

Prevalence of Vitamin D and Calcium Deficiency among a Sample of People in the Gharyan City, Western Libya

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Abstract
The study aimed to determine the prevalence of vitamin D and calcium deficiency in a sample of residents in the city of Gharyan, located in the western regions of Libya, based on 300 cases visiting laboratories and clinics and medical clinics in the city for the year 2025 AD, divided into two groups for both sexes with a number of (150) cases, for different age groups from (5-85) years The study reached results showing that vitamin D and calcium deficiency is widespread among cases for both sexes, as the percentage of vitamin D deficiency in males reached 29.34%, and in females it reached 25.66%, calcium deficiency was recorded at 25.34% in males and 24.66% in females. The highest prevalence of vitamin deficiency was recorded in the age group of (46-65) years, at 20.66% in males, and 25.33% in females. Followed by the age group from (26-45) years, with 29% of the total cases, 14.33% in males, and 14.66% in females. This is consistent with many studies conducted in some areas of the entire country, which confirmed that most of the population and different age groups suffer from a deficiency in the level of vitamin D and calcium, despite the country's location in an environmental zone suitable for the availability of sufficient sunlight However, due to some reasons of lack of health awareness, daily lifestyle and some social and dietary habits that have further exacerbated the problem of the spread of vitamin D and calcium deficiency among the population, the study recommended conducting intensive research and studies in various regions and following up on the cases of the population, spreading health awareness through various available means and holding scientific seminars and conferences for specialists, to educate society about the dangers of vitamin D and calcium deficiency on public health Changing habits and daily life patterns, conducting routine examinations, and following a healthy diet to reduce the increasing shortage rates among different age groups of the population.
Keywords. Vitamin D, Calcium, Prevalence Rate, Gharyan City, Libya

Introduction

Vitamin D and calcium deficiency are global health problems affecting populations worldwide, which results in dysfunction, complications, and severe infections. The two reports indicated that about half of the world's population suffers from increasing rates of vitamin D and calcium deficiency, which leads to multiple complications and diseases, such as neurodegenerative diseases represented by Alzheimer's, multiple sclerosis, dementia, and Parkinson's [1]. Chronic diseases such as type 2 diabetes, autoimmune disorders, cardiovascular diseases, osteoporosis, preeclampsia, cancer, digestive system disorders, and obesity [2]. The occurrence of childhood disorders such as autism, obesity, rickets, and asthma [3]. Scientific studies have confirmed the important and effective role of vitamin D and calcium in many physiological and pathological processes related to the organs and systems of the human body [4]. The regulatory role in many biological and functional processes in different tissues of organs and in reducing the risk of many different diseases [5]. Scientific evidence has indicated that vitamin D and calcium have a positive and effective effect on body mass indicators, especially with age, and represent important nutrients for the health of the body. Any imbalance in their normal levels has a negative effect on many vital processes in the body. Calcium, despite its role in mineralizing the skeleton, represents the main and basic regulator of protein pathways and the dynamics of muscle contraction and maintenance [6]. Vitamin D represents the main source of calcium and its balance in the body and in regulating its absorption in the intestines, as the efficiency of calcium absorption in the intestines decreases to more than 75% in the case of a low level of vitamin D [7]. The rates and prevalence of vitamin D and calcium deficiency have increased widely in various regions of the world, with many people having low health awareness of the dangers facing them, in addition to wrong daily behaviours and practices, lack of direct exposure to sunlight, lack of exercise, poor nutritional regulation, and obesity [8]. Dyspepsia and absorption syndrome, skin colour, urban lifestyle, gender, and age, skin atrophy, especially with age, which has increased and exacerbated the spread of vitamin D deficiency, and many elements and minerals are necessary for the safety and health of the body [9]. The study aims to identify the prevalence of vitamin D and calcium deficiency in a sample of individuals visiting some medical laboratories in the city of Gharyan, western Libya

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Methods

The study was conducted on a sample size of 300, visiting the Accuracy Laboratory, the Peace Laboratory, and the Accommodation Efficiency Clinic in the city of Gharyan, during the year 2025 AD. The sample was divided equally into 150 males and 150 females, according to the different age groups. The appropriate statistical analysis program was used to determine the distribution rate of the sample members according to the level of calcium and vitamin D by classifying them in appropriate statistical tables by the researchers.

