مجلة جامعة بني وليد للعلوم الإنسانية والتطبيقية
Bani Waleed University Journal of Humanities and Applied Sciences
تصدر عن– جامعة بني وليد – ليبيا
Website:https://jhas-bwu.com/index.php/bwjhas/index
ISSN 3005-3900 الصفحات (171 -177) المجلد الحادي عشر – العدد الأول – 2026

Assessment of Vitamin D Deficiency Prevalence A Field Laboratory Study in Gharyan City

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تقييم معدلات انتشار نقص فيتامين د دراسة ميدانية مخبرية في مدينة غريان

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Received: 20-12-2025	Accepted: 25-01-2026	Published: 10-02-2026

الملخص:
نقص فيتامين د لدى السكان لوحظ في العديد من دول العالم، حيث أثر هذا النقص على الصحة العامة. يؤدي نقص فيتامين د للعديد من الامراض مثل مرض الكساح لدي الأطفال وهشاشة العظام عند البالغين. لم يتم سابقا اجراء أي دراسة لتقييم مدي انتشار نقص فيتامين د لدى سكان مدينة غريان. تهدف هذه الدراسة لقدير مدى انتشار نقص فيتامين د عند سكان غريان والذي بدوره يصب في خدمة الصحة العامة للمجتمع وهي دراسة حقلية أجريت في الفترة ما بين بداية سبتمبر 2024 الى نهاية ديسمبر 2024 في بعض مختبرات غريان الطبية (مختبر القمة، النهضة ،اليسر، الدقة مشفى غريان الطبي. خلال هذه الدراسة تم تسجيل 1718 حالة تحليل للكشف عن معدل فيتامين د وقد صنفت هذه الحالات الى 6 مجموعات اعتمادا على المراحل العمرية (النزعة المركزية). أظهرت النتائج في كل المراحل العمرية المسجلة من حديثي الولادة الى عمر 97 سنة ان 30% هم من الذكور و70% من الاناث حيث تبين ان انتشار النقص للفيتامين كان عند الاناث أكثر وبشكل مضاعف منه لدي الذكور في كل المراحل العمرية. وقد تبين ان حوالي 62% من الحالات لديهم نقص بمعدل اقل من 30 نانوجرام/ ملم. المعدلات العالية لم تتجاوز 0.45 % اما المعدلات الطبيعية فكانت 37%. المرضى في كل من المجموعة 4 و5 كانت اعلى من حيث النقص للفيتامين د في مجمل المجموعات. هذه النتائج تقود الى الاهتمام واثراء الدراسة في هذا الجانب من اجل المحافظة على الصحة العامة.

الكلمات الدالة: انتشار نقص فيتامين د اختبارات فيتامين د، فيتامين د. نقص فيتامين د. مدينة غريان.

Abstract
The prevalence of vitamin D deficiency has recently been recognized in different parts of the world, even affecting healthy populations. The deficiency of vitamin D can lead to rickets in children and osteomalacia in adults. No studies have been done in Gharyan city to evaluate

the status of vitamin D among the population. So, this work aims to estimate the prevalence of vitamin D deficiency in the city, which is essential to maintaining the health of populations in general. This was a survey study conducted from September 2024 to December 2024, at some laboratories in the city: Alkama. Alnahda, Ayouser, Aldaka and Mashfa Gharyian. During the study period, 1718 analysis tests results of vitamin D were collected, classified to six groups according to age and characterized by measures of central tendency. The results showed that the age of the cases ranged from newborns to about 97 years, 30% males and 70 % females. Prevalence of vitamin D deficiency among female was more than males in all aged groups of the cases, about 62 % of the cases had low vitamin D levels (less than 30 ng/ml), the high level was 0.45% and 37% were at normal range. But the patients in categories 4, 5 had the highest number of cases. Spreading awareness among the population about the importance and vital role of the vitamin, explaining the risks of vitamin D deficiency and associated diseases among the population were recommended to reduce the Prevalence of vitamin D deficiency in Gharyan city

Keywords: prevalence of vitamin D، Vitamin D, Vitamin D analysis, Vitamin D deficiency, Gharyan city

Introduction

Vitamins play a vital character when our bodies absorb them, but the body needs them in specific amounts to perform this role. Vitamin D (VD) is a unique food source obtained externally from foods rich in it and internally by shedding the ultraviolet radiation of sunlight on the skin [1]. In addition, Vitamin D is necessary for the proper intake of calcium in the biological system as it supports the inundation of calcium in the digestive system and its removal in the bone structure and it also controls the number of calcium points in the plasma. One of the most common diseases associated with vitamin D is bone diseases such as rickets in children and osteoporosis in adults [2]. Vitamin D deficiency has spread widely in many countries and it is considered a common epidemic because it affects about one billion people in the world [3], and for this reason, it is a source of concern for health and international organizations, especially through early stages of human growth of including infancy stage, followed by the childhood, and finally the stage adolescence [4, 5

