

Association Between B12 Concentration and Obesity among Adults in Iraq

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Abstract

We provide a clinical use for B12, particularly in the identification of obesity. This study was carried out to precisely predict or identify an increase in vitamin B12 in obese persons. This study analyzed a total of fifty cases, including 25 overweight or obese patients and 25 people control. The patients ranged in age from 20 to 40 years. Obese research participants' patients' B12 levels and Body Mass Index were computed. This study also found a connection between BMI and B12. The findings showed that the participants had a wide range of BMIs, with 35% of them being normal weight, 15% being overweight, 15% being obese, and 25% being extremely obese. Additionally, compared to other groups, participants in the study who are obese have a statistically significant increase [p 0.05] in serum B12 level, and this marker has a positive correlation with BMI. These findings demonstrate that in obese individuals, higher plasma levels of vitamin B12. A serum B12 level and this marker have a positive correlation with BMI. These findings demonstrate that in obese individuals, higher plasma levels of vitamin B12 may act as an independent marker of obesity.

Keywords: vitamin B12, BMI, obesity, body mass index, Cobalamin

1. Introduction

Type 2 diabetes and cardiovascular disease incidence and prevalence have rapidly increased over the past 20 years, making obesity one of the most spread chronic diseases in the world [1]. Overweight and obesity affect an estimated 2.1 billion people worldwide, and the condition has been called a pandemic.[2] Several variables, such as family's story and absence of exercise, contribute to the rise in obesity, but the main one is excessive calorie intake the man is gluttony.[3] Numerous studies have investigated the connection of vitamin B12 deficiency with obesity.[4] The water-soluble vitamin cobalamin, also known as vitamin B12, serves as a coenzyme, it aids in the production of red blood cells and maintains healthy a functioning nervous system. Human beings, we know obtain vitamin B12 through diet and gut microbial production [5]. Since the human body is unable to produce vitamin B12, it must only be obtained through diet. Meat, eggs, fish, and milk, they are the main sources of vitamin B12[6].

2. Materials and Methods

The investigation was conducted in The Artificial Kidney Unit of Al-Kafeel Hospital in the province of Karbala. We examined a total of 50 individuals, including 25 patients who were overweight and 25 who were normal.

Note: we mention the patients or control group do not receive any medications that contain or change the pharmacodynamics or pharmacokinetics of vitamin B12

2.1. Study Design

Patients with chronic renal failure receiving hemodialysis treatment we taken from the samples that were analyzed. The ages of the patients range from 20 to 40. Some patient under the study had smoking, vaccinated with COVID 19 and all patient affected with COVID19. The ages of patient range between (20-40 years).

2.2. Collection of Blood Sample

Serum was taken from the blood, Blood was left at room temperature for 10 minutes for clotting, centrifuged 6000 rpm for 15 minutes, and then serum was separated and freezing at -80 °C until time for performed the laboratory analysis for study.

2.3. Determination of BMI

The weights & length of patients were evaluated in light indoor clothing by the use of well-calibrated digital weight and height scale measuring device, body mass index was measured by dividing weight in kilograms by the square of the height in meters as in the equation: $BMI = \text{weight (kilograms)} / \text{height (meters)}^2$.

2.4. Determination of Blood b12 concentration

Using a Mindray CL-900, B12 levels in the serum were evaluated. We measured vitamin B12 and recorded the values in tables, which we used in the statistical process to obtain the final results.

2.5. Statistical Analysis:

The data were statistically analyzed using SPSS, Version 26 of the Statistical Package for the Social Sciences program. In a comparison of the subdivided groups in the measured parameters, a Pearson correlation and multivariate Analysis of variance (ANOVA) were utilized. was statistically analyzing is significant: $p < 0.05$.

3. Results:

Clinical Characteristics of Study Subject:

In this study the comparison was complete.

As can be seen in Table (1), patients' BMIs have significantly increased when compared to the healthy group.

The age difference between the sick and control groups is non-significant.

