



A RETROSPECTIVE STUDY ON DISTRIBUTION AND PREVALENCE OF HYPERURICEMIA AMONG SUBJECTS IN GHAZIABAD (INDIA)

Biochemistry

Shazia Nazir*

Department of Biochemistry, Santosh Medical College and Hospital, Ghaziabad, Uttar Pradesh, India *Corresponding Author

Mallyannar Ittagappa

Department of Biochemistry, Santosh Medical College and Hospital, Ghaziabad, Uttar Pradesh, India,
Department of Biochemistry, Sri Basaveshwara Medical College Chitradurga, India

Iyman Rasool

Department of Emergency Medicine, Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Soura, Srinagar, J&K, India

ABSTRACT

Gout is a systemic disease that occurs due to the accumulation of monosodium urate crystals (MSU) in tissues. Uric acid is primarily synthesized in the liver, intestines and the vascular endothelium as the end product of an exogenous pool of purines, and endogenously from damaged, dying and dead cells, whereby nucleic acids, adenine and guanine, are degraded into uric acid. The present study was designed to check the progress of hyperuricemia in different age and sex groups. A total of 150 patients with hyperuricemia were selected and the study was carried out at Santosh Hospital, Ghaziabad (India). This study included 90 females and 60 male patients with different age groups. Out of 150 study participants, 62 were hyperuricemia cases and the mean serum uric acid level was significantly higher in cases (6.40 ± 1.95) as compared to controls (5.30 ± 1.5). The overall prevalence of gout found was 41.33 % (62/150). Among 62 cases of hyperuricemia 36 were females (36/62= 58.06 %) versus 26 males (26/62 = 41.93 %). On the other hand the prevalence of male patients with hyperuricemia was 28.8 % (26/90) while as in females it was observed to be 40 % (36/90). During the study it was found that the prevalence of hyperuricemia was common in females than males. On the other hand maximum number of cases were reported in the age groups of 50-59 years (26/62 = 41.93 %) followed by 40-49 years (17/62 = 27.41 %), while as in other age groups the prevalence was 11.29 % (30-39 years) and 14.51 % in cases above 60 years of age. Least number of hyperuricemia cases were reported in age group below <30 years with prevalence rate of 4.83 % respectively.

KEYWORDS

Gout, serum uric acid (SUA), hyperuricemia, prevalence

INTRODUCTION:

Gout is a systemic disease that occurs due to the accumulation of monosodium urate crystals (MSU) in tissues. On the physicochemical basis, hyperuricemia (HU) is defined as SUA levels > 7 mg/dL⁽¹⁾. HU can be classified as primary or secondary depending upon its occurrence as a consequence of another coexisting disease or drug⁽²⁾. Increase in the levels of serum uric acid levels above a specific threshold results in the formation of uric acid crystals. Many people with hyperuricemia do not develop gout or even form UA crystals in spite of the fact that hyperuricemia is the main pathogenic defect in gout. It has been found that 5% of people with uric acid concentration above 9 mg/dL develop gout. Accumulation of monosodium urate crystals in tissues leads to inflammatory arthritis, tenosynovitis, bursitis, tophaceous deposits, urolithiasis and renal disease. The intake of purine rich foods in diet particularly (red meat, seafood, beans) or high fat dairy product/alcohol/sweetened soft drinks or under-excretion of uric acid because of renal dysfunction and use of thiazide and loop diuretics or extreme levels of physical activity are the main factors that contribute to increased production of uric acid in the serum⁽³⁾. Many studies related gout which is accompanied by high levels of uric acid is often associated with hypertension, hyperlipidemia, diabetes mellitus, obesity and ischaemic heart disease. A report Study that has been carried out in India have found that patients with T2DM (25.35%), hyperuricemia (47.1%), obesity (44.6%), and HTN (37.33% have a higher prevalence of hyperuricemia as compared to healthy individuals⁽⁴⁻⁶⁾. In the tribal population of Rajasthan the prevalence of hyperuricemia was found to be 13.5 % with more frequent in men (14.4%) than women (12.8%)⁽⁷⁾. Further the prevalence of HU varies in respect to age and gender. Various studies have reported that with advancing age, serum uric acid levels tends to increase.⁽⁸⁻⁹⁾

MATERIALS AND METHODS:

The study was conducted in the Department of Biochemistry, Santosh Medical College and Department of Medicine, Santosh Hospital, Ghaziabad (U.P.) and a total of 150 patients with different age groups were selected for the study.

Study participants:- This study included 90 females and 60 male patients with different age groups. As shown in table I the total number of participants that were selected for the study were 150. Out of this, number of participants in the age group of <29 were (N= 11, M= 4, F

=7), whereas in the age group 30-39 the number of participants observed were [(N= 25) M= 10, F=15]. Similarly, the number of cases observed in age group of 40-49 were [(N=46), M= 16, F=30] and in age group 50-59 the number studied were (N= 48, M=21, F= 27). Further in the age group of > 60 years (N= 20, M= 9, F= 11) respectively. Out of 150 patients, the number of hyperuricemia cases 62 were hyperuricemia (females = 36, males = 26).

