



تحديد انتشار نقص فيتامين دي في كل من الذكور والإناث بمدينة الزاوية وطرابلس

د- لطفية محمد مسعود خليل ، و د- ثريا على محمد شعبان
جامعة الزاوية كلية التربية الزاوية قسم الاحياء

Title:

Determinates of Spread Vitamin D deficiency in both gender with different age in Tripoli and Al-zawia city Libya.

Author :

Dr Lotfia Mahamed Masod Khalil & Dr Thuraya Ali Mohamed Shaban

Objective:

To discover if there is a relationship between age and vitamin D deficiency.

Does gender have a role in vitamin D deficiency?

ملخص البحث:

فيتامين (د) هو عنصر غذائي أساسي لصحة الإنسان وخاصة لنمو الخلايا وعمل الجهاز المناعي. يعتبر من مجموعة الفيتامينات القابلة للذوبان في الدهون، ويتم تخزينه في الأنسجة الدهنية، وقد تم تقدير فيتامين (د) لدوره في استتباب الكالسيوم وصحة العظام. وهو يُساعد على امتصاص الكالسيوم والمغنيسيوم والفوسفات من الأمعاء كما أنه مهم لعدة وظائف بيولوجية. نقص فيتامين (د) هو انخفاض مستواه في الدم عن المعدل الطبيعي، مما يؤثر سلباً على الصحة العامة للشخص، وخاصة صحة العظام والعضلات إن الانتشار الواسع لنقص الفيتامين سلط الضوء على أهمية دراسة مستوياته في الدم. تهدف الدراسة الحالية لتقييم مستوى فيتامين (د) في الدم لدى بعض الأشخاص في محيط مدينتي الزاوية وطرابلس، ومعرفة مدى ارتباط العمر والجنس بنقص مستوى الفيتامين في الدم. لتحقيق هدف الدراسة تمت مراجعة نتائج تحاليل دم لأشخاص من الجنسين وفي أعمار مختلفة تردوا على مختبرات التحليل لأجراء اختبار نقص الفيتامين في الفترة من 2021-12 إلى 2022-5.

منهج الدراسة: اشتملت الدراسة على عدد 987 حالة من كلا الجنسين من الذكور والإناث منذ ديسمبر 2021 حتى مايو 2022 بفئات عمرية مختلفة دخلوا جميعهم إلى

المركز. لمعرفة النتائج تم تحليل البيانات للتعرف على الفرق بين العمر والجنس الذي يرتبط SPSS3 التي تم جمعها إحصائياً باستخدام برنامج بمعدل نقص فيتامين (د).

النتائج: الذكور الذين تتراوح أعمارهم بين أقل من 20 سنة وما فوق 80 لم تكن

$F=1.091$ ذات دلالة إحصائية لأنه قيمة كانت

و (القيمة الاحتمالية = $0.362 < 0.05$)

$F=5.596$ تختلف الفئات العمرية للإناث من أقل من 20 إلى 80 ما فوق بحيث

كانت

وهذا يدل على وجود فرق معتد به إحصائياً في مستوى فيتامين (د) ($p = 0.000$) (< 0.05)

بالإضافة إلى ذلك، توجد فروق ذات دلالة إحصائية في فيتامين (د) بين الفئة العمرية أقل من 20 والفئة العمرية 80 سنة وما فوق.

لا توجد فروق ذات دلالة إحصائية في فيتامين د بين الذكور والإناث

هذا يعني أنه لا يوجد تأثير للجنس على فيتامين د (القيمة الاحتمالية = $0.122 < 0.05$). وفقاً لهذه النتيجة قد يكون عدد الرجال أقل من عدد الإناث وكذلك النساء تأثرت في الغالب بنقص فيتامين (د) لأن عدد النساء كان أكثر من الرجال. الاستنتاج الذي توصلنا إليه هو أن النساء أكثر تأثراً بنقص فيتامين (د) من الرجال من خلال قلة تعرضهم للشمس ونمط الحياة المعتادة وبسبب الحمل وفقدان المعادن المهمة بدليل معظم العينات مسجلة للنساء

