



RESEARCH PAPER

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A comparative study for evaluation of uric acid among age-wise and gender-wise in district Toba Tek Singh

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Abstract

The present study conducted in Toba Tek Singh district to assess a prevalence for increased uric acid level. For this study, 300 samples were taken among healthy individuals. The samples examined in a laboratory to determine a serum uric acid concentrations in all the selected samples. All the 300 samples were subjected to determine a mean uric acid value. This data was compared within selected samples age-wise and gender-wise. The reference value in male and female was 3.5-7.0 mg/dL and 2.5-6.0 mg/dL respectively. The results determined that uric acid value was high in a group of 10-30 years of age. In this group, a mean uric acid value is 5.17 ± 1.02 mg/dL. In a group of 31-50 years of age, the average uric acid value found 5.14 ± 0.91 mg/dL that is lower than a group of 10-30 years of age. The mean serum uric acid value of a group of 51-70 years of age is 5.4 ± 1.34 mg/dL, while 5.47 ± 1.27 mg/dL is a mean serum uric acid value of an age group of 71-90 years. All groups study showed that serum uric acid level is increased by increasing age of males while in the case of female it is increased after 50 years of age. It is due to the hormonal effect as the level of estrogen in the female is high. The increased level of Uric acid leads to gouty arthritis, cardiovascular disease in females, cancer mortality in male, kidney diseases and diabetes mellitus.

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Introduction

Man faces some fatal and non-fatal diseases that impose not only a physical but also a financial burden. The burden of morbidity hampers the growth and development of a nation. Several risk factors for the diseases we face for human prosperity, well-being and health must be eliminated. Great research is being done to reduce the burden of the disease. Hyperuricaemia in humans leading to diseases such as hypertension, kidney disease, diabetes, cardiovascular disease and especially gouty arthritis, must be kept in the optimal range, using appropriate preventive physical methods. The predisposing condition for a soaring serum urate can keep going. A high concentration of uric acid in human beings, blood causes gout which still affects us. It causes inflammation and hypertension. Uric acid is a possible causative agent of primary human hypertension Mazzali *et al* (2010).

When uric acid builds up in an individual's joints and connective tissues, gout, which is hyperuricemia, is produced. Endogenous factors are the main cause of hyperuricemia. When uric acid appears in a form of urate crystals, it causes gout and is also related to hypertension and atherosclerosis so and Thorens (2010).

Uric acid protects vitamins C and E. It performs a role inside the inhibition of radicals such as peroxynitrite and peroxy radicals. It can also protect DNA and the cell membrane Wayner *et al* (1987). Uric acid acts as an antioxidant within the brain. It reduced nigrostriatal dopamine neurons in parkinsonian patients, contributing towards an environmental vulnerability to oxidative stress Church and Ward (1994). Due to the antioxidant efficacy of uric acid, it reduces the chances of cardiovascular disease Kanbay *et al* (2007). Hyperuricemia and gout have increased significantly in the past few decades. Gout was inflammatory arthritis common in several countries. Gout patients have comorbidities such as hypertension, inveterate renal disease, cardiovascular disease, and obesity. CKD contributes to a development of hyperuricemia

and/or gout Karis *et al* (2014). The aims of the study was to check the reference value of uric acid among the age groups and genders, to check the mean uric acid value between males and females and to know a correlation of serum uric acid (SUA) concentration between age-wise and sex-wise.

Materials and methods

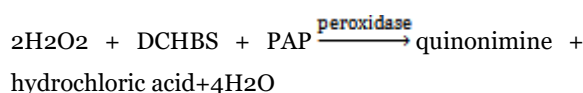
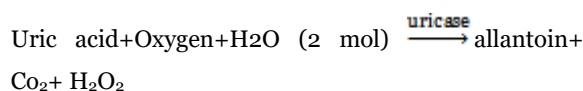
Research work was conducted in laboratory experiments. Samples were collected from different tehsils of Toba Tek Singh district. A study done at a laboratory, Eye Cum General Hospital, Gojra, Toba Tek Singh, Pakistan.

Sample collection

Blood samples were collected from the Toba Tek Singh district. Samples were received from individuals based on the age and sex of the different tehsils in the Toba Tek Singh district. 300 samples were collected from the Toba Tek Singh district. The samples were collected randomly. The blood samples taken with squirts and stored into (EDTA) tubes.

Chemical reactions

The chemical reactions were



Equipment

The equipment used is a Water bath, Centrifuge, and Chemistry analyzer.