RESULTS

As our study included a total of 150 participants (M= 60, F= 90), out of which the number of hyperuricemia cases were 62 (males=26, females=36). The number of hyperuricemia cases were found to be higher in the age group of 50-59 (N=26) years followed by 40-49 (N=17), in age group of above 60 years (N=9) while as least number of cases were found in the age group of < 29 years (N=3). The total number of hyperuricemia cases that were found in respective gender as shown in table 2. The mean serum uric acid level was significantly higher in cases (6.40 ± 1.95) as compared to controls (5.26 ± 1.5) ($p = 0.005$) (Table 3).

Out of 150 study participants, 62 hyperuricemia cases were found, maximum number of which were reported in the age groups of 50-59 years (26/62 = 41.93 %) followed by 40-49 years (17/62 = 27.41 %), while as in other age groups the prevalence was 11.29 % (30-39 years) and 14.51 % in cases above 60 years of age. Least number of hyperuricemia cases were reported in age group below < 30 years with prevalence rate of 4.83 % respectively (figure 1). During the study the overall prevalence was 41.33% (62/150) as shown in figure 1. Among 62 cases of hyperuricemia 36 were females (36/62= 58.06 %) versus 26 males (26/62 = 41.93 %) shown in figure 3. On the other hand the prevalence of male patients with hyperuricemia was 28.8 % (26/90) while as in females it was observed to be 40% (36/90) as represented in figure 4. During the study it was found that the prevalence of hyperuricemia was common in females than males.

DISCUSSION:

Gout occurs due to the accumulation of monosodium urate crystals (MSU) in tissues thereby causing inflammation and pain particularly in joints. The mean serum uric acid level was significantly higher in cases (6.40 ± 1.95) as compared to controls (5.26 ± 1.5) ($p = 0.005$). According to various studies the mean onset of gout is 45 years in Delhi⁽¹⁰⁾ and 44.5 years in Calcutta⁽¹¹⁾. According to a study carried out by Lin

et al. 2006⁽¹²⁾ higher odds of having hypertension, hyperglycemia and low HDL cholesterol were found in hyperuricemic patients as compared to patients with normal serum uric acid levels.

A study reported by Nobel Medical College found the prevalence was 28.33% (male 30.06%, female 26.61%)⁽¹³⁾. Another study that was carried out in Bangkok population showed that prevalence of hyperuricemia is 24.40%⁽¹⁴⁾. Pearce et al observed higher serum uric acid values in males as compared to females (5.28 ± 0.66 versus 4.47 ± 0.78 mg/dl)⁽¹⁵⁾ Mbenza LB et al found significantly higher serum uric acid level in males (6.6 ± 7 versus 5.8 ± 6 mg/dl, P < 0.01)⁽¹⁶⁾.

Various studies, have reported hyperuricemia as an independent risk factor for type-2 diabetes mellitus and hypertension. Further these studies have also evaluated that by decreasing serum uric acid level the risk of such disease may be lowered. Increase in the levels of uric acid induces endothelial dysfunction, which in turn causes reduced insulin-stimulated nitric oxide-induced vasodilation in skeletal muscle thereby resulting in reduced glucose uptake in skeletal muscles. At regular intervals of time screening of serum uric acid level may serve as a cheap, better and reliable indicator to check the onset or progression of diabetes and hypertension⁽¹⁷⁾

CONCLUSION

In conclusion, the overall prevalence of hypercalcemia in patients attending the screening programs was 41.33%. Thus, there is a need to do further prospective studies in the Indian population to corroborate the results of the present study and to determine if early screening of sodium uric acid levels may help to reduce the risk and complications of this disease.

Table 3: Showing No. of study participants with different age groups

S.NO	Sex	Age Group				
		< 29 years	30-39 years	40-49 years	50-59 years	> 60 years
01	Male	4	10	16	21	9
02	Female	7	15	30	27	11

Table 2: Showing No. of hyperuricemia cases in different age groups

S.NO	Sex	No. of hyperuricemia patients				
		< 29 years	30-39 years	40-49 years	50-59 years	> 60 years
01	Male	1	3	7	10	5
02	Female	2	4	10	16	4

Table 3: Comparison of serum uric acid levels between cases and controls.

Parameters	Control (Mean ± SD)	Cases (Mean ± SD)	P value
Serum Uric acid (SUA) mg/dl	5.30±1.5	6.40±1.95	0.005

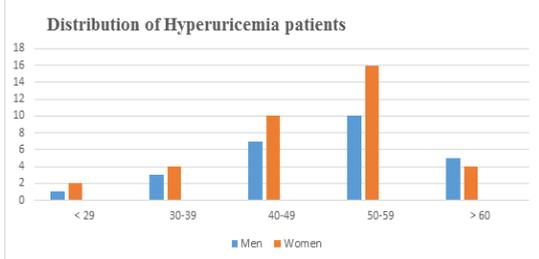


Figure 1: Age and sex distribution of hyperuricemia cases.

