

Vitamin D Level Status and Diabetes Mellitus among Old Adult Iraqi People in Al Hillah City

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Abstract

Background: Vitamin D has different biological actions in the body . Vitamin D has the pleiotropic effects in multiple organ systems. Vitamin D (vit D) deficiency has been found to have an inverse relationship with the occurrence of type-2 diabetes mellitus (DM). The aim of this study was to assess the vit D level in type-2 diabetic patients.

Objective: To identify Vitamin D level and its correlate with type2 diabetes mellitus among old adults.

Methodology: This was across sectional descriptive observational study included a non-probability (convenient sample) of elders (>65 years both women and men) in Hilla City, Babylon province, the period of the study started from the first of January through August 2019, the sample size was calculated according to the sample size calculation equation with 95% confidence level, 300 elderly people were participated voluntarily in this study after explaining the objective of the study by the researcher, the response rate in this study 100%. This study was approved by the Ethics Committee of College of nursing - University of Babylon, a pretested questionnaire was used to interview the participants after obtaining their verbal consents, the sample included old adults, apparently healthy & not receiving vitamin D supplement, serum level of Vitamin D that made by chemo immunoassay method (maglumi instrument). Data about demographic characteristics, drug uses, number of chronic diseases, as well as measurement of mean blood sugar of each participant were done single handy by the researcher. Blood sugar was measured using electronic system, blood sugar more than 170mg/dl considered diabetes in this study or those who diagnosed previously as diabetes (type 2) and taking anti diabetic drugs. Vitamin D levels are divided into three categories .deficient < 20ng/ml, insufficient between 23-29ng/ml and normal level 30-100 ng/ml ²⁷ . Data were analyzed by using the (spss) package version 23. The chi-square test was used to test the associations between variables. The association considered statistically significant when the P-value is less than 0.05.

Results: The study included 300 participants, most of the study sample had either insufficiency or deficiency of Vitamin D level. Diabetic elders in this study had significant low serum Vitamin D level (both deficiency and insufficiency of vitamin) as compared to healthy group, this difference was statistically significant p<0.05.

Conclusion: There was a significant inverse relationship between vitamin D level and type 2 diabetes mellitus .

Keywords: *Vitamin D levels, Type 2 Diabetes Mellitus, Old adults, Iraq.*

Introduction

Vitamin D(VD) deficiency is globally very highly prevalent, about one billion people are affected⁽¹⁻⁶⁾. About 50% of population in developing countries lack VD⁷. Many factors increase the deficiency of VD

including less sunlight exposure, darkness skin, winter, elderly, use of clothes covering most of the body, female gender, and obesity⁸. Type 2 diabetes is one of the most common non communicable diseases among elders and has become a serious threat to older adults⁹ .

The public health impact of vitamin D deficiency has received attention due to the discovery of associations between low plasma concentrations of VD metabolites and higher risk of several chronic diseases including metabolic syndrome¹⁰. Previous studies have examined the association between vitamin D and type 2 diabetes risk.⁽¹¹⁻¹⁹⁾ However, the result remains controversial.

Several previous studies proved that VD deficiency is highly prevalent in Type Diabetes Mellitus, T2DM⁽²⁰⁻²²⁾. Correlation between VD serum levels and T2DM was studied by few local studies in Iraq, the results of these studies are also conflicting and controversial⁽²³⁻²⁶⁾.

group is the dominant age group, the overall mean age and the standard deviation are 70.44+3.9

Table (2) Means of vitamin D level by gender.

Female	19.5 ng/ml
Male	25.8ng/ml
Male and female	22.5 ng/ml

Table(2) and figure (1) show the frequency distribution of the study participants according to the means of vitamin D level by gender the mean of vitamin D level among females is lower than vitamin D level among males.

Table (1) Frequency distribution of the mean age of the study group.

Parameter	Number	Mean of the Age
65-69 years	168	67 years
70 -74 years	84	73 years
75-80and more	48	78 years
Total	300	70.44+3.9

Table(1) shows the distribution of elders according to their age and mean age of the study groups, 65-69year



Figure (1) Means of vitamin D level by gender.