Procedure

The blood specimen collected by syringes and stored in the Eppendorf tube for a few minutes for coagulation. Later than completing coagulation, the Eppendorf tube kept in a centrifuge at 13000 rpm for ten minutes. There were 2 layers. One was a layer of granules and the second was the layer of dinner. All cells accumulated in the granular layer while plasma or serum was present on the pep pill layer. By using a pipette; 20 µl of serum taken from the supernatant

and aggrandize to a standard tube in which 1mm enzymatic reagent included. Later than inversion, the standard tube kept into a water bath and on temperature 37°C about 10 minutes. In a water bath, all enzymatic reactions took place at a temperature of 37°C. At the extremities; the standard tube removed from the water bath and put into the micro scanner.

Computation of the serum uric acid value

The expression used to evaluate the SUA level was:

$$C = 8 \times \text{absorbance samples} / \text{absorption of std. Mg/dl}$$

Results

Statistics was applied to find out results. In the first group of 10-30 years of age, a total of 94 individuals

were included. It resulted that the mean serum uric acid value was 5.17±1.02 mg/dL. The serum uric acid level in males is 5.68±1.02 mg/dL while in the female it is 4.67±0.60 mg/dL. In the second group of 31-50 years of age, a total of 154 individuals were included. It was concluded that the mean serum uric acid value was 5.14±0.91 mg/dL. The serum uric acid level in males is 5.71±0.86 mg/dL while in the females it is 4.73±0.71 mg/dL. It shows that mean serum uric acid was somewhat high in a group of 10-30 years of age. As in this group of age the level of uric acid is increased (Table 1). In the third group of 51-70 years of age, a total of 38 individuals were included. It resulted that the mean serum uric acid value was 5.43±1.34 mg/dL. The serum uric acid level in males is 6.25±1.02 mg/dL while in the female it is 4.42±0.95 mg/dL.

Table 1. Mean blood serum uric acid levels in male and female (Group 1 and 2).

Gender	Age (years)	Number	Mean	Standard Deviation
Group 1				
Male	10-30	46	5.68	1.02
Female	10-30	48	4.67	0.60
Total		94	5.17	1.02
Group 2				
Male	31-50	64	5.71	0.86
Female	31-50	90	4.73	0.71
Total		154	5.14	0.91

The fourth of age 71-90 years were included in this study. In this group, it found a mean uric acid level 5.47±1.27mg/dL. The uric acid level is 6.08±1.11mg/dL, and 4.66±1.06 mg/dL in men, and women respectively of this group (Table 2). The results shows that the serum uric acid is high in males as compared to females as shown in figure 1.

Discussion

The present study shows that the four groups of age have different values of average uric acid likewise serum uric acid concentration within males and females. Mean uric acid value found 5.17±1.02mg/dL within a first group having age between 10-30 years, and in the second group having a group between 31-50 years of age, a mean value was 5.14±0.91mg/dL. In

a third group, a mean value found 5.43±1.34 mg/dL, while within a fourth group the mean value was 5.47±1.27 mg/dL. Rehman *et al* (1980) performed research to propagate the serum uric acid (SUA) level between the two parameters, age, and gender.

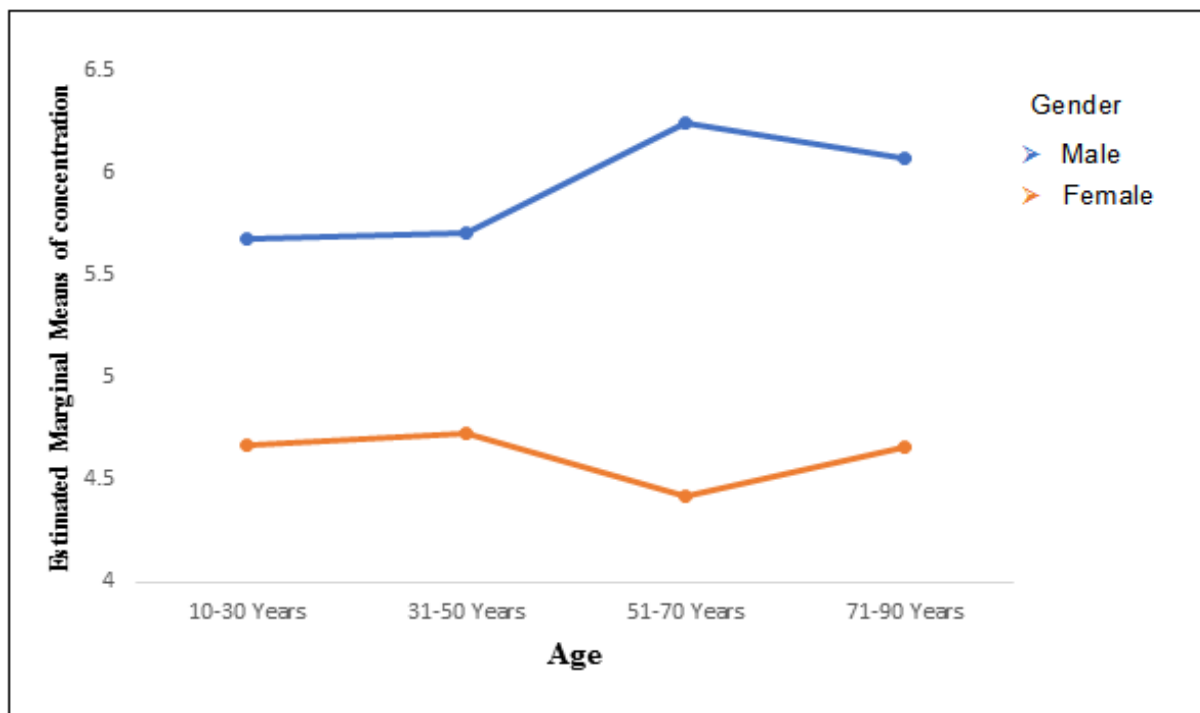
The mean uric acid value in a group of 10-30 years of age was 4.1±1.61mg/dL in men and women it was 4.05±0.96 mg/dL. It also resulted that a group of 31-50 years of age has the average uric acid concentration of males and females was 4.6±1.84 mg/dL and 4.25±0.28 mg/dL respectively. In the current research, the mean uric acid value was 5.17±1.02 mg/dL for the age group of 10-30 years. Mean uric acid value found 5.68±1.02 mg/dL for males and females it was 4.67±0.60 mg/dL.

