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Metabolic antioxidant status in obese individuals

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ABSTRACT

To assess the level of metabolic antioxidant-uric acid in obese individuals. Obesity is the major health problem worldwide. This condition leads to the development of or causative factors for the many other disease conditions like cardiovascular disease, chronic renal failure, diabetes mellitus and so on. Many metabolic products are synthesized in this condition may prevent or proceed with the disease condition. So, the current study aimed to assess the one of the metabolic product- uric acid level in obese individuals. 20 age and sex-matched healthy individuals with BMI (19.9-24.9), 20obese individuals were selected from those attending the outpatient department of Saveetha Dental College, and hospitals. Informed consent was obtained from the patients before sample collection. 5 ml of venous blood was collected in plain collection tubes and centrifuged in 3000 rpm. Then serum was separated andanalyzed to estimate the Serum Uric acid by Uricase method using ERBA CHEM 5 plus analyzer. Mean BMI and Uric acid level of the control group were 21.89±1.87 and 3.57±0.9 respectively. Mean BMI and Uric acid level of the study group were 37.13±5.13 and 6.0±1.28. There is a significant difference between these two groups with the p-value of 0.0001. The data of the present study suggested uric acid level was increased in obese individuals.

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INTRODUCTION

Obesity is nowadays most prevalent worldwide in the developing and in the developed countries for the past three decades. Obesity can be explained as a medical condition in which the excess body fat has been accumulated (Vunnam Sri Sai Charan, 2004). People are considered as obese when their body mass index (BMI) is above 30 kg/m2. Obesity is most commonly caused by a combination of both excessive intake of food and lack of physical activity, and in some cases, it may be due to genetic susceptibility (Yazdi *et al.,* 2015). A few cases of obesity are caused primarily by the genes or endocrine disorder or mental disorder (Bleich S *et al.,* 2008). Obesity may lead to several risks in the physical and mental conditions. Obesity may lead to several conditions particularly like the obstructive sleep apnea, osteoarthritis, asthma, cardiovascular diseases, diabetes mellitus, and even sometimes to cancer. Thus obesity may increase the mortality (Haslam DW, James WP, 2005). The major pathogenesis behind obesity and its complication is oxidative stress status. The oxidative stress is defined as the excessive production of reactive oxygen species (ROS). These ROS favour the development of insulin resistance and metabolic syndrome via deregulation of adipokines and pro-inflammatory cytokines (Bonnefont-Rousselot D, 2014). The human body has an excellent defence mechanism to reduce the production of ROS which is called antioxidants (Lobo V *et al.,* 2010). The antioxidants can be divided into two groups enzymatic and non-enzymatic antioxidants. Enzymatic antioxidants includes superoxide dismutase (SOD), glutathione

peroxide (GPx), catalase (CAT). The non-enzymatic antioxidants include glutathione, vitamin C, vitamin E, carotenoids, uric acid, albumin, bilirubin and so on. (Elisa Couto Gomes *et al.,* 2012). Among this uric acid is an important metabolic antioxidant. Uric acid is a final waste product of purine metabolism in humans (Zohreh Soltani *et al.,* 2013). The main physiological function of uric acid is a strong reaction oxygen species and peroxynitrite scavenger and antioxidant (Glantrzonis G K *et al.,* 2005).

So, the present study aimed to assess the level of metabolic antioxidant-uric acid in obese individuals.

MATERIALS AND METHODS

40 Patients were selected from those attending the outpatient department of Saveetha Dental College, and hospitals and divided into two groups as follows

Group I – 20 age and sex-matched healthy individuals with BMI (19.9-24.9)

Group II – Obese individuals – 20 individuals

Inclusion Criteria

Healthy individuals

Obese individuals with BMI gt; 30

Exclusion Criteria

Persons with other systemic illness like cardiovascular disease, renal failure, Stroke, endocrine illness.

Persons with an acute illness like a fever.

Immunocompromised persons.

