

## ORIGINAL RESEARCH

**Assessment of obesity and serum uric acid in adults****Dr. Aditya Yadav**

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**Abstract**

**Background:** Obesity was been studied that associated to many chronic diseases. The present study was conducted to assess obesity and serum uric acid in adults.

**Materials & Methods:** 120 adults of both genders were included and Height, weight and Body mass index (BMI) was calculated. Serum uric acid was measured by the urinate method.

**Results:** Out of 120 patients, males were 65 and females were 55. The mean age of males was 37.5 years and in females was 35.2 years, weight was 65.8 Kgs and in females was 57.3 Kgs, height was 176.2 cm in males and 158.7 cm in females, BMI was 28.4 kg/m<sup>2</sup> in males and 23.3 Kg/m<sup>2</sup> in females and uric acid was 370.4 µmol/L in males and 290.2 µmol/L in females. The difference was significant (P< 0.05). The serum uric acid in normal subjects was 320.2 µmol/L in males and 318 µmol/L in females. In underweight was 286.4 µmol/L in males and 290.6 µmol/L in females. In overweight was 378.6 µmol/L in males and 360.4 µmol/L in females. In obese, it was 396.2 µmol/L in males and 376.3 µmol/L in females. The difference was significant (P< 0.05).

**Conclusion:** There was association of high serum uric acid and obesity. High uric acid level was observed in males.

**Key words:** Obesity, uric acid, Kidney

**Introduction**

The global public has paid close attention to the prevalence of obesity. Obesity was been studied that associated to many chronic diseases, for example, breast cancer, COPD, depressive disorder and so on. In United States, the country has put in large invest to prevent youth obesity by promoting health eating and physical activity.<sup>1,2</sup>

Uric acid is originated from enzymatic degradation and metabolic conversion of exogenous or endogenous purines in the liver and intestine. It is excreted in urine through the kidney as the by-product of amino acid (purines) metabolism in humans.<sup>3</sup> Uric acid is a weak acid with a high dissociation constant and can exist in plasma as the monovalent sodium salt in the form of monosodium urate. Some studies have indicated that variation in serum uric acid is genetic and could be affected by several genes. When the saturation threshold of uric acid in body fluids (serum or urine) is exceeded, hyperuricemia or hyperuricosuria, respectively, occurs.<sup>4</sup> The average urate pool in healthy adults is estimated to be 1200 mg with a mean turnover rate of 700 mg/day. Hyperuricemia was established as serum uric acid level >450 µmol/L for males and >390 µmol/L for females while hyperuricosuria was defined as urine

uric acid level >1000 mg/24 h assuming for normal diets.<sup>5</sup>The present study was conducted to assess obesity and serum uric acid in adults.

### Materials & Methods

The present study comprised of 120 adults of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Height was measured with a standard stadiometer and weight was measured in light clothing on an electronic scale. Body mass index (BMI) was calculated by dividing the weight (kg) by the height (m) squared. Serum uric acid was measured by the urinate method. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

### Results

**Table I: Distribution of patients**

Total- 120		
Gender	Males	Females
Number	65	55

Table I shows that out of 120 patients, males were 65 and females were 55.

**Table II: Assessment of parameters**

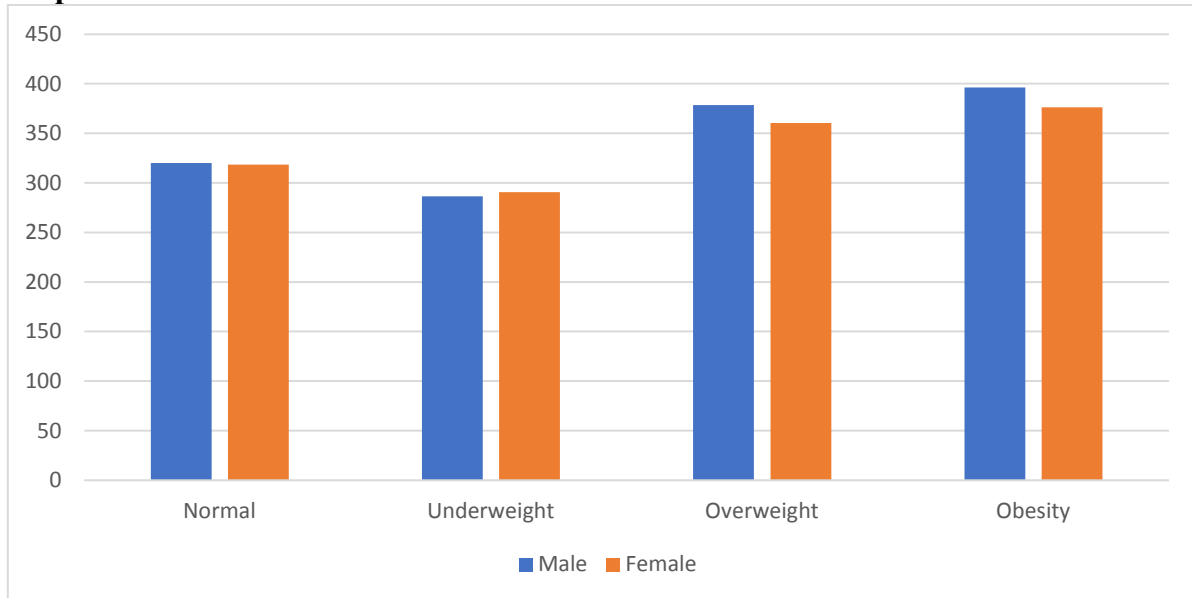
Parameters	Male	Female	P value
Age (years)	37.5	35.2	0.92
Weight (Kgs)	65.8	57.3	0.01
Height (cm)	176.2	158.7	0.02
BMI (Kg/m <sup>2</sup> )	28.4	23.3	0.04
Uric acid (μmol/L)	370.4	290.2	0.05

Table II shows that the mean age of males was 37.5 years and in females was 35.2 years, weight was 65.8 Kgs and in females was 57.3 Kgs, height was 176.2 cm in males and 158.7 cm in females, BMI was 28.4 kg/m<sup>2</sup> in males and 23.3 Kg/m<sup>2</sup> in females and uric acid was 370.4 μmol/L in males and 290.2 μmol/L in females. The difference was significant (P< 0.05).

