

The Prevalence of Vitamin D Deficiency in Benghazi Population

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Abstract: *The link between Vitamin D deficiency and other diseases was investigated through many researches that appeared strong relation between them. The types and definition of Vit.D were discussed in addition to highlight its structure, mechanism, sources and causes of deficiency. Our study interested in investigate the Vit.D deficiency prevalence among Benghazi population from different gender and ages. Statical analysis has been used to describe the data ,and find the effect of the age and gender on the prevalence of Vit.D deficiency. Descriptive study was performed on 234 patients with vitamin D deficiency symptoms and conducted in privates analytical labs located in Benghazi in the period between June to October 2016 the level of vitamin D .classified into three main categories ,sufficient, insufficient and deficiency . we can see clearly that the high percentage(63%) of deficient cases appeared in less than 20 years age group, in relative to only 20% with more than 60 years age group. The prevalence of Vit.D deficiency among Benghazi population was high in Age group less than 20 years, and in female more than in male*

Date of Submission: 02-07-2018

Date of acceptance: 18-07-2018

I. Introduction

Vitamin D deficiency affects persons of all ages. Common manifestations of vitamin D deficiency are symmetric low back pain, proximal muscle weakness, muscle aches, and throbbing bone pain elicited with pressure over the sternum or tibia. (**Bischoff HA et al**) A 25- hydroxyl vitamin D level should be obtained in patients with suspected vitamin D deficiency. More research is required to recommend screening individuals who are not at risk for deficiency or to prescribe vitamin D. Vitamin D deficiency is defined as a serum 25-hydroxyvitamin D level of less than 20 ng per mL (50 nmol per L), and insufficiency is defined as a serum 25-hydroxyvitamin D level of 20 to 30 ng per mL (50 to 75 nmol per L) (**Holick MF,2008**). The goal of treatment is to normalize vitamin D levels to relieve symptoms and decrease the risk of fractures, falls, and other adverse health outcomes. To prevent vitamin D deficiency, the American Academy of Pediatrics recommends that infants and children receive at least 400 IU per day from diet and supplements. Evidence shows that vitamin D supplementation of at least 700 to 800 IU per day reduces fracture and fall rates in adults. In persons with vitamin D deficiency, treatment may include oral ergocalciferol (vitamin D₂) at 50,000 IU per week for eight weeks. After vitamin D levels normalize, experts recommend maintenance dosages of cholecalciferol (vitamin D₃) at 800 to 1,000 IU per day from dietary and supplemental sources (**Holick .,et al 2012**) The major cause of vitamin D deficiency is inadequate exposure to sunlight. Wearing a sunscreen with a sun protection factor of 30 reduces vitamin D synthesis in the skin by more than 95%. People with a naturally dark skin tone have natural sun protection and require at least three to five times longer exposure to make the same amount of vitamin D as a person with a white skin tone, and the obesity is associated with vitamin D deficiency. There are several other causes for vitamin D deficiency (**Wolpowitz.,et al 2006**).