Abstract

Vitamin D is essential nutrient component for human health especially cell growth and immune function. it is fat soluble vitamin which is stored in fat tissue Vitamin D has been appreciated for its role in calcium homeostasis and bone health. It is important for bone metabolism and healthy mineral. Therefore, Vitamin D deficiency increased in Libya by showing the symptom of deficiency. Vitamin D deficiency results were collected from different clinics. **Method:** The study included a number of 987 cases of both sexes, males and females since Dec 2021 till May 2022 were collected, with different age groups, all of whom entered the center. To find out the results the collected data has been statistically analysis by using SPSS3 program to recognize the difference between age and gender. It is associated with the rate of vitamin deficiency. **The results:** The male between less than 20 years' till



above 80 was not statistically significant because the F value was 1.091 and the (p-value = 0.362 > 0.05). Different age group of the females from less than 20 age till above 80. This shows that the statistically significant difference in Vitamin D level, because the F value was 5.596 and the (p-value = 0.000 < 0.05).. In additional, there is statistically significant difference in Vitamin D between age group less than 20 and age group 80 years old and above. There is no statistically significant difference in Vit D between male and female. This means that there is no effect of gender on Vit D for females (p-value = 0.122 > 0.05). according this result may the number of men was less than the number of females As well women mostly effected to vitamin D deficiency because the number of women were more than men. **The conclusion** we found that women more impact to vitamin D than men

Background:

Vitamin D has common called (the sunshine vitamin (20). The collective name of vitamin D is cholecalciferol (vitamin D) which is fat-soluble vitamin, rarely found in foods as well added as a dietary supplement and produced endogenously when ultraviolet (UV) rays from sunlight penetrate to the skin and start synthesis Vitamin D[1-3]. Vitamin D work in many biological processes (21). It is a source of hormones with an important role in regulation of metabolism of calcium and phosphates (14). Vitamin D has been appreciated for its role in calcium homeostasis and bone health. Vitamin D is important for bone metabolism and healthy mineral (15). Vitamin D play important role to enhance calcium and phosphate absorption by small intestine, negatively controls PTH secretion via the endocrine action of it is active calcitriol (16). It has other important effect in human body involving regulation of arterial blood pressure, prohibition of cardiovascular intricacy, modification of immunological response, arranging of insulin production, and minimized diabetes, decrease certain cancers and other beneficial factor (16). Vitamin D is secosteroid of nutritional origin as well can generated in the skin by ultraviolet light (17). Once the serum level of Calcium low, the parathyroid hormone will up regulate the 1α -hydroxylase enzyme which is important for active pre-vitamin D3. Therefore, once obtained vitamin D via skin or diet, is biologically inactive pre-vitamin D3. Therefore, pre-vitamin D3 well converted to 25(OH)D via 25 hydroxylase

enzyme which is produced by the liver then convert to 24R,25(OH)2D by 24-hydroxylase enzyme (18). The second step is convert the 25(OH)D to 1,25(OH)2D by 1 α -hydroxylase enzyme produced by kidney (18). The summary of Vitamin D metabolic pathway has been showing in the figure 1: as following; vitamin D₃ well converted to 25(OH)D via 25 hydroxylase enzyme to 25(OH)D₃, then to 24,25(OH)2D₃ (in kidney, Oxidation, side chain cleavage). And 25(OH)D converted (Low calcium/PTH Low phosphate) to 1,25(OH)2D₃ then to target tissue. 1,25(OH)2D₃ ((via 24(OH)ase(CYP24A1) and 1,25(OH)2D and low PTH)) converted to (1,24,25(OH)3D C24 (oxidation pathway) and 1,23,25(OH)3D, C23 (lactone pathway)) (0). The major source of 25(OH)D has been established by the liver (18). And the major source of circulating levels of 1,25(OH)2D is kidney (18).