Results

Through the data recorded in (Table 1) for the number and percentage of cases for both sexes according to the level of vitamin (D), we find that the number of male cases was (62), or 20.66%, with a normal level of vitamin D, and for (88) cases, or 29.34%, they had a low level of vitamin D, while (73) cases, or 24.34% of females, recorded a normal level of vitamin D with a number of (77) cases, or 25.66%, with a low level of vitamin D, while we find that the total number of cases of males and females who had a normal level of vitamin D was (135) cases, or 45% of the total number of cases, and with a number of (165) cases, or 55%, they had a low level of vitamin D**.**

Table (1). Distribution of the number and percentage of sample members according to vitamin (D) level

gender	level of Vitamin D			
	natural	Percentage%	low	percentage%
Males	62	20.66	88	29.34
Females	73	24.34	77	25.66
Total	135	45	165	55

While the number of cases for both sexes was recorded according to the calcium level, as shown in (Table 2), we find that 150 cases were recorded for both males and females, representing 50% of the normal and low calcium level among the total sample members. The number of male cases reached (78) cases, representing 26%, who had a normal calcium level, and (72) cases of females, representing 24%, with a normal level As for the low calcium level, it was recorded in (76) cases of males, representing 25.34%, and in (74) cases, representing 24.66% of females out of the total sample members, the prevalence of calcium deficiency was nearly equal between males and females.

Table (2). Distribution of the number of sample members according to calcium level

Gender	Level of calcium			
	Natural	Percentage%	Low	Percentage%
Males	78	26	76	25.34
Females	72	24	74	2466.
Total	150	50	150	50

Through the data recorded in (Table 3), for the number and percentage of cases for vitamin D and calcium levels according to the different age groups, we find that the age group from (46-65) recorded (138) cases, representing 46% of the total cases, the number of male cases recorded (62) cases, representing 20.66%, and the number of female cases recorded (76) cases, representing 25.33% Followed by the age group between (26-45) with a total number of (87), representing 29% of the total cases, while the number of males only was recorded at (43) cases, representing 14.33%, and the number of females at (44), representing 14.66%, followed by the age group from (5-25) with 50 cases for both sexes, representing 16.66% of the total cases It was recorded for (27) males, representing 9%, and for (23) females, representing 7.66%, and finally the age group of (66-85) with a total number of (25) cases, representing 8.34%, in which the number of male cases was recorded as (16) cases, representing 5.33%, and (9) female cases, representing 3%, It is clear from presenting and interpreting the data that the prevalence of vitamin D and calcium deficiency for both sexes is almost close and there are no significant differences in the distribution rates between the sample members.

A decrease in the level of vitamin D was recorded for (88), (77), at a rate of 29.34%, 25.66%, respectively, for males and females, while the number of cases of low calcium level was recorded for (76), (74) at a rate of 25.34%, 24.66% for males and females respectively. According to age groups, we find that the age group from (46-65) recorded the highest number (138), representing 46%, followed by the age group from (26-45) with (87), representing 29%, followed by the age group from (5-25) with (50) cases, representing 16.66% Finally, the age group from (66-85) with (25) cases, representing 8.34%.

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Table (3). Distribution of the number and percentage of sample members according to age group and level of vitamin (D) and calcium

Age group	Number	Percentage%	Males		Females	
			Number	Percentage%	Number	Percentage%
5-25	50	16.66	27	9	23	7.66
26-45	87	29	43	14.33	44	14.66
46-65	138	46	62	20.66	76	25.33
66-85	25	8.34	16	5.33	9	3
Total	300	100	148	49.33	152	50.66