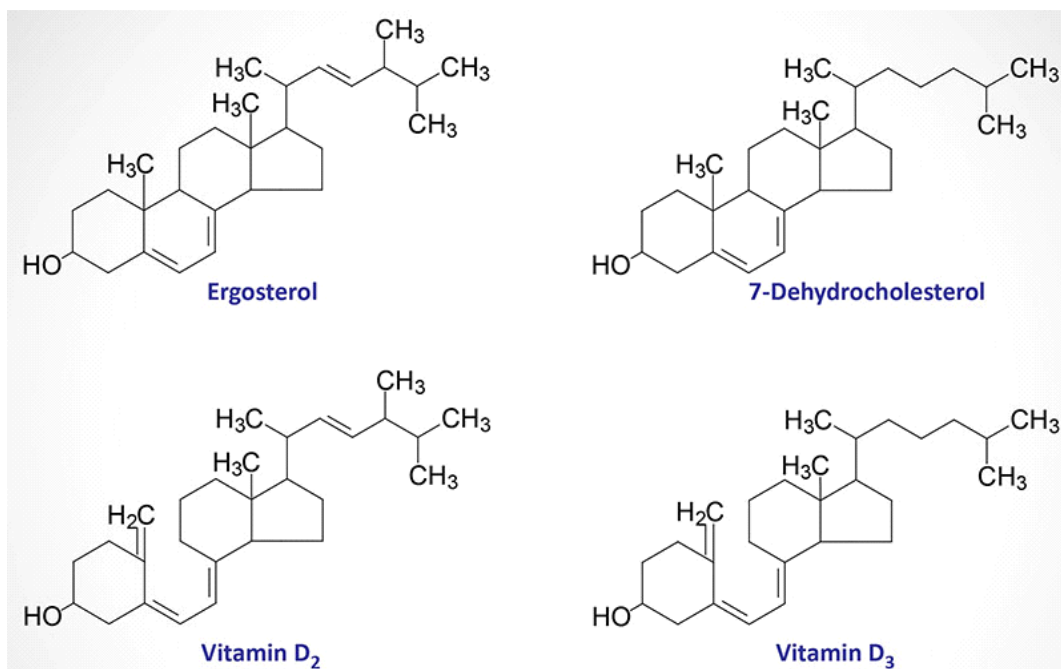


Fig1 (Chemical structure of vit.D)

<http://themedicalbiochemistrypage.org/vitamins.php>

Sources

A major source of vitamin D for most humans comes from exposure of the skin to sunlight typically between 10.00 a.m and 15.00 p.m in the spring, summer (Michael F., 2011) .

Few foods naturally contain vitamin D2 or vitamin D3 in the United States and Canada, milk is fortified with vitamin D, as are some bread products, orange juices, cereals, yogurts, and cheeses In Europe, most countries do not fortify milk with vitamin D (Michael F., 2011).

Vitamin D Content	Source
About 600–1000 IU of vitamin D3	Fresh, wild salmon (3.5 oz)
About 300–600 IU of vitamin D3	Canned (3.5 oz) Sardines, canned (3.5 oz)
About 300 IU of vitamin D3	Mackerel, canned (3.5 oz)
About 250 IU of vitamin D3	Tuna, canned (3.6 oz)
About 230 IU of vitamin D3	Cod liver oil (1 tsp)
About 400–1000 IU of vitamin D3	Shiitake mushrooms Fresh (3.5 oz)
About 100 IU of vitamin D2	Egg yolk
About 1600 IU of vitamin D2	Exposure to sunlight, ultraviolet B radiation (0.5 minimal erythemal dose)†
About 20 IU of vitamin D3 or D2	Fortified milk
About 100 IU/8 oz, usually vitamin D3	Fortified orange juice
About 100 IU/8 oz vitamin D3	Infant formulas
About 100 IU/8 oz vitamin D3	Fortified margarine

Table 1 Sources of vit.D

Causes of Vitamin D Deficiency

There are many causes of vitamin D deficiency result from inadequate irradiation of the skin, insufficient intake from the diet or impairments in the metabolic activation(hydroxylations) of the vitamin (Gerald F. Combs, 2008). Avoidance of sun exposure and the use of sunscreen and sun-protective clothing are among the more common causes .

Therefore, vitamin D deficiency can have privational and/or nonprivational causes

● Privational causes These involve inadequate vitamin D supply. They include:

- Inadequate exposure to sunlight
- Insufficient consumption of food sources of vitamin D

● Nonprivational causes these relate to impairments in the absorption, metabolism, or nuclear binding of the vitamin.

Aim of study

This study is designed to investigate the prevalence of vitamin D deficiency among Benghazi population from different ages and gender to find the correlation between the age and vitamin D deficiency .

II. Method and Procedures

Description of the Research Setting:

Descriptive study was performed on 234 patients with vitamin D deficiency symptoms and conducted in private analytical labs located in Benghazi in the period between June to October 2016.

Subject and Sampling:

The target sample of the study was 234 patients, data were collected from three different labs (which were distributed on three main areas Benghazi), to increase the number of participants .Patients who visited these labs were referred from their physicians who follow up their cases.

Study Design:

A quantitative and qualitative type of research was conducted.

Inclusion and exclusion criteria

Inclusion criteria: the patients who allowed to participate in this study were asked to do Vit.D. deficiency test in Benghazi labs whatever their ages, gender, and their health state.

The Research Instrument:

The research used Pearson correlation between two variables (Vitamin D percentage and age), that were obtained from the lab data base.

Data Collection Procedure

All the data that collected from the labs data base were recorded and statically analyzed to describe the percentage of each group. Data collection took place in the summer between June and August 2016, from different labs located in three main regions (Alsafwa,alsalem and alrazi lab).

Ethical Consideration:

The researcher got verbal permission from administration of the labs to use information which needed to conduct this study. All the patients personal information were hidden .People who works at lab administration offices were informed about the identity of the researchers as students in Faculty of Pharmacy in University of Benghazi.