More attention has been given in the last few years about relation of Vitamin D deficiency and many common diseases, including endocrine diseases, chronic diseases, cancer progression and autoimmune diseases. These relation has been observational studies and meta analyses association between circulating levels of vitamin D and outcome of common diseases (22). There is to many basic scientific research show it that vitamin D has important role in the innate immunity in the upper respiratory disease such as Tuberculosis (04). According to preliminary study in Iranian population who had COVID-19 disease, they find that vitamin D deficiency was related to higher death rate (03). As showing in the figure 1 the pathway of vitamin D₃ metabolism In United Kingdom, The manifestation rickets and osteomalacia due to vitamin D deficiency, according to level of vitamin D in serum show it as below or equal to 25 nmol/L (02). The sufficient recommend level of Vitamin D is over 50 nmol/L for good bone health (02). The Optimal levels have been subject to debate, especially with regards to extraskelatal outcomes, a review of 25(OH)D levels for a range of health outcomes determined that 25(OH)D levels over 75 nmol/L was optimum (02). Recent evidence show that an association between vitamin D deficiency and heart failure, hypertension, peripheral vascular disease, diabetes mellitus, metabolic syndrome, and coronary artery disease (01). Therefore, find that vitamin D deficiency was associated with a significant risk of cardiovascular disease and reduced



survival. Vitamin D supplementation was significantly associated with better survival, specifically in patients with documented deficiency.