Discussion

By presenting the data and results obtained in the current study, the prevalence of vitamin D deficiency was found to be 55% of all cases in the sample. This finding is consistent with study [10], conducted in the city of Derna, which reported that 61.01% of the population sample suffered from vitamin D deficiency. Similarly, study [11] showed that the incidence of vitamin D deficiency in the Qaminis region of eastern Libya reached 74.81%, with levels below 30 ng/ml in 25.18% of the study sample. In the present study, vitamin D deficiency was recorded at 29.34% in males and 25.66% in females, indicating a slightly higher prevalence among males. This agrees with study [8], which confirmed that vitamin D deficiency was more common among young people and males compared to the elderly and females. The causes were attributed to lifestyle, demographic, and social factors, including increased obesity, consumption of soft drinks, and lack of nutritional supplements. However, these findings differ from study [12], which reported that vitamin D deficiency was greater among females, particularly pregnant women (82.9% in one study) and postmenopausal women, with negative effects on cardiovascular health. That study recommended the use of nutritional supplements to reduce potential risks.

A previous Study [13], conducted on the adult population in Tripoli, showed that the prevalence of vitamin D deficiency in females reached 79.62%, compared to 25.58% in males. In contrast, the current study recorded a calcium deficiency rate of 50% in the total sample, with similar prevalence in both sexes (25.34% in males and 24.66% in females). This finding does not correspond with study [14], which confirmed that calcium levels are generally higher in females than in males. Study [15], conducted on women in Wadi Atiba, found that calcium levels were normal in 68% of cases. When analyzed by age group, the highest prevalence of vitamin D and calcium deficiency was observed in the 46–65 years group (46% of cases: 20.66% in males and 25.33% in females). This was followed by the 26–45 years group (29% of cases: 14.33% in males and 14.66% in females). The 5–25 years group recorded 16.66% of cases (9% in males and 7.66% in females), while the 66–85 years group showed the lowest prevalence (8.34%: 5.33% in males and 3% in females). These results differ from study [16], which reported the highest calcium levels in men aged 18–44 years and in females aged 1–17 years, highlighting age-related differences between sexes. The current findings agree with study [17], which confirmed that vitamin D deficiency was widespread in individuals under 75 years, but differ from study [18], which found that the highest vitamin D levels were recorded in children aged 1–4 years during summer compared to winter. They are consistent with study [10], which reported vitamin D deficiency in the 18–30 years age group, leading to poor calcium absorption, and with study [19], which showed that 89.54% of individuals aged 18–65 years had vitamin D deficiency, particularly young males at puberty. The results also align with study [20] (2024), which included a meta-analysis of studies across Libya and confirmed that the prevalence of vitamin D deficiency ranged between 45.4% and 87%, with rates of 54.31% in males and 53.29% in females.

It is clear that vitamin D and calcium deficiency is widespread across different age groups and sexes, influenced by multiple variables such as behavioral, social, and nutritional habits, lifestyle, age, sun exposure, clothing style, air pollution, and obesity [3]. The International Organization for Migration recommended daily calcium intake of 2500 mg/day for adults aged 19–50 years and 2000 mg/day for those over 50 years [21]. The European Food Safety Authority set the recommended intake at 2500 mg/day for all adults [22]. Many institutions and associations have advised consuming 800–2000 IU of vitamin D daily for adults over 50 years to achieve serum levels of 30 ng/ml, thereby improving calcium absorption and reducing secondary hyperparathyroidism [8]. However, excessive intake should be avoided due to risks to the arteries and kidneys [23]. It is preferable to obtain calcium from a healthy diet rather than supplements, as excessive supplementation may have harmful effects on biological functions [24].

Conclusion

We conclude from the results of the study that the prevalence of vitamin D and calcium deficiency is widespread among the population of different age groups, as the percentage was recorded at 29.34% among males and 25.66% among females, while the percentage of calcium among males was 25.34%, and females at 24.66%. The age group (46-65) had the highest prevalence rate, reaching 46%, at 20.66% among males, 25.33% among females, and then the age group from (26-45) at 29%. Its percentage is 14.33% in males and 14.66% in females. Further studies are urgently needed to investigate this issue across different regions of

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Libya, raise awareness of the dangers of vitamin D and calcium deficiency among members of society, conduct regular checkups, and change social and dietary habits that may increase the severity of the spread and exposure to risks that threaten public health.

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Conflicts of Interest
The authors declare no conflicts of interest.

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