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Research Article

Comparison of hemoglobin and vitamin D3 parameters in men with type 2 diabetes

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Abstract:
Type 2 diabetes mellitus (T2DM) has become a significant global health care problem and its reported incidence is increasing at an alarming rate. Our study was conducted from December 2023 to April 2024 and the aim of the study is to a levels hemoglbin and vit d3 for men only in Najaf Governorate / Iraq withType 2 diabetic males and compared to healthy controls. The number of samples was 258 subjects (one hundred and fifty-two T2DM patients and ninety-six healthy controls). Ages Participants (20-60 years) showed that in general there is no significant difference, between the ages of patients and healthy people. When measuring the criteria for the studythe results showed that the hemoglobin level was within normal limits for both groups and did not constitute any significant difference at P-Value less than 0.5, for all ages. As for vitamin D3, there was a very slight increase in the control group, but it did not constitute any significant difference. Whatever the cause or result must be randomized controlled larger studies, which research the relation between diabetic regulation and vitamin D3 and hemoglobin levels.

Keywords: Type 2 diabetes mellitus (T2DM), Vitamin D3, Hemoglobin

Introduction

The prevalence of diabetes (DM) has increased significantly, mainly as a result of continuous rise in the incidence of type 2 DM. According to World Health Organization statistics, >422 million adults globally were suffering from DM in 2014 and a continuous rise in DM prevalence is expected [1]. Type 2 diabetes mellitus (T2DM) is the main source of morbidity and mortality around the world [2]. The high incidence of diabetes mellitus has resulted in a substantial economic and social burden worldwide. Preventing and treating DM has become a top public health priority in many countries [3]. In T2DM, dysfunction of beta cells in the pancreas leads to

decreased insulin release, which is insufficient to maintain normal glucose levels [4]. In addition, insulin resistance contributes to decreased glucose uptake in muscle and adipose tissue and increased glucose production in the liver at a specific insulin level [5]. T2DM is caused by insulin resistance and beta cell dysfunction. Anemia is a common clinical It is mostly defined according to the World Health Organization criteria as a hemoglobin value <12 g/dL in women and <13 g/dL in men [6]. Anemia is an important public health problem that negatively affects health of individuals and economic potential of populations [7] and is most commonly caused by iron deficiency [8]. In children, women and the elderly, iron deficiency anemia is an important health concern. It is also common in kidney disease [9] . Vitamin D3 is essential for calcium and bone balance [10]. Humans depend heavily on photosynthesis caused by ultraviolet rays from the sun for vitamin D, as well as on foods, as few of them contain vitamin D [11][12]. and having significant beneficial effects and an important macronutrient component in the prevention of diseases and reducing the risks of cardiovascular disease, stroke, heart failure [13] .This study aimed to evaluate the relationship and comparison of vitamin D3 and blood hemoglobin levels in men with type 2 diabetes with healthy controls.

Materials and Methods

Ethical Consideration

It was approved by the Institutional Ethics Committees of the College of science at the University of Kufa and the Scientific Committee for Research in the Health Department of Najaf.

Patients

The study was conducted from December 2023 to April 2024, and was designed as a comparative study in 258 male subjects (one hundred and fifty-two T2DM patients and ninety-six healthy controls). WHO attended the Diabetes and Endocrinology Center at Al-Sadr Teaching Hospital in Najaf. Ages Participants (20-60 years) All patients were diagnosed by specialist physicians as having T2DM. Determine the study indicators: Randomized blood glucose RBS and glycated hemoglobin (HbA1C) estimation were performed. In addition to blood hemoglobin HB and vitamin D3.

The inclusion criteriaand exclusion criteria

The inclusion criteria: Type 2 diabetic males were diagnosed with diabetes on the basis of WHO criteria and taking antidiabetic drugs.Has been excludedinvolve Those who are suffering from acute or chronic diseases and subjects taking insulin and smoking.

Statistical analysis

SPSS statistical package version 26 was utilized to conduct a data analysis.P-value less than 0.05 considered significantly [14]

Results

The study, which included men only, and as shown in Table 1, showed that in general there is no significant difference, with a p-value of 0.646, between the ages of patients and healthy people. When the age is divided into two groups (20-40 years) and (41-60 years), and as shown in Figure 1, we notice that the second group is The highest prevalence is 72% and 77% for healthy and patients, respectively. When measuring the criteria for the study, as shown in Table 2, the results showed that the hemoglobin level was within normal limits for both groups and did not constitute any significant difference at P-Value less than 0.5, which was 0.071, for all ages. As for vitamin D3, there was a very slight increase in the control group, but it did not constitute any significant difference (0.913).