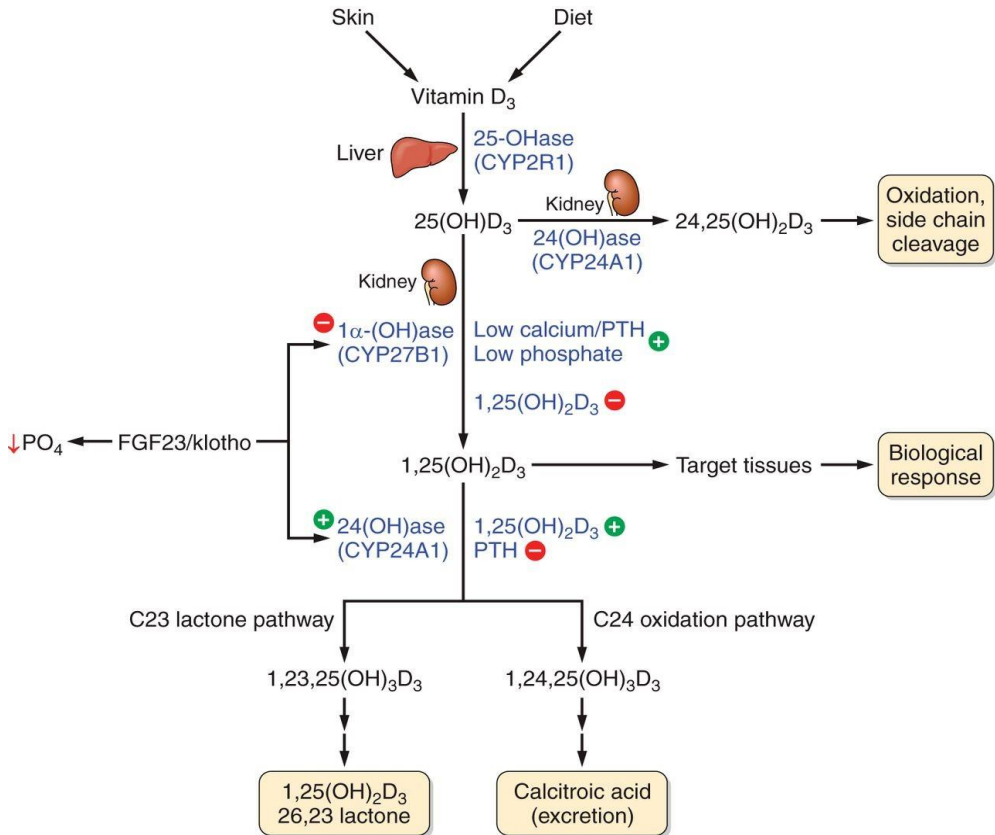


Figure 1. The pathway of Vitamin D metabolic as following: vitamin D3 well converted to 25(OH)D via 25 hydroxylase enzyme to 25(OH)D3, then to 24,25(OH)2D3 (in kidney, Oxidation, side chain cleavage). And 25(OH)D converted (Low calcium/PTH Low phosphate) to 1,25(OH)2D3 then to target tissue. 1,25(OH)2D3 ((via 24(OH)ase(CYP24A1) and 1,25(OH)2D and low PTH)) converted to (1,24,25(OH)3D C24 (oxidation pathway) and 1,23,25(OH)3D, C23 (lactone pathway)).

Methods:

1-The study included a number of 987 cases has been randomly collected of both genders, males and females, of different age groups, all of whom entered the center.

2- Blood Samples were collected from different clinic Alsaraj Clinic Tripoli, Almosah Clinic Tripoli, and Alraed laboratory Alzawia. Different sample for male and female in different age has been collected. since December 2021 till may 2022.

3- The manufactured of vitamin D in the skin to 25-hydroxyl vitamin D, for that reason the best analysis to know the body's store of vitamin D is to analyzed the level of 25-hydroxyle vitamin D. Vitamin D deficiency results were collected from different clinics. The following point showing the method.

4- By using i CHROMA II Machin serum sample has been tested for male and female in different age, then analyzed the data.

5-To find out the results the collected data has been statistically analysis by using SPSS3 program to recognize the difference between age and gender. It is associated with the rate of vitamin deficiency. The results that has been obtained

Results:

The results analysis according to the following SPSS3 program. The normal level of vitamin D (25OHD serum or D3) is above 30 nmg, insufficient amount of vitamin D (25OHD serum or D3) is less than 30 nmg.

The results base on the samples were collected, the **Table (1)** showing the total number of the sample. There is 987 sample from both male and female. 193 samples were collected from male and percent was 19.6 % from total samples. 794 were collected from female and percent was 80.4 % from total samples.

The **Table (2)** shows that 13.5 of sample study aged less than 20 years, 44.7% of the sample study aged 20 to 39 years, 29.1% of the sample study aged 40 to 59 years, 10.8% of the sample study aged 60 to 79 years, while 1.9% of the sample study aged 80 years or older.

According to the results on **Table (3)**, shows that the comparison of vitamin D level between the age group of the male between less than 20 years' till above 80 was not statistically significant because the F value was 1.091 and the (p-value = 0.362 > 0.05). This mean that the number of males were collect not enough to do the comparison in age as well we found that mostly samples



were collected females. Also, may found that the male exposure to sun more than female for this reason, we did not obtain a lots of samples for males.

In additional analysis the results on **Table (4)**, it was comparison between different age group of the females from less than 20 age till above 80. This shows that thye statistically significant difference in Vitamin D level, because the F value was 5.596 and the (p-value = 0.000 < 0.05). The significant of this results show that Vitamin D for women with ages 20 to 79 is significantly higher than women with age less than 20 and women with ages 80 years old and above. In additional, there is statistically significant difference in Vit D between age group less than 20 and age group 80 years old and above. We conclude from these results the women more commonly effected to Vitamin D deficiency, because the number of samples was more than the male which mean they have symptom of vitamin D deficiency, such as fatigue, bone pain, muscle weakness. In general, the main causes of Vitamin D deficiency are getting enough amount from vitamin D from sunlight because most women in Libya wear a scarf, wear clothing that cover all their body or they stay in the house for long time these lead to not obtain adequate amount of vitamin D exposure to sunlight. Other cause is not getting enough from vitamin D through a nutritional supplements. In additional, may have problem in absorbing of vitamin D or using Vitamin D in the body.

