

# The relation between Serum Vitamin C and D, Calcium Intake With Obese Type 2 Diabetic Patients

Yasamin Abdul - amer Kadhum<sup>1</sup>; Shaimaa D. Salman<sup>1</sup>, Sabah Abdel- Hameid Abdel- Rahman<sup>1</sup>,  
Najat Sabah A. Hameid<sup>2</sup>

<sup>1</sup>Biology department, faculty of science, Mustansiriyah University, <sup>2</sup>M.B.Ch.B/ Ministry of health/Iraq

## Abstract

This study took place at Al-kindy hospital on 30 men with type 2 diabetes mellitus aged between (35-52) years old and 30 control men aged between (37-48) years old.

In addition, the body mass index, vitamin D and C, serum calcium were measured.

It was noticed that the body mass index increases in diabetic group (28.9 kg/m<sup>2</sup>) in comparison with the control group (24.2 kg/m<sup>2</sup>).

Besides, serum calcium, vitamins C&D showed a significant decrease in diabetogenic patients (7.601mg/ml, 0.61ng/ml,16.48ng/ml respectively)

Compared with the control ones (9.871mg/dl, 1.21ng/ml, 28.104ng/ml respectively)

**Key Words:** *Obese type 2 diabetic patients, antioxidant, vitamin C and D, Serum Calcium.*

## Introduction

Gaining weight is a medical issue that has been expanding over the most recent couple of years because of increment of fast food causing cautions among numerous nations<sup>(1)</sup>.

Vitamin C is viewed as an antioxidant agent, and auxiliary comparability among nutrient C and glucose makes it of enthusiasm for diabetes <sup>(2)</sup>. Oxidation pressure can prompt aggravated glucose digestion and hyperglycemia <sup>(3)</sup>. Along these lines, an advantage of cell reinforcements to counteract diabetes or to accomplish positive outcomes in type 2 diabetes mellitus (T2DM) is organically conceivable.

Vitamin D assumes fundamental job through entire body calcium homeostasis by applying exemplary impacts on the duodenum, bone and kidney <sup>(4)</sup> and modify intracellular calcium singles and in this manner assumes a job in pancreatic insulin discharge and insulin affectability, the two of which identify with Ca<sup>2+</sup> levels. It has potential in the counteractive action of type 2 diabetes mellitus . A job of it in insulin opposition has been considered broadly and Vit.C is nutrient for whom

researchers have shown relationship with high glucose level<sup>(5)</sup>.

The blend of decreased serum 25-hydroxyvitamin D (25[OH]D) and lacking calcium admission has been related with heart and blood vessels hazard factors, for example, hypertension, overweight, metabolic disorder and type 2 diabetes mellitus <sup>(6)</sup>. Vitamin D inadequacy and low calcium administration are accounted for, alittle is thought about the impact of those micronutrients in the avoidance of numerous infections, for example, heftiness <sup>(7)</sup>. Be that as it may, a few examinations propose Ca and vit D admission don't avert nontransferable chronic ailments <sup>(8)</sup>.

Point of this study is to know the impact of vit C and vit D as defensive measures in aversion of obesity and TDM2, and diminish its danger, additionally to think about the part of Ca admission take to diminish the danger of TDM2.

## Material and Method

The study carried out on 30 men diabetic patients aged (35-52) years who visited the specialist center for endocrine and diabetes at Al-Kindy hospital in Baghdad,

and 30 men control aged (37-48) years were included in this study, the study was begun from January,2019 to march, 2019.

The body weights of individuals were measured by balanced and body heights of them were measured

by paper tape. Body mass index was calculated as weight(w) in Kilograms divided by height (H) in meters squared <sup>(9)</sup> with following formula

$$BMI = W/H^2$$

the values for BMI showed in table 1.

**Table 1: measuring of Body weight**

Risk of disease	Body mass index (Kg/m2)	obesity	Weight classification
Low	< 18.5		Under weight
Normal	18.5-24.9		Normal
Increased	25 -29.9		Over weight
High	30-34.9	Obese	Obesity
Very high 35 -39.9		Sever obese	
Extremely high	> 40	Morbidly obese	

Five milliliters of blood were drawn from each patient after (10-12) hours fasting via venipuncture , by syringes between (8-10 A.M), the blood sample was transferred into Gel tubes without anticoagulant serum were separated by centrifugation a 3000 rpm for 10 minutes used for the determination calcium, vitamin C and D.

The normal sufficiency of vitamin D is 10-44 ng/ml. However, the normal value of Ca is 8.5-10.2 mg/dl and to vitamin C is 0.4-1.8 mg/dL.

Table 1: weight classification by body mass index (WHO)

The statistical Analysis system SAS <sup>(13)</sup> program was implied for effect variation factors in study parameters. T-test was used to significant comparability between means.

**Results and Discussion**

The BMI showed highly significant increase (P<0.01) in adiabatic group (30.73) comparison with control group (24.2). Also, the age showed non-significant increase in diabetic group (45.09+2.86) in comparison with control group (44.89+3.21).

Table 2 showed that the diabetic patients BMI with overweight. <sup>(10)</sup>.