Statistical Analysis:

All the gathered data analyzed using the Statistical Package for Social Sciences (SPSS) version 18 for windows (SPSS Inc., Chicago, Illinois). The analysis include frequencies of discrete variables, pearson analysis used to measure any linear correlation between categorical variables. All P-values were two-sided and $P < 0.05$ was considered statistically significant.

III. Results and Discussion

Table (2), shows some of statistical measurements to describe the dispersion and location of data for two variables .

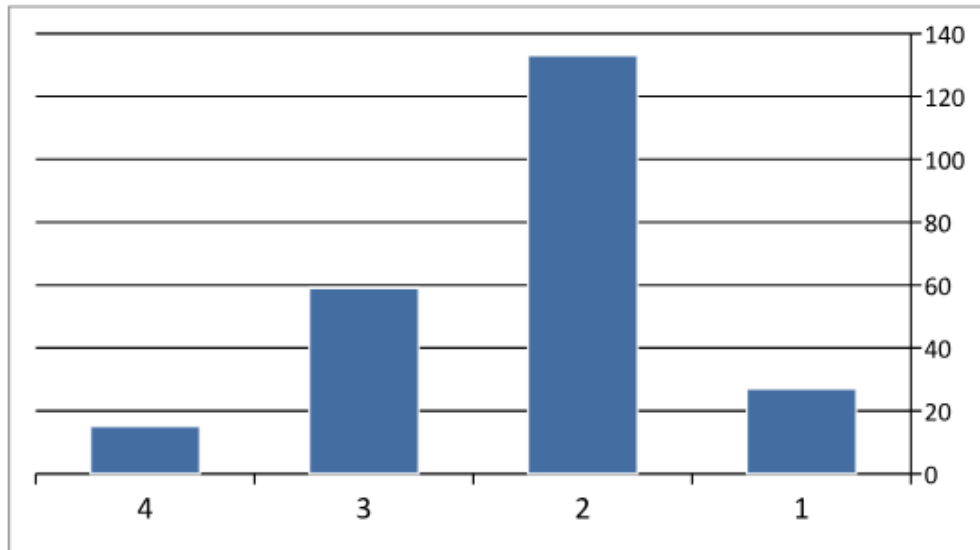
	N	Minimum	Maximum	Mean	Std. Deviation
Age	234	1.00	82.00	34.50	15.34
Vitamin	234	1.00	70.00	17.01	14.47

Table(2): Descriptive Statistics

To more illustration ,the ages divided into four groups (less than 20 yrs., 20 to 30 yrs., 40 to 59 yrs., more than 60 yrs.) respectively. The results of ages groups appeared in Table (3), where the age group (20 to 39) represent the highest percentage (56.8%), whereas the lowest percentage found in more than 60 years. Moreover the percentage of the rest ages group was 25.2% for 40 to 59 years group and 11.5% for the last group. Figure (2) represent these results.

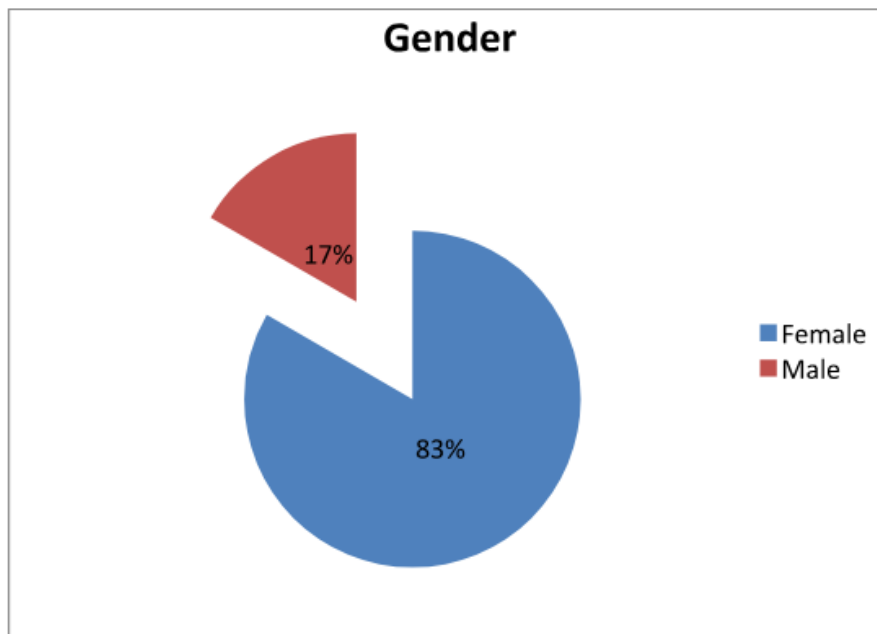
Age	Frequency	Percent	Cumulative Percent
Less than 20 year	27	11.5 %	11.5 %
20-39 year	133	56.8%	68.4 %
40- 59 year	59	25.2 %	93.6 %
More than 60 year	15	6.4%	100%
Total	234	100 %	