The last data analysis was in **Table (5)**, shows that there is no statistically significant difference in Vit D between male and female. This means that there is no effect of gender on Vit D for females (p-value = 0.122 > 0.05). according this result may the number of men was less than the number of females (the number of men were 193 sample while the number of females were collected 794). As well women mostly effected to vitamin D deficiency because the number of women were more than men. This lead to,

Vit D Analysis

Table (1)

Sample study based on Gender

Gender	Count	%
Male	193	19.6%
Female	794	80.4%
Total	987	100.0%

Table above shows that 19.6% of the sample study is male, while 80.4% of the sample is female.

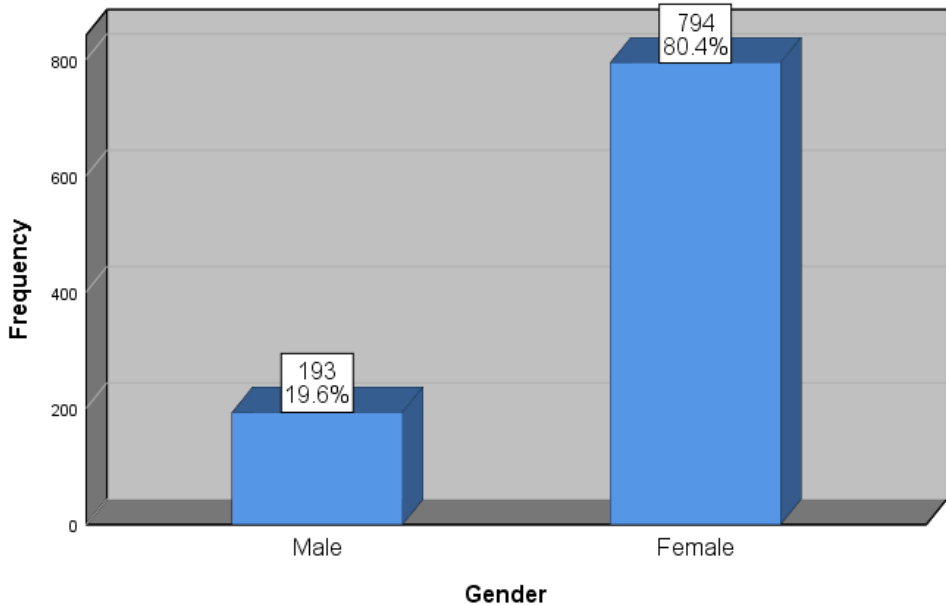
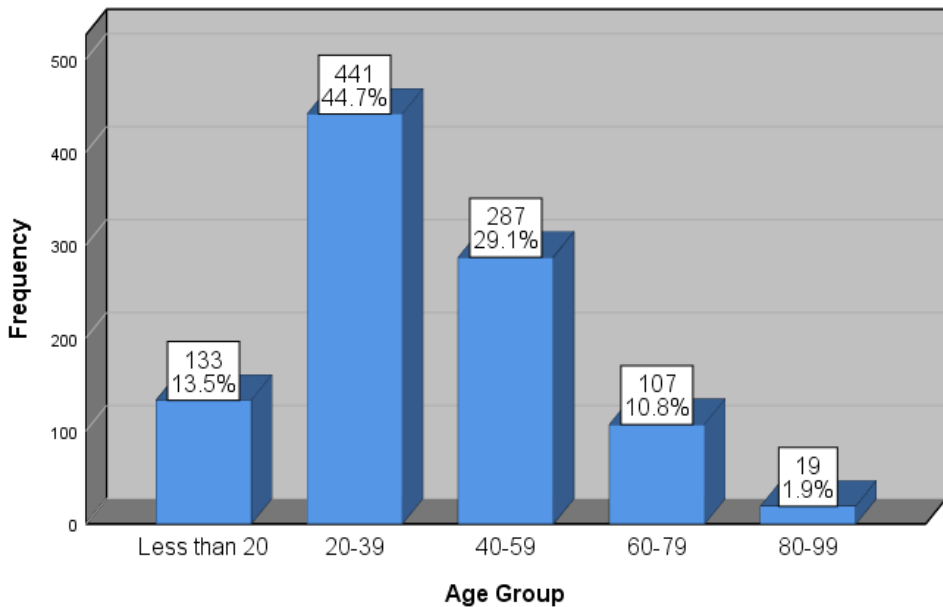