**Table 2. The means of Age and BMI in diabetic and control groups.**

Groups	Mean + SD	
	Body mass index (Kg/m2)	Age group (year)
Control	44.89+3.21	24.2±0.87
Diabetic	45.09±2.86	28.9+1.21
T- test	0.29 NS	3.23
P-value	0.623	0.0005

NS=non significant \*\*P<0.01

Overweight<sup>[10]</sup> demonstrated that the most reduced danger of diabetes happens in people who have BMI under 21, expanding frequency of T2DM predominance was been found when obesity levels expanded . Nevertheless, abundant fat tissue adds to a chronic diseases, the use of unsaturated fats decreasing the utilization of glucose as a cellular vitality weight <sup>[11]</sup>.

Despite the fact that age did not indicate noteworthy distinction among diabetic and control (Table 2). Expanded concentration of free fatty acids in blood builds glucose formation, and this will restrain insulin that takes apart in glucose take-up <sup>[12]</sup>.

Obesity is viewed as a general medical issue that has been progressively arriving at disturbing extents in all districts of the world<sup>[1]</sup>.

Table 3 shows the changes in calcium, Vitamin D and Vitamin C, Calcium level was increased significantly (P<0.01) in control group 9.871 mg/dl compared with diabetic group 7.601 mg/dl.

Furthermore, the data were showing significant (P<0.01) elevation of vitamin D in control group (28.104 ng/ml) with the diabetic group (16.48 ng/ml). On the other hand, vitamin C was increased significantly (P<0.01) in control group (1.21mg/dL) compared with diabetic group (0.61mg/dL).

**Table 3. Levels of Calcium, Vitamin D and Vitamin C (Mean± SD) in control and Diabetic Groups.**

Groups	Mean ± SD		
	Calcium(mg/dl)	Vitamin D (ng/ml)	Vitamin C (ng/ml)
Control	9.871±0.862	28.104±3.572	1.21±0.053
Diabetic	7.601±0.973	16.48±4.104	0.61±0.035
T- test	1.283**	6.218**	0.42**
P-value	0.001	0.0052	0.001

\*\* P<0.01

It is accounted for that 1.25 (OH)2D3 can control insulin emission out of pancreatic β-cells <sup>[14]</sup>. Quick increment in intracellular calcium [Ca<sup>2+</sup>], triggers insulin discharge. The job of 1.25(OH)2D2 in insulin emission gets from its impacts on Ca<sup>2+</sup>deluge assembly and buffering in pancreatic β-cells <sup>[15]</sup>.

Moreover 1.25(OH)D3 has a significant job in the guideline of cell Ca<sup>2+</sup> signaling that is connected to cell reactions, signaling and secretion<sup>[16]</sup>. Supported Ca<sup>2+</sup>sign activated by 1.25(OH)2D2 inquired about to the guideline of apoptosis a procedure that can decide cell passing in diseases , for example, obesity and type 2 diabetes <sup>[17]</sup>.

Besides, 1.25(OH)2D3 induces Ca<sup>+2</sup> signals (Ca<sup>+2</sup> motions) can manage insulin discharge from pancreatic β-cells [18]. Vitamin D status has been connected to insulin resistance and T2DM in observational studies<sup>[19]</sup>

The complete calcium substance diminished in clear human lens between 18-55 years, it at that point expanded with age between 55-75 years <sup>[20]</sup>.

Lack of 25-hydroxy vitamin 25(OH)D3 has been described as value of (20ng/ml) and has been perceived as a reason for childhood rickets and adulthood osteomalacia since the mid nineteenth century. Extreme insufficiency has been characterized as under 10ng/ml (25nmol/l) over the most recent 40 years, observational examinations have connected 25(OH)D lack to the advancement of chronic conditions including cardiovascular diseases and diabetes mellitus <sup>[21]</sup> . Vitamin D inadequacy is related with diabetes mellitus in elder working adults <sup>[22]</sup>.

Vitamin D dissolve in fats actually, while vitamin C liquefy in water. Vitamin C is a cancer prevention agent and the auxiliary similitude between nutrient

C and glucose makes it of enthusiasm for diabetes [23]. Oxidative pressure can prompt disturbed glucose digestion and hyperglycemia [24;25]. Subsequently, an advantage of cancer prevention agents to counteract diabetes or to accomplish positive results in T2DM is organically conceivable. Inadequacy of vitamin C brings about blemished development of collagen and connective tissues in the skin, ligament, dentine, bone and blood, vessels, patients with diabetes should all get dietary guidance about good dieting and vitamin C dietary sources, including crisp leafy foods, the prescribed a dietary admission of the vitamin C is 45mg every day for grown-ups, vitamin C levels are lower among individuals with T2DM and not totally clarified by a distinction in dietary vitamin C consumption, various systems fundamental the abatement in vitamin C levels and expanded necessities in T2DM have been proposed expanding endogenous degree of vitamin C and D can be accomplished by dietary modifications<sup>[26]</sup>.

### Conclusion

Vitamin D and C along with calcium are essential protective micronutrients to reduce and control type 2 diabetes mellitus especially in those suffering from obesity. Doctors should recommend a diet rich with those elements.

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