Table (3): Percentage of age's groups



Fig(2): bar chart of ages groups

As can be seen in Table (4), the percentage of female involved in this study more than male ,where 83.3% related to female and the percentage of male appeared in 16.7%. We can see that clearly in Figure (3).



Fig(3): Pie chart illustrate gender of patients.

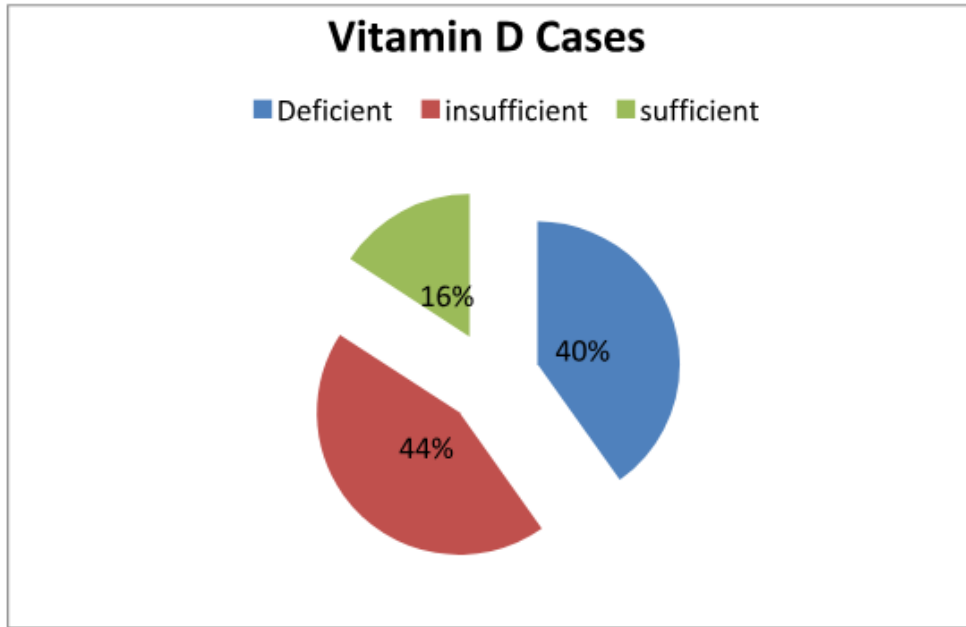
Gender	Frequency	Percent	Cumulative Percent
Female	195	83.3 %	83.3 %
Male	39	16.7 %	100 %
Total	234	100 %	

Table 4: frequency and percentage of gender.

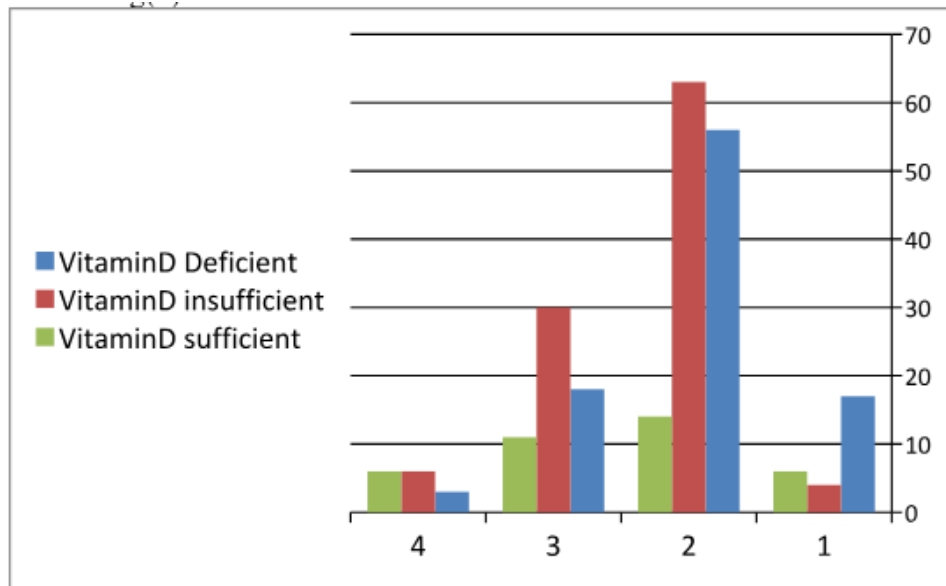
Table (5), focus on most interested point in our work, where the cases divided into three groups depends on the international classification that followed in Benghazi labs. These results appeared clearly in Fig(4), whereas Fig(5), summarize vit. D cases with ages groups.