Table 2. Mean blood serum uric acid levels in male and female (Group 3 and 4).

		Group 3		
Male	51-70	21	6.25	1.02
Female	51-70	17	4.42	0.95
Total		38	5.43	1.34
		Group 4		
Male	71-90	8	6.08	1.11
Female	71-90	6	4.66	1.06
Total		14	5.47	1.27

A group between 31-50 years of age has a mean uric acid level 5.14 ± 0.91 mg/dL while in men the mean uric acid value was 5.71 ± 0.86 mg/dL and for women, it was 4.73 ± 0.71 mg/dL. Das *et al* (2014) performed research to determine a reference level of uric acid. They took samples of 1476 subjects among 35-86

years of age. The samples taken from healthy, and normal subjects. The mean age and uric acid values were studied. It was seen that there was a statistically significant difference in the mean value of both parameters among males and females. The mean value of serum uric acid was 5.5 ± 1.4 mg/dL.

**Fig. 1.** Blood serum uric acid level in surveyed individuals in association with age and gender.

The average value of serum uric acid found significantly higher within men as compared to women Sari *et al* (2009). In a present research, it was also seen that the serum uric acid level higher in males as compared to females.

A mean uric acid value was high in males as compared to females. It was due to the higher amount of urate excrete through the kidney due to the high estrogen level Anton *et al* (1986). For the treatment of

the lower levels of uric acid, a Government has recommended hormonal therapy. A metabolic syndrome may be associated to a high value of uric acid. It was also observed that lower uric acid value, may also be linked to put down metabolic syndrome Chiou *et al* (2010). SLC2A9 and ABCG2 are the major loci imply in urate control Voruganti *et al* (2014).

In our research, it was saw that the mean uric acid value of a group of 10-30 years of age is slightly

higher as compared to a group of 31-50 years of age. It was due to the congenital disorder (deficiency of hypoxanthine-guanine phosphoribosyl transferase (HGPT), hyperactivity of phosphoribosyl-pyrophosphate synthetase), purine metabolism effected that was the cause of hyperuricemia and gout in a different group of ages. It was especially in the case of Kelly-Seegmiller syndrome Povoroznyuk *et al.*, (2012).

A mean uric acid level decreased within a group of 31-50 years of age than in other groups. A mean uric acid value of this group of age is 5.14 ± 0.91 mg/dL. In 1959-1960 a research was performed by Dodge and his colleagues that showed alike results in which serum uric acid level somewhat decrease after 24 years and 55 years of age, it again rose Dodge *et al* (1970). In this group of 51-70 years of age having to mean uric acid value of 5.43 ± 1.34 .

These unknown age-related dispersion of mean serum uric acid values in dissimilar specimen were because serum uric acid levels in all subjects are affected by environmental, genetic, and biological factors Shima and Ohta (2006).

Conclusion

This research indicated that serum uric acid has positive connection with sex and age. The reference range of the research turned out to be similar to the work done previously. Research results showed that the average uric acid value higher within males than females. A main reason for the high values in men compared to women is the hormonal effect, the level of estrogen in women is high. Possible unknown patterns can be biological, environmental and genetic. This may also be due to the small sample size.

In the light of this my study it is recommended that this research opens further fields for research to make the uric acid a useful product which are: In an older age research may be carried out at a metabolic level to lower the uric acid level and at the genetic level work can be done to control the hyperuricemia up to a limited level.

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