Table 1: Comparison of patients and control group clinical features

Clinical characteristics	Mean \pm SE	
	<i>Patient Number=25</i>	<i>Control Number =25</i>
Age (years)	24.300 \pm 0.858	24.100 \pm 1.0
BMI (kg/m ²)	29.399 \pm 1.72*	18.90 \pm 0.3055

*** P < 0.05 is significantly significant with the control group**

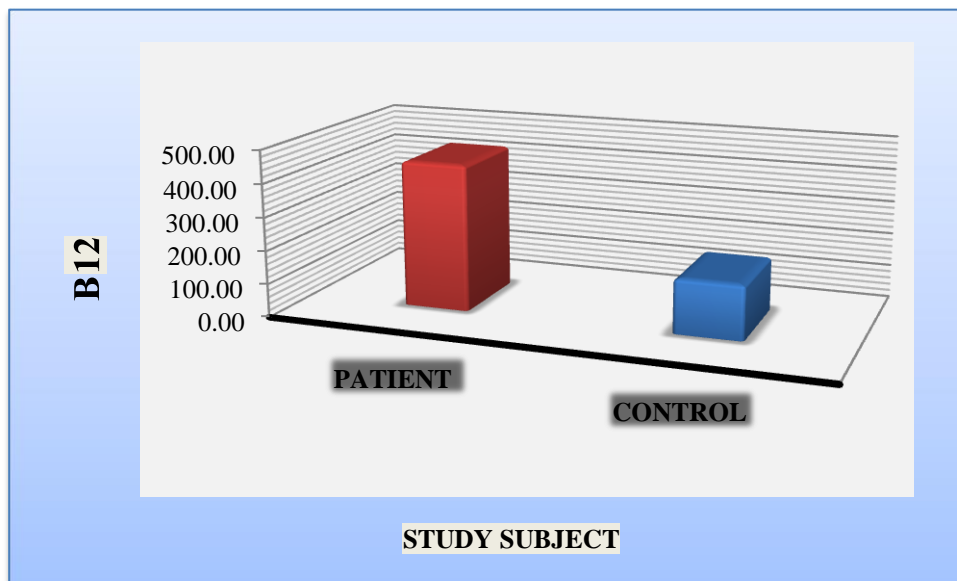
3.1. Biochemical concentration

B12 levels in patients are much higher than in the healthy group, as illustrated in Figure (1).

Many studies in recent years have shown a low level of B12 among the population of Iraq. Our study confirms that obesity restores balance to B12 levels in the serum.

**Comparison of the B12 (mg/dl) between Groups of Patients and healthy group
statistically significant with the control group**

3.2.



Correlation

We note that the relationship between vitamin B12 and BMI is linear, meaning that every increase in B12 level corresponds to an increase in BMI.