Table (2)
Sample study based on age group

Age Group	Count	%
Less than 20	133	13.5%
20-39	441	44.7%
40-59	287	29.1%
60-79	107	10.8%
80 and above	19	1.9%
Total	987	100.0%

Table above shows that 13.5% of the sample study aged less than 20 years, 44.7% of the sample study aged 20 to 39 years, 29.1% of the sample study aged 40 to 59 years, 10.8% of the sample study aged 60 to 79 years, while 1.9% of the sample study aged 80 years or older.



Comparison between age groups in terms of Vit. D

1) For Male

Table (3)

Comparison between age group in terms of Vit D

Age Groups	No	Mean	Standard Deviation	F	P-value
Less than 20	36	28.14	24.278	1.091	0.362
20-39	60	22.22	10.653		
40-59	59	25.38	12.499		
60-79	32	23.13	10.730		
80 and above	6	21.77	10.054		

Table above shows that there is no statistically significant difference in Vit D between age groups. This means that there is no effect of age groups on Vit D for males ($p\text{-value} = 0.362 > 0.05$).

1) For Females

Table (4)
Comparison between age group in terms of Vit D

Age Groups	No	Mean	Standard Deviation	F	P-value
Less than 20	97	17.78	15.709	5.596	0.000
20-39	381	22.44	14.259		
40-59	228	23.33	14.053		
60-79	75	28.01	16.243		
80 and above	13	19.23	10.388		

Table above shows that there is statistically significant difference in Vit D between age groups. This means that there is an effect of age groups on Vit D for females ($p\text{-value} = 0.000 < 0.05$).

Post hoc comparison using Tukey showed that:

- 1) Vit D for women with ages 20 to 79 is significantly higher than women with age less than 20 and women with ages 80 years old and above.
- 2) There is statistically significant difference in Vit D between age group less than 20 and age group 80 years old and above.

Comparison between male and female in terms of Vit D

Table (5)
Comparison between male and female in terms of Vit D

Gender	No	Mean	Standard Deviation	t	P-value
Male	193	24.42	14.684	1.549	0.122
Female	794	22.60	14.698		

Table above shows that there is no statistically significant difference in Vit D between male and female. This means that there is no effect of gender on Vit D for females ($p\text{-value} = 0.122 > 0.05$).

Discussion

The study shows that the percentage of females was 80.4%, and the percentage of males was 19.6%.

This indicates that the number of females who suffer from vitamin deficiency is higher than the number of males, which indicates the



relationship of sex to the state of vitamin deficiency, and the reason may be that women are less exposed to the sun by virtue of the nature of work, which reduces the ability of the skin to benefit from sunlight in the manufacture of vitamin D. The fetus also needs vitamin D, and its consumption of the mother's stores of this vitamin may lead to a deficiency. The results of this study agreed with the results of a study published in Jordan in 2019 by researcher Muhammad Al-Khatib and others, in which they indicated that the prevalence of vitamin deficiency in women is higher than in men, and this was attributed to the same reasons. The results also showed that age had no effect on vitamin deficiency in men, while the effect of age on vitamin deficiency in women was significant, in women in the age group of 20-79 years, higher than in women less than 20 years and older than 80 years, by comparing the level of vitamin D. In women less than 20 years old with women older than 80 years, the results showed that vitamin deficiency in women older than 80 years is higher than in women less than 20 years old. It leads to a decrease in the efficiency of the skin in the manufacture of vitamin D when exposed to sunlight, in addition to a decrease in the ability of the kidneys to convert vitamin D into its active form.

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