Vitamin D is an important nutrient for the human body because it is associated with many diseases. There were many health problems in which vitamin D deficiency had a role [6]. Vitamin D is considered as a nutrient whose function is to enhance the process of calcium absorption and a cofactor in physiological processes such as bone and calcium metabolism, metabolism, and works on the balance of phosphorus and calcium [7]. In addition, vitamin D prevents calcium excretion by re-absorption by the kidneys and plays an important role in calcium homeostasis in the bones, intestines, and kidneys [8]. Vitamin D is of great importance because it is associated with many diseases, including cardiovascular diseases, diabetes, autoimmune diseases, rickets in infants, some skin diseases, obesity, neurological disorders, infections, and cognitive decline [9]. Therefore, at the present time, many studies have been conducted on vitamin D and its importance. Consequently, the increasing interest in vitamin D was shown by researchers and specialists in the health community and in the field of biomedical sciences, more than any other nutrients related to human health [10]. In addition, some recent studies indicate that vitamin D deficiency and its prevalence are among the most important factors that lead to contract diseases and mortality. Furthermore, recent studies have reported that there is an association between vitamin D deficiency and upper respiratory tract infection and the coronavirus disease (COVID-19) and this indicates the seriousness of vitamin D deficiency in the event of an epidemic such as the Corona pandemic [11]

There are problems of vitamin D deficiency as a silent epidemic as a large number of people are not even aware that they are affected by it and have no idea about how complicated their lives are because of it. Therefore, it was very important to address this problem, identify it, and determine the extent of its impact on the public health of the population in Gharyan city, to identify its prevalence rate. This was the main objective of this study, in addition to clarify the extent of the impact of vitamin D deficiency in different circumstances, the complications it causes, the role of sunlight, and good nutrition rich in vitamin D.

2. Materials and Methods

This study was divided for two parts: a survey study designed to determine vitamin D deficiency among the population in Gharyan city by collecting the results from the medical laboratories in the center of city.

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The analytical study to determine vitamin D levels in blood serum by using Cobas e411 (full automatic)

3. Results and discussion

Field study (survey study) 3.1

This study was conducting in period from September to December 2024 in Gharyan city, where data collecting was done at some laboratories in the city of Gharyan: (Alkama. Alnahda, Ayouser, Aldaka and Mashfa Gharyian)

3.1.1 Characterization of study sample

Where about 1540 analysis tests results of vitamin D were collected, classified to six groups according to age and characterized as shown in table 1

Table 1: number and classification of cases

No.	Age	Male	Female	Total
1	0 – 10	73	82	155
2	11 – 18	44	91	135
3	19 – 25	41	176	217
4	**26 – 40**	**104**	**320**	**424**
5	**41 - 55**	**107**	**252**	**359**
6	> 55	100	150	250
	total	496	1071	**1540**

The results showed that the age of the patients ranged from newborns to about 97 years, 30% males and 70 % females table 1, the patients in categories 4, 5, had the highest number of patients