Chronic alcoholics, Smokers

Sample collection

Informed consent was obtained from the patients before sample collection. 5 ml of venous blood was collected in plain collection tubes and centrifuged in 3000rpm. Then serum was separated and analyzed to estimate the Serum Uric acid by Uricase method using ERBA CHEM 5 plus analyzer.

RESULTS AND DISCUSSION

All the data were analyzed using SPSS software. Student t test analysis was done to find out significant differences between the two groups.

Mean BMI level in control and study group was 21.89±1.87 and 37.13±5.13 respectively (Table1, Figure1). Mean Uric acid (UA) level in control and study group was 3.57±0.9 and 6.0±1.28 respectively (Table1, Figure2).

Table 1: Mean, SD, p Values of BMI and Uric Acid level in two groups

Parameters	Control	Obese individuals	p-value
BMI	21.89±1.87	37.13±5.13	<0.001
Uric Acid (mg/dl)	3.57±0.9	6.0±1.28	<0.001

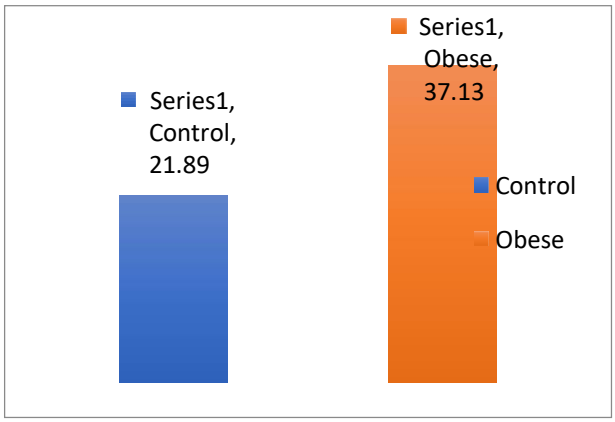

Figure 1: Mean BMI levels in two groups

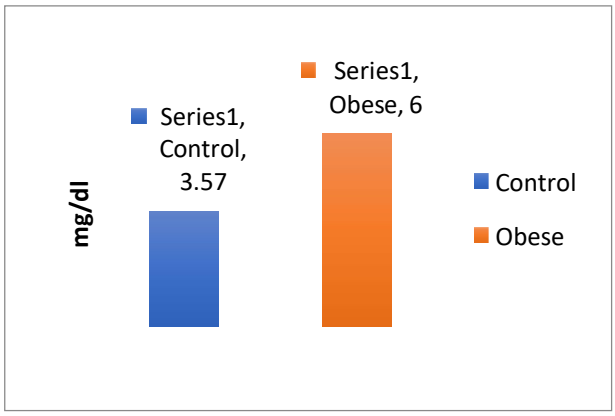

Figure 2: Mean Uric acid levels in two groups

The BMI levels in obese individuals were significantly high when compared to the healthy individuals, which indicate proper selection of study groups. The Uric acid level of significantly high in metabolic syndrome individuals when compared to the healthy individuals (p-value is 0.0001).

Free radicals are a normal by product of oxygen metabolism in our body (Joe M. McCord, 2000). Free radicals are known as the toxic by products of oxygen metabolism because they are known to cause significant damage to the living cells and also the tissues in our body in a process known as oxidative stress" (William B. Salt II, 1999). Free radicals involved in the mechanism of damage associated with disease development (Rice-Evans C, 1999). Free radicals may cause damage to myocardial cells and sometimes causes damage to the vascular endothelium that is similar to the damage of the myocardial cells and also leads to many other problems (Karen P. Burton, 1988).

This harmful effects of free radicals are prevented by the antioxidants produced by our body (Zwanvillines, 2017).

CONCLUSION

The data obtained from the present study shows that the uric acid level was increased among the obese individuals taken for the study. The free radicals that are harmful to the body are also produced in high levels in the obese individuals. Thus, this high level of antioxidant metabolism acts as an advantage for the obese individuals to prevent the body from the harmful effects of free radicals.

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