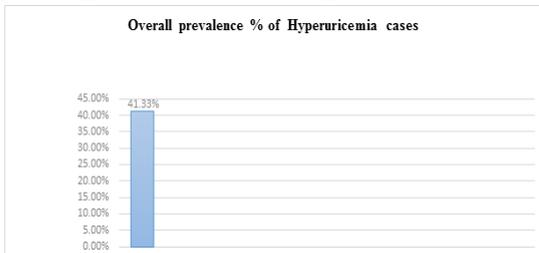


Figure 2: Overall prevalence % of Hyperuricemia.

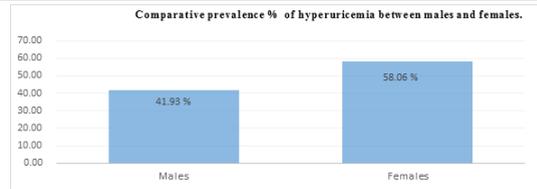


Figure 3: Comparative prevalence % of Hyperuricemia between males and females

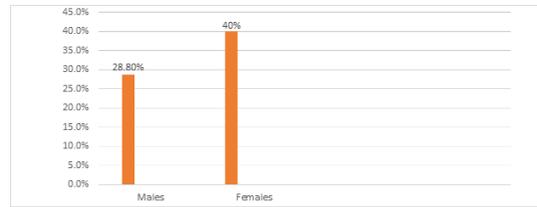


Figure 4: Prevalence % of Hyperuricemia in males and females

REFERENCES

- 1) Yamanaka H. Japanese Society of Gout and Nucleic Acid Metabolism. Japanese guideline for the management of hyperuricemia and gout: Second edition. *Nucleosides Nucleotides Nucleic Acids* 2011; 30:1018-29.
- 2) Making AD. Approach to a Case of Hyperuricemia. *Ind J Aerospace Med* 2010; 54:1.
- 3) Schlesinger N. Hyperuricemia, Gout, and Diet. In: Coleman L.A. (eds) *Nutrition and Rheumatic Disease*. Nutrition and Health. Humana Press 2008.
- 4) Mundhe SA, Mhasde DR. The study of prevalence of hyperuricemia and hyperuricemia in type 2 diabetes mellitus. *Int J Adv Med* 2016; 3:241-49.
- 5) Remedios C, Shah M, Bhasker AG, Lakdawala M. Hyperuricemia: a reality in the Indian obese. *Obes Surg* 2012; 22:945-48.
- 6) Shrivastav C, Kaur M, Suhalka ML, Sharma S, Basu A. Hyperuricemia- Potential Indicator to Diagnose the Risk of Essential Hypertension. *J Clin Diagn Res* 2016; 10:CC01-3.
- 7) Sachdev B. Prevalence of hyperuricemia and its relation with metabolic syndrome in a select nomad tribal population of Rajasthan, India. *Int J Health Sci Res* 2012;2:25-32.
- 8) Mikkesen WM, Dodge HJ, Valkenburg H. The distribution of serum uric acid values in a population unselected as to gout or hyperuricemia. *Tecumseh, Michigan, 1959-1960. Am J Med* 1965; 39:242-51.
- 9) Culleton BF, Larson MG, Kannel WB, Levy D. Serum uric acid and risk for cardiovascular disease and death: the Framingham Heart Study. *Ann Intern Med* 1999; 131:7-13.
- 10) Kumar A, Singh YN, Malaviya AN, Choudhary K, Tripathy S. Clinical profile, therapeutic approach and outcome of gouty arthritis in northern India. *J. Assoc. Physicians India* 1990; 38: 400-2.
- 11) Gupta SK. Primary gout in an orthopedic practice of Calcutta. *J Indian Rheumatol Assoc* 1994; 2: 153-6.
- 12) Yang Z, Lu B, Wen J, Ye Z, Chen L, He M, Tao X, Zhang W, Huang Y, et al. Serum uric acid level and its association with metabolic syndrome and carotid atherosclerosis in patients with type 2 diabetes.
- 13) Yadav SK, Nepal N, Niroula D. Prevalence of hyperuricemia among people of morang district of nepal. *Journal Nobel Medical College*. 2014;3(6):16-21.
- 14) Uaratanawong S, Suraamornkul S, Angkeaw S, Uaratanawong R. Prevalence of hyperuricemia in Bangkok population. *Clinical Rheumatology*. 2011;30(7):887-93.
- 15) Pearce J, Aziz H. Uric acid and plasma lipids in cerebrovascular disease. Prevalence of hyperuricemia. *Br Med J*. 1969;4:78-80
- 16) Mbenza B, Luila EL, Mbete P, Vita EK. Is hyperuricemia risk factor of stroke and coronary heart disease among Africans? *Int J Cardiol*. 1999;71(1):17-22.
- 17) Fouad M, Fathy H, Zidan A. Serum uric acid and its association with hypertension, early nephropathy and chronic kidney disease in type 2 diabetic patients. *J Bras Nefrol* 2016; 38:403-10