Table 1. Study group depending on age

Age - years	Healthy Controls (n=96)	T2DM patients (n=152)	P-Value
(20-60) (mean ±SD)	45.68 ± 10.55	44.96± 9.74	0.646
(20-40) years NO. (%)	29 (27.6 %)	35 (23%)	-----
(41-60) years NO. (%)	67 (72.4%)	117 (77%)	-----

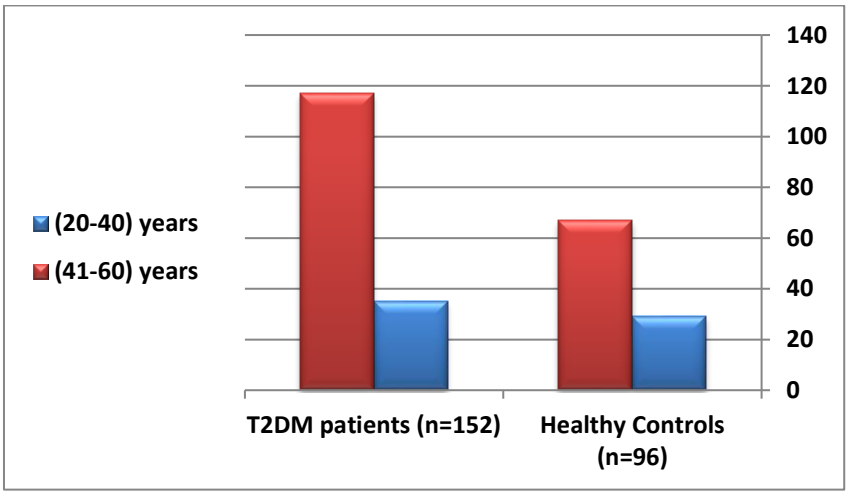

Figure 1. Comparison between study samples depending on age groups

Table 2. Biochemical and Hematological parameters of study groups

Study parameters (mean ± SD)	Healthy Controls (n=96)	T2DM Patients (n=152)	P-Value
RBS (mg/dL)	94.85 ± 1.16	228.1 ± 14.67	<0.001***
Vit D3 (nmol/L)	23.274 ± 0.73	22.788 ± 0.62	0.913
Hb (g/dl)	14.93 ± 0.27	13.073 ± 0.21	0.071
Study parameters (mean ± SD)	**Healthy Controls (20-40) years (n=29)**	**T2DM Patients (20-40) years (n=35)**	**P-Value**
RBS (mg/dL)	96.475 ± 2.31	200.483 ± 12.02	<0.001***
Vit D3 (nmol/L)	23.146 ± 1.39	22.288 ± 126	0.60
Hb (g/dl)	14.52 ± 0.53	12.88 ± 0.44	0.16
Study parameters (mean ± SD)	**Healthy Controls (41-60) years (n=67)**	**T2DM Patients (41-60) years (n=117)**	**P-Value**
RBS (mg/dL)	94 ± 1.35	238 ± 18.55	<0.001***
Vit D3 (nmol/L)	23.341 ± 0.89	22.869 ± 0.66	0.887
Hb (g/dl)	14.33 ± 0.32	13.13 ± 0.23	0.213

Discussion

Diabetes continues to be a major contemporary epidemic [15]. In this study, only men were targeted, with specific ages from 20 to 60 years, and for both groups, patients and healthy ones, due to the fact that the studies focused on one group rather than the other. In many studies related to type 2 diabetes, samples were taken randomly in terms of gender and age, as in studies [16] [17]. [18]. Ages younger than 20 were also excluded because ages below this year did not have the physiological and structural formation of the body complete [19]. Ages over 60 were also excluded due to the weakness of some organs to function, or the nature of their work or lifestyle may differ from ages younger than them. [20]. Type 2 diabetes may have effects on blood parameters, hormones, and important vitamins in the body [21][22], but in this study, after comparing the hemoglobin level, it was found that there is no significant difference between the groups studied, and this contradicts what was found, and the reason may be due to the age group that was taken. In the study, or perhaps because of the exclusion of some groups suffering from other diseases in addition to diabetes, especially blood diseases, which play an important role in the percentage of

hemoglobin [23], or who have a defect or disease in a specific organ, such as the liver [24]. Sometimes there is an increase in hemoglobin for diabetics, but I think that It is caused by the disease, perhaps due to the nature of the food, which diabetics often prefer healthy foods [25] or because they use special medications to increase iron in the body [26]. As for vitamin D3, its results were all lower than the normal values, which are 30-100, as indicated [27]. I believe that the reason is the lack of sufficient exposure to sunlight, which plays an important role in vitamin D3 metabolism [28][13]. When comparing its percentage between diabetes and healthy people, the result was that there was no significant difference with a BValue of less than 0.005 The relationship between vitamin D deficiency and with type 2 diabetes is not completely understood [29]. Therefore, according to our the study, type 2 diabetes has no relationship to a decrease or increase in vitamin D3 levels, but it differs with other study vitamin D3 levels measured were lower in diabetics, particularly in females ($p < 0.001$) [30]. Low vitamin D3 levels may be a consequence of even worse metabolic control of diabetes [31]. It is concluded from the results of this study that type 2 diabetes does not affect vitamin D3 and hemoglobin in the blood, provided that the patient has an average age of 44.96±9.74 in addition to being safe from all diseases that have a role or impact on these standard.

Conclusions

In Iraq - Najaf Governorate - the results of the current study indicated that there are no significant differences in the levels of hemoglobin and vitamin D among male patients with type 2 diabetes when compared with healthy controls.

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