Vitamin D	Frequency	Percent	Cumulative Percent
Deficient	94	40.2 %	40.2 %
insufficient	103	44.0 %	84.2 %
sufficient	37	15.8 %	100 %
Total	234	100 %	

Table (4): frequency and percentage of vitamin D cases.



Fig(4): Pie Chart for Vitamin D Cases



Fig(5): bar Chart for Vitamin D Cases with Ages groups

		Vitamin	Age
Vitamin	Pearson Correlation (r)	1	0.23
Age	Pearson Correlation (r)	0.23	1

Table (6): Pearson Correlations of vitamin D and age.

Pearson Correlation shows the linear relationship between two sets of data. we can see that, the Pearson's r for the linear correlation between the Vitamin D and Age variables in our results is 0.23. This means there is a weak positive linear relationship(variables were not strongly correlated).

		Vitamin D Cases			Total	
		Deficient	Insufficient	Sufficient		
Age Group	< 20 year	Count	17	4	6	27
		% within Age G.	63.0%	14.8%	22.2%	100.0%
	20-39 year	Count	56	63	14	133
		% within Age G.	42.1%	47.4%	10.5%	100.0%
	40- 59 year	Count	18	30	11	59
		% within Age G.	30.5%	50.8%	18.6%	100.0%
	> 60 year	Count	3	6	6	15
		% within Age G.	20.0%	40.0%	40.0%	100.0%
Total		Count	94	103	37	234
		Percent %	40.2%	44.0%	15.8%	100.0%

Table (7): Age Groups with Vitamin D Cases

Table (7) shows the combination of age groups and levels of vitamin D, as we know that, the level of vitamin D classified into three main categories, sufficient, insufficient and deficiency. we can see clearly the high percentage (%63) of deficient cases appeared in less than 20 years age group, in relative to only 20% with more than 60 years age group. Although the number of people who participated in this study compounds mainly from patients ages between 20 and 39 years, the highest and lowest percentage of vit.D deficiency cases appear in other age groups. These results may be, due to increase the demand of body to Vit.D in these two stages (childhood and adulthood). (The percentage of insufficient cases is nearly the same for all age groups that lie in between(40% to 50% ,(with exception in first age group) less than 20 years) where the percentage of this cases is %14.8. These results indicate to presence unique factors that lead to Vit.D in insufficient amounts among most patients. However, in last cases group the amount of VitD, was in normal range present with small number of peoples with exception found in more than 60 years ages group. This unexpected result might be because, most people in this stage suffer from other chronic disease that have the same manifestation that present in vit. D deficiency

IV. Conclusion

This research considered the vitamin D deficiency among Benghazi population. The number of patients who suffering from Vit.D deficiency was 94 from 234, that is means more 50% of people who is involved in this study have symptoms of deficiency with sufficient or insufficient percentage of Vit.D. Moreover, the results appeared weak linear correlation between the age and Vit.D. This outcome lead us to thinking about increase awareness of people to importance of medical check before taking any medical supplement, and in the same time the importance of treatment the insufficiency cases to prevent deterioration of symptoms and maintain the adequate level of vit.D in normal people. Overall, the prevalence of Vit.D deficiency among Benghazi population was high in Age group less than 20 years, and in female more than in male .

V. Recommendations

To maintain the normal Vit.D level between Benghazi population, we recommended that

- Regular exposure to sun from the born
- Consume the food that contain high percentage of Vit.D .
- Regular screening for Vit.D in individuals at risk for deficiency .
- Consult the physician to discuss any health disturbance before take any vitamin supplement .
- More research is required to recommend screening individuals who are not at risk for deficiency or to prescribe vitamin D.

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IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) is UGC approved Journal with Sl. No. 5012, Journal no. 49063.

Nazik M Ali Hamad "The Prevalence of Vitamin D Deficiency in Benghazi Population." *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)* 13.4 (2018): 36-42.