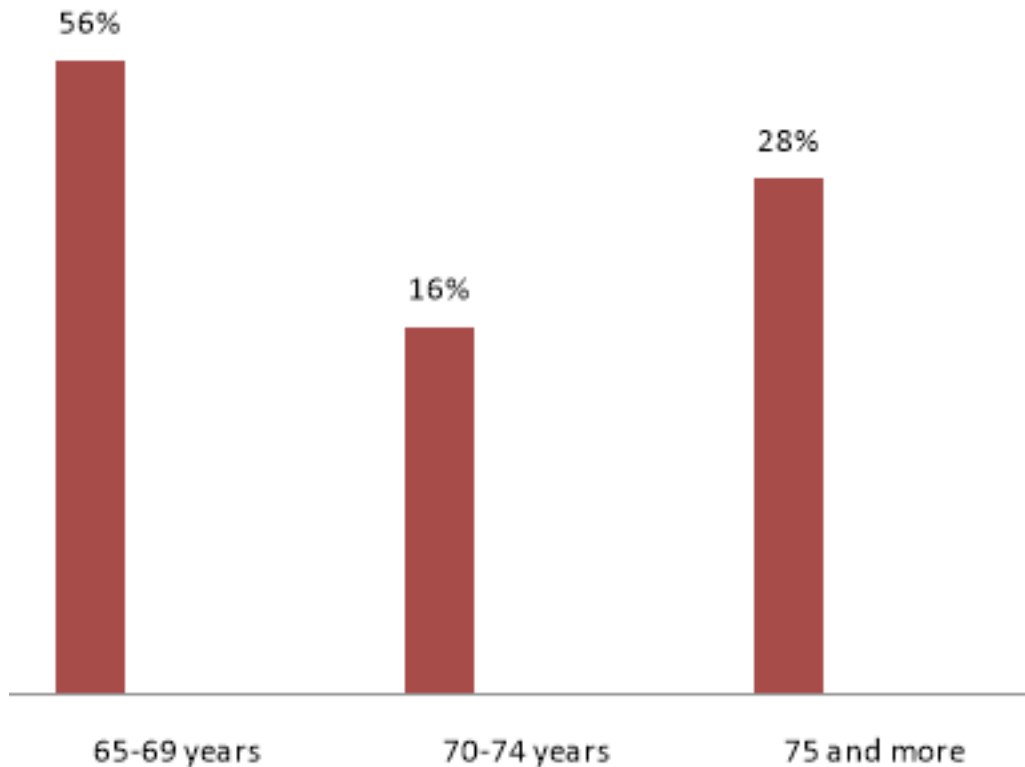


Figure (2): Shows the distribution of the elders according to age group, most of the participants in the age group 65-69years(56%).

Table (3) Association between Vitamin D and Diabetes mellitus among males

Study Variables	Vitamin D level among male					χ^2	P-value
	Deficiency (0-20 ng/ml) N (%)	Insufficiency (21-29 ng/ml) N (%)	Normal (30-100 ng/ml) N (%)	Total	Deficiency Proportion		
Diabetes Mellitus							
Yes	46 (83.6%)	9 (60%)	9 (31%)	55/64	85.9%	57.99	< 0.002*
No	9 (16.4%)	6 (40%)	20 (69.0%)	15/35	42.8%		
Total	55 (55.6%)	15 (15.1%)	29 (29.3%)	70/ 99 (70.7%)			

Table(3) shows that 70.7% of old males have low serum vitamin D level (less than 30ng/ml) most of them with deficient or insufficient level, this table also explains a positive highly significant association between low vitamin D and having high blood sugar (Diabetes) among elderly males chi square =57.99, df=2, p<0.002, there is an inverse relationship between the two variables.

Table(4) Association between Vitamin D and type 2 diabetes mellitus among females

Study Variables	Vitamin D level among females					χ^2	P-value
	Deficiency (0-20 ng/ml) N %	Insufficiency (21-29 ng/ml) N %	Normal (30-100 ng/ml) N %	Total	Deficiency Proportion		
Diabetes							
Yes	100 (83.3%)	21 (60%)	7 (15.2%)	121/128	94.5%	59.11	< 0.001*
No	20 (16.7%)	14 (40%)	39 (84.8%)	34/73	46.5%		
Total	120 (59.7%)	35 (17.3%)	46 (22.9%)	155/ 201=77.1%			

Table(4) shows that 77.1% of old females have low serum vitamin D level (less than 30ng/ml) most of them with deficient or insufficient level, this table also explains a positive highly significant association between low vitamin D and having high blood sugar (Diabetes) among elderly males chi square = 57.99, df = 2, p < 0.002, there is an inverse relationship between the two variables.

Discussion

To our best knowledge this study is the first study in our country that addresses the association between vitamin D status and type 2 diabetes among elderly people for both gender.

In this study, the Vitamin D level status among elders in Al Hillah City and its relation to type 2 diabetes mellitus are assessed among 301 old adults of both gender, females constitute about two third of the study group . The prevalence of low vitamin D serum level is higher among women than in men. the prevalence of Vitamin D Deficiency in the current study is about three quarter among the study group, this high prevalence is similar to that reported by a study conducted by Kara A

and Datta S in India who found that Vitamin D deficiency is significantly prevalent in otherwise healthy old aged population²⁸ .

The Korea National Health and Nutrition Examination Survey reported lower prevalence of vitamin D deficiency (<20 ng/mL) of 47.3% in males and 64.5% in females which is lower than our finding²⁹, but in a nationwide population-based study conducted in Thailand, only 5.7% of the population had a 25(OH)-D level <20 ng/mL³⁰, The prevalence of VD deficiency in this study is higher than that found in a local study conducted in Baghdad on 20 parkinsonism Iraqi patients with mean age 59 years (62.5%) the same study reported that the proportion of VD deficiency was much lower in the control group (27.5%)³¹.

Studies found that there is an increasing prevalence of vitamin D deficiency with age³². In general, elder people are more liable to VD deficiency due to many reasons, not only due to decrease skin production of Vitamin D but also due to decreased sunlight exposure, decreased dietary intake, impaired intestinal absorption, and diminished hydroxylation in the liver

and kidney^(33,34). Our study depicts a strong association between low serum concentration of vitamin D and type 2 diabetes mellitus in both in men and women this finding goes in line with findings of many other studies in different countries⁽³⁵⁻⁴²⁾. However, findings of other few studies disagree with our finding^(43,44).

Conclusion

Results of the current study showed a widespread, severe Vitamin D deficiency specially among women and high prevalence type 2 diabetes mellitus among elders, the study revealed a highly significant association between low vitamin D and having type 2 diabetes mellitus, a large scale public educational campaigns are needed to address this public health problem in our society. We suggest that physicians should keep an eye on the Vitamin D levels of elderly people in order to reduce and control the ever-increasing incidence of type 2 diabetes mellitus.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon College of Nursing and all experiments were carried out in accordance with approved guidelines.

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