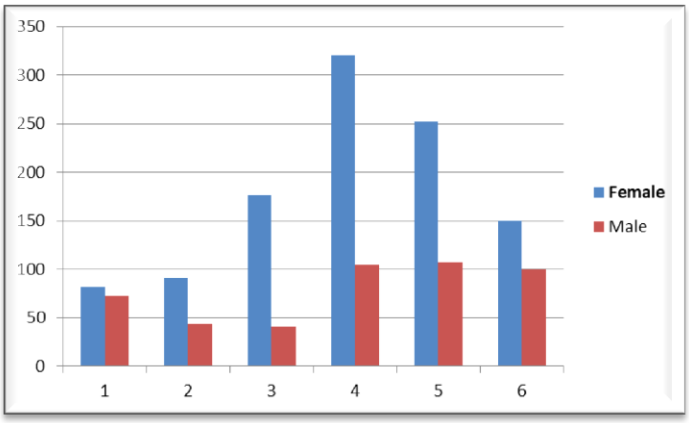

Figure 1: comparisons between male and female patient groups

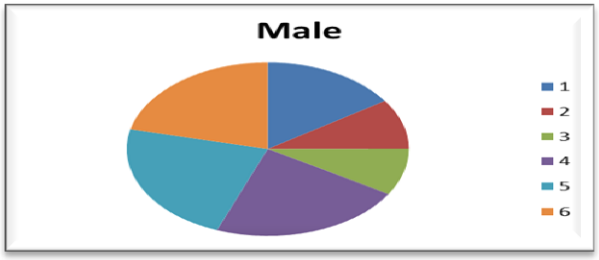

Figure 2: distribution of Male patients in aged patients in aged

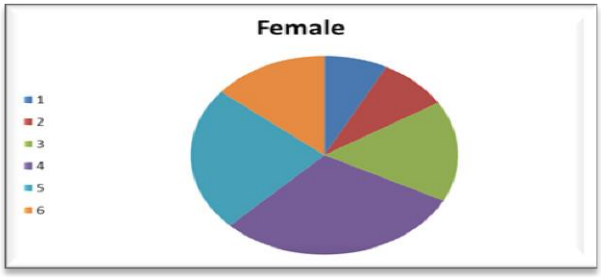

Figure 3: distribution of female

3.1.2**. Prevalence of vitamin D deficiency in place of study**

This was the main objective of this study, where the patients in these categories had different ranges of vitamin D levels in blood serum, but these results indicate that Prevalence of vitamin D deficiency among female more than males in all aged groups of the patients, about 62 % of the patients had low vitamin D levels (less than 30 ng/ml), the high level was 0.45% and 37% were at normal range as shown in table 2.

Table 2: vitamin D levels (ng/ml) of samples

No.	Age group	number	Range	Normal value
1	0 – 10	155	3 – 109.7	30 ng/ml
2	11 – 18	135	8.7 – 56.8	
3	19 – 25	217	3.3 – 73	
4	26 – 40	424	15.5 – 79	
5	41 – 55	359	8.4 -120	
6	> 55	250	12.3 - 107	
	Total	1540		

3.2. **Determination of vitamin D levels in blood serum**

The analytical study to determine vitamin D levels in blood serum by using Cobas e411 (full automatic technique) was the second part of study, Where about 178 cases were collected, classified to six groups according to age and measured vitamin D levels table 3.

Table 3: number and classification of cases

No.	Age	Male	Female	Total
1	0 – 10	12	17	29
2	11 – 18	11	13	24
3	19 – 25	6	15	21
4	**26 – 40**	**14**	**32**	**46**
5	**41 - 55**	**6**	**29**	**35**
6	> 55	5	18	23
	Total	54	124	178

The results showed that the age of the patients ranged from 1 year to about 88 years, 31.3% males and 69.7 % females table 3, the patients in categories 4, 5 had the highest number of patients.

Table 4: vitamin D levels (ng/ml) of samples

No.	Age group	number	Range	Normal value
1	0 – 10	29	14 – 100	30 ng/ml
2	11 – 18	24	3 – 115	
3	19 – 25	21	3 – 70	
4	26 – 40	**46**	3 - 82	
5	41 – 55	**35**	5 – 80	
6	> 55	23	3 – 45	
	Total	178		

This results indicate that the patients in these categories had different ranges of vitamin D levels in blood serum, Prevalence of vitamin D deficiency among female more than males in all aged groups of the patients, about 65 % of the patients had low vitamin D levels (less than 30 ng/ml), the high level was 0.55% and 34% were at normal range. Table (5) explain low percentage of all aged groups.

Table 5: vitamin D low percentage of all aged groups

No.	Age	Low %	High %	normal range %
1	0 – 10	31	-	69
2	11 – 18	70.8	4.2	25
3	19 – 25	71.2	-	28.8
4	**26 – 40**	**91.3**	**-**	**8.7**
5	**41 – 55**	**62.8**	**-**	**37**
6	> 55	60.9	-	39

Discussion

The age of patients ranged from newborns to about 97 years. The number of patient was 1540, 30% males and 70 % females. The aged groups in categories 4, 5 had the highest number. Prevalence of vitamin D deficiency among female more than males in all aged groups of the patients, about 62 % of the patients had low vitamin D levels (less than 30 ng/ml). 37% of the patients were at normal range. Only 0.5% was at the high level of vitamin.

Vitamin D deficiency is considered to be a public health problem worldwide. Female gender is one of the most

Important predictors of vitamin D deficiency [12]. This finding of increased prevalence seen in females is comparable to male can be due to a sedentary lifestyle and their clothes which prevent from sunlight .

This study has demonstrated a high prevalence of vitamin D deficiency among patients visiting in medical laboratories in Gharyan city based study with a diverse sample population should be conducted in the future to find out a more accurate prevalence. Similarly, other studies that further look into the association between gender and age and other contributions.

5. Recommendations

To reduce the Prevalence of vitamin D deficiency in Gharyan city: Increase research and studies to find out the main reasons of vitamin D deficiency in the city. Spreading awareness among the population of the importance and vital role of the vitamin D. explaining the risks of vitamin D deficiency and associated diseases among the population.

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