**Table III: Serum uric acid and BMI**

BMI	Male	Female	P value
Normal	320.2	318.5	0.12
Underweight	286.4	290.6	0.05
Overweight	378.6	360.4	0.04
Obesity	396.2	376.3	0.03

Table III, graph I shows that serum uric acid in normal subjects was 320.2 μmol/L in males and 318 μmol/L in females. In underweight was 286.4 μmol/L in males and 290.6 μmol/L in females. In overweight was 378.6 μmol/L in males and 360.4 μmol/L in females. In obese, it was 396.2 μmol/L in males and 376.3 μmol/L in females. The difference was significant (P< 0.05).

**Graph I: Serum uric acid and BMI**

### Discussion

Obesity is an increasingly serious public health problem on a global level, with a sustained increase in global mortality and incidence of chronic diseases.<sup>6</sup> Obesity exhibits an intimate correlation with multiple diseases (eg, hypertension, atherosclerosis, cardiopulmonary disease, metabolic syndrome, and cancer) and is also an induction factor responsible for increased risk of cardiovascular disease and all-cause mortality.<sup>7</sup> In addition, 25-hydroxyvitamin D Levels are negatively and independently associated with fat mass in healthy overweight and obese subjects.<sup>8,9</sup> The present study was conducted to assess obesity and serum uric acid in adults.

We found that out of 120 patients, males were 65 and females were 55. Oyama et al<sup>10</sup> in their study serum uric acid levels were determined in 1,729 healthy children, consisted of 923 boys and 806 girls, aged 9.1 - 15.0 years. The incidence of hyperuricemia in boys and girls were 8.8% and 0.6%, respectively. In 1,281 children out of all subjects, including 684 boys and 597 girls, height, weight, aspartate aminotransferase, and alanine aminotransferase were also determined and the correlations between serum uric acid levels and obesity were analyzed. BMI is popularly used as a standard indicator of obesity in adults. However, BMI increases without fat accumulation as children grow. Serum uric acid levels are positively correlated with obesity-related indicators, BMI and POW, in both boys and girls. Serum uric acid levels of the subjects with high POW ( $\geq 20\%$ ) are significantly higher than those of the subjects with low POW ( $< 20\%$ ) in both boys and girls. These results suggest that serum uric acid levels are significantly increased with obesity and could be used as one of obesity-related indicators even in early adolescence.

We found that the mean age of males was 37.5 years and in females was 35.2 years, weight was 65.8 Kgs and in females was 57.3 Kgs, height was 176.2 cm in males and 158.7 cm in females, BMI was 28.4 kg/m<sup>2</sup> in males and 23.3 Kg/m<sup>2</sup> in females and uric acid was 370.4  $\mu\text{mol/L}$  in males and 290.2  $\mu\text{mol/L}$  in females. Duan et al<sup>11</sup> assessed the association between serum uric acid and obesity among university students who participated in routine health screening in 2013. In this cross-sectional study, 3529 subjects were analyzed. Obesity categories were classified by BMI levels. There were 1285 males (mean age,  $19.8 \pm 1.3$  years) and 2244 females (mean age,  $19.9 \pm 1.3$  years). Association between 2nd serum uric acid quartile and normal in male are significant and coefficient was 0.519. The 3rd serum uric acid quartile and normal in female was associated significantly ( $r = 0.173$ ,  $p = 0.010$ ). And

associations between overweight and 3rd and 4th serum uric acid quartiles in female were significant. The 4th serum uric acid quartile and obesity in two gender groups were significantly associated.

We found that serum uric acid in normal subjects was 320.2  $\mu\text{mol/L}$  in males and 318  $\mu\text{mol/L}$  in females. In underweight was 286.4  $\mu\text{mol/L}$  in males and 290.6  $\mu\text{mol/L}$  in females. In overweight was 378.6  $\mu\text{mol/L}$  in males and 360.4  $\mu\text{mol/L}$  in females. In obese, it was 396.2  $\mu\text{mol/L}$  in males and 376.3  $\mu\text{mol/L}$  in females. Onwubuya et al<sup>12</sup> in their study a total of 302 undergraduate students aged between 18 and 40 years were randomly recruited. They were grouped based on their body mass index (BMI) as overweight, obese, and control participants. 132 participants were males, of which 21 were obese, 34 were overweight while 77 were normal (control) males. 170 participants were females, of which 56 were obese, 62 were overweight while the remaining 52 were normal (control) females. The study observed significantly higher serum uric acid level in obese and overweight males than female and control counterparts ( $p=0.000$ , respectively). Urine uric acid level was significantly higher in obese males and females than in their overweight and control counterparts ( $p=0.000$ ). This shows increase production and accumulation of monosodium urate with decreased uric acid excretion which may result in hyperuricemia and hyperuricosuria which may result in gout. Serum and urine uric acid levels were significantly higher among age range (26–32) and (33–40) years compared with those among age range (18–25) ( $p<0.05$ ).

The limitation the study is small sample size.

## Conclusion

Authors found that there was association of high serum uric acid and obesity. High uric acid level was observed in males.

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