

The effect of vitamin d3 supplementation



Research background

As observed in European and North American communities, levels of obesity in the Saudi Arabian population are on the increase. The epidemic of obesity has been described as the fastest-growing public health challenge in a number of countries. The cost implications alone from the treatment of people with obesity have put a strain on the medical services. One such example is published in an American study in 2008, which showed that that \$147 billion needs to be spent every year in America for the management of obesity and obesity related disease. This figure was double of what it was a decade ago.

Obesity is a term used to indicate excessive deposition of fat in the body. As mentioned before, it is the most common nutritional disorder in developed countries, and is as well significantly rising in the developing countries such as Saudi Arabia. This can be evidenced from the data reported by the Saudi National Nutrition Survey published on WHO (Health Journal, 2007). Recent studies have found the insufficient level of vitamin D in obese people (Turner, et. al. 2013; Wortsman, et. al. 2000). Although the specific mechanism that results in this shortfall is not yet fully understood, but Turner, et. al. (2013) suggested that the deposition of vitamin D3 in body fat compartments results decreased bioavailability of vitamin D3 from cutaneous and dietary sources. In addition, it has been proposed that intestinal absorption of vitamin D is reduced in patients with obesity (Wortsman, et. al. 2000). Lack of absorption of vitamin D weakens the calcium metabolism in patients with obesity; this in turn, affects the function of the thyroid glands. Altered

thyroid gland can no longer perform its physiological roles, one of which is to activate vitamin D in the body.

Moreover, studies have reported low level of 25-hydroxyvitamin D concentrations in obese adults and are linked to increased body fat mass, suggesting the association between low circulating concentrations of vitamin D metabolites and obesity. (Rock, et. al. 2012; Boqacka, et. al. 2011).

Furthermore, it has also been reported that after absorption in the intestine, the storage of vitamin D occurs in adipose and muscle tissue, which then slowly releases into the blood stream. Defect in this storage system or pathway may result the deficiency of vitamin D and may have an impact in determining the level of body's fat and adipose tissue (Salehpour, 2012). Hence, it is believed that the deficiency of vitamin D may induce obesity.

Research aims

Having reviewed the available literature in the subject, this research project is therefore aimed to:

Investigate the effect of vitamin D3 supplementation in healthy, overweight and obese women of Saudi Arabia

Investigate the effect of vitamin D3 supplementation on body composition in overweight and obese women of Saudi Arabia

These aims were targeted with the views to providing evidence regarding the association between vitamin D supplements and obesity. Saudi population were given the preference as the prevalence of vitamin D

deficiency, as well as of diabetes in Saudi Arabian population is very high (Ardawi, et. al. 2012).

Research methods

Female population between the ages of 18 and 50 will be studied. In a double-blind, placebo-controlled trial, 2 groups will be randomly given a vitamin D3 supplement or a placebo (control group) for 12 weeks.

Comparison of the levels of vitamin D3 in three different groups of people, healthy, overweight and obese will be done with an aim to measure its implication in these people. After this, analysis will be done measuring different factors that are associated with obesity.

Inclusion and exclusion criteria

Old, healthy, overweight and obese Saudi women participants with BMI ≥ 25 kg/ and ages between 18-50 years will be included for the study. Healthy participants will be free from metabolic bone disease, diabetes mellitus, cardiovascular disease, renal disease and will not be on any medication, or vitamin supplements. , pregnant or lactating women will be excluded from the study. In addition, individuals with changes in body weight more than 3 kg within last three months prior to the experiment will also be excluded from the study. Finally, the participants who follow the weight-loss programs or are taking weight loss drugs and smoking will be excluded from the study.

Research intentions

To address the aims, this study is based upon the following research intentions. These will be tested in the laboratory.

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Assessment of body fat mass and fat free mass by bioelectrical impedance analysis at baseline and end of study

Assessment of energy and nutrient intakes by 24hfoodrecall and validated food frequency questionnaires, which will then be analyzed for nutrient intake

Analysis of blood serum 25(OH)D and parathyroid hormone at baseline and end of study

Measurement of vitamin D level in the participants' blood to determine the fluctuation in its level and its affect.

Measurement of vitamin D levels of obese and healthy weight participants to establish the difference in the level of vitamin D in these two groups of people.

Measurement of vitamin D post digestion to determine the amount of ingested vitamin D to show their fluctuationsbefore and after ingestion in the participants of different groups.

To conclude, the main aim of this study will be to investigate the effect of Vitamin D3 supplementation on body fat mass in healthy, overweight and obese Saudi women. The association between vitamin D deficiency and obesity is well established. Obesity still remains one of major health challenges. Despite of intense research, the exact cause of obesity still remains obscure. Both genetic and environmental factors have been reported to be associated with obesity, but none of them completely illustrate the mechanism behind it. But recently, the link between vitamin D3 and obesity has gained some interest. Since obesity is associated with many pathological conditions including cancer and cardiovascular disease,

unraveling the potent cause and mechanism of obesity will provide insights into the development of promising therapeutics for obesity and obesity related diseases. Also, in the future,

References

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