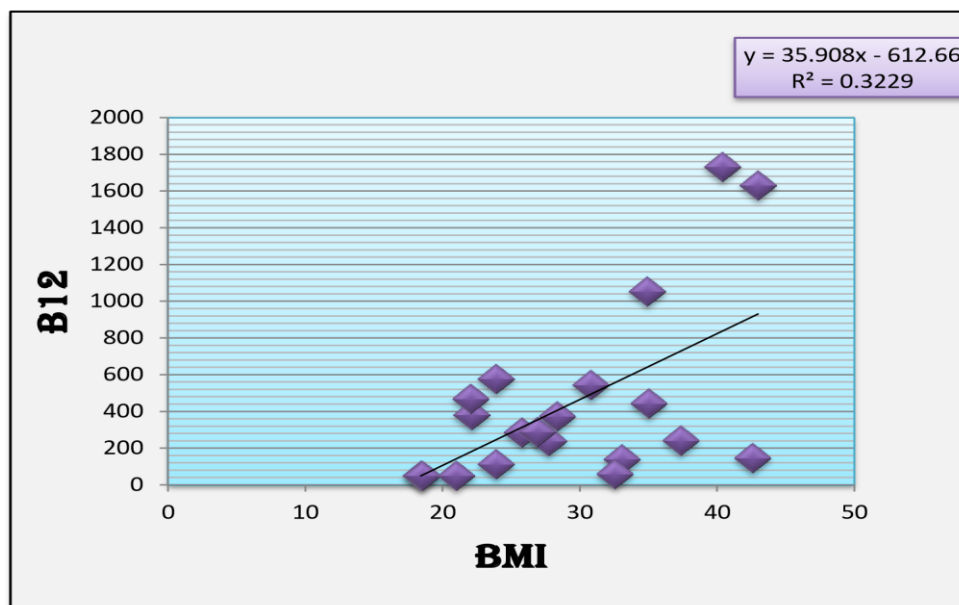


Figure 3: Correlation between the vitamin B12 and BMI

4. Discussion

In people whose B12 levels have been measured, elevated levels over the upper reference range are typical. The prevalence ranges from 1.2% to 18% [7,8] depending on the study population and cutoff values for defining elevated B12 levels. Increased plasma levels of B12 were associated with a higher 1-year cancer risk than normal B12 levels in UK patients seen in primary care, indicating that some cancers may affect B12 metabolism [9]. revealed that obese children and adolescents had a risk of poor vitamin B12 level that was more than fourfold, increased. In accordance with data from the based on populations Canadian Health Measurement Survey [10], A 4%–24% drop in vitamin B12 is linked to vitamin B12 malabsorption in adults, which affects 10%–30% of metformin users [11]. Even after a thorough adjustment for all known sources of high B12, an abnormal elevation of B12 was still substantially linked to the existence of a solid malignancy. For nonmetastatic tumors, this connection was substantial, but it was more pronounced for metastatic malignancies. After accounting for liver disorders, we were unable to substantiate the connection of increased B12 with liver malignancies, in contrast to the findings of registries' research. The most often associated metastatic lesions with elevated B12 levels were those to the pancreas, colon/rectum, lungs, prostate, urothelium, bone, and liver [12].

How the underlying malignancy can result in elevated plasma B12 levels is not fully understood. The only two substances to which circulating B12 is linked are haptocorrin and transcobalamin. By altering the concentrations of these B12-binding protein molecules, which in return results in increased plasma

B12 levels, the malignancy may have an impact on B12 metabolism [15, 16]. Obese children had reduced vitamin B12 levels, according to recent studies [17, 18]. According to Macfarlane et al.'s research [18], B12 insufficiency was more common in children aged 6 to 19 than it was in youngsters of average weight. So, even though the initial abnormality in this case is not a vitamin B12 deficiency, a functional vitamin B12 shortfall with an increase in homocysteine and/or Methyl malonic acid levels can still happen [20, 21]. In addition to that method, functional shortage may also result from the injured liver's inability to absorb cobalamin through the blood as well as from total vitamin B12 leaking to the plasma from the liver tissue [19–22].

The result in question lined up with the other. In both industrialized and developing nations, According to a 2013 study by Pietrement et al., women are allegedly more inclined than men to be overweight or obese [23, 24]. This trend can be seen in the prevalence of obesity (which affects 15% of women and 11% of men worldwide) and overweight obesity (which affects 40% of women and 39% of men) [40]. Research indicates that women are more vulnerable to the effects of obesity compared to males [25, 26]. It has been proposed that several of the evolutionary causes of this sensitivity may be explained by a biological predisposition of women to retain more fat, have larger adipose depots, and have a greater total proportion of body fat than men [27]. Women of reproductive age are much more likely to be overweight or obese due to general weight growth throughout childbearing years, prenatal weight gain and retention, and unfavorable lifestyle risk factors both during pregnancy and after delivery [28]. Although there was no noticeable sex difference, adolescents with serum vitamin B12 concentrations of 221 pmol/L had higher BMI z-scores, which was consistent with previous research. Reduced vitamin B12 concentrations in the childhood obesity population are thought to be caused by inadequate nutrient intake from a nutrient-poor diet, recurrent short-term restrictive diets, and/or increased nutritional requirements due to increasing growth and body size [29].

The new study supports other studies that show B12 content rises when BMI rises [30]. The second research showed that patients with obesity had lower vitamin B12 concentrations and that these levels were negatively associated with BMI [31]. Our findings are in line with some earlier research that found an inverse relationship between serum vitamin B12 levels and obesity.

5. CONCLUSIONS

- These results imply that elevated plasma levels of vitamin B12 may serve as independent predictors of vascular dysfunction in obese people.
- Female patients had higher B12 levels than the male group did.
- We would want to conclude that there is a beneficial relationship between B12 and patient BMI.
- B12 is utilized as an indicator of stress and obesity, and it can also be used to forecast the possibility of inflammation.

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