

ORIGINAL RESEARCH PAPER

Uric acid level and its relationship with the dietary habits of people in greater Kamrup of Assam

Doungel Nomi¹, Gogoi Gourangie², Kataki Monjuri³

Received on October 01, 2019; editorial approval on November 9, 2019

ABSTRACT

Introduction: The evidence for a relationship between dietary patterns and uric acid concentrations is scanty. In the state of Assam, a diverse group of the community lives with different food habit. This study has aimed to evaluate and compare a relationship between Serum Uric Acid level in relation to dietary intake and alcohol consumption among the different community of Kamrup district of Assam.

Materials and methods: The present study was conducted among Ahom, Adivasi, Bodo, Bengali, Karbi, Manipuri and Marwari communities in Greater Kamrup District of Assam. Samples were collected by stratified random sampling technique. Serum uric acid level in relation to dietary intake and alcohol consumption were evaluated and compared.

Results: Uric acid level of Bodo and Ahom community is found higher in comparison to Manipuri, Bengali, Adivasi and Marwari. High Uric acid level is absent among of vegetarian category whereas nonvegetarian who take alcohol have significant high uric acid level. **Conclusion:** Balance dietary habits need to be placed in the context of overall health promotion; disease prevention and disease treatment with appropriate attention to nutritional needs.

Keywords: Gout; diet; alcohol; community; purine.

INTRODUCTION

Since time immemorial, religious devotees abstained from meat or fast for the purpose of achieving the highest degree of physical and spiritual regeneration.¹ Among a moral reformer, Pythagoras who was born a physiologist was the first to claim that, low protein and a strict vegetarian diet was essential for all who wish to live in continence and experience the beneficial effect of the practice in leading

better brain nutrition and in heightening intellectual and spiritual powers.² Some of the greater mathematicians, astronomers, philosopher and physicians of antiquity prohibited not only meat but also all foods rich in protein including concentrated vegetable proteins as inimical to reaching the desired states of spiritual continence.³

Gout was originally the disease of the affluent, primarily observed in the middle-aged men of the wealthy upper class.⁴ Although gout was observed through the ages, it became epidemic in the seventeenth century to nineteenth century when it was a favourite subject of artists.⁵

However, it has been postulated that a major mechanism underlying the development of gout is the excess ingestion of purine-rich foods and alcohol. It was found that the risks of gout were increased by a diet which is higher in meat, seafood, alcohol and lower in low-fat dairy products.⁶ Dietary

Address for correspondence:

¹Associate Professor
Department of Physiology
Tezpur Medical College, Tezpur, Assam
Email: nomidoungel@gmail.com

Mobile: +919864025015
²Associate Professor (Corresponding author)

Mobile: +919435330732
Email: drgourangie@gmail.com
Department of Community Medicine
Assam Medical College, Dibrugarh, Assam, India

³Associate Professor
Department of Microbiology
Gauhati Medical College, Guwahati, Assam, India.

Cite this article as: Doungel Nomi, Gogoi Gourangie, Kataki Monjuri. Uric acid level and its relationship with the dietary habits of people in greater Kamrup of Assam. *Int J Health Res Medico Leg Prae* 2020 January;6(1):45-48. DOI 10.31741/ijhrmlp.v6.i1.2020.9

alteration with low purine can help in treating gout and avoiding complications.⁷

Gout food diet that includes complex carbohydrates promotes a feeling and help in maintaining healthy body weight besides providing vitamins, minerals and fiber.⁸ Reducing red meat consumption may be recommended because it has been associated with other health problems such as colon cancer and diabetes.⁹

In the state of Assam, a diverse group of the community lives with different food habit and different background. This original paper has aimed to evaluate and compare a relationship between Serum Uric Acid level in relation to dietary intake and alcohol consumption among the different community of Greater Kamrup District of Assam.

MATERIALS AND METHODS

The present study was conducted among different communities in Greater Kamrup District of Assam. Samples were collected by stratified random sampling technique. Communities selected were like- Ahom, Adivasi, Bodo, Bengali, Karbi, Manipuri and Marwari. Serum uric acid level in relation to diet in different communities was evaluated and compared.

The study was carried out over a period of 2 years with a total number of 280 subjects. 40 subjects from each community consisting of equal numbers of males and females (1:1). They belong from the different community different occupations and socioeconomic status with different food habits and after giving informed consent to participate in the study. Subjects are evenly distributed in the age group of 25 years to 70 years. Dietary history of the subjects is taken very carefully and meticulously by a given special interest in food habits and present diet. Particular care was taken to include all foods that are high in purine. Information is taken in relation to intake of fish, meat (all red meat), alcohol, eggs, vegetables, pulses, diary products, tea, coffee.

Estimation of serum uric acid was done within 48 hours of collections of the blood samples. Using a calorimeter, the biochemical estimations were done. Uricase converts uric acid to allantoin and hydrogen peroxide. The hydrogen peroxide formed further reacts with a phenolic compound and 4-aminoantipyrine by the catalytic action of peroxidase to form a red-coloured Quinone imine dye complex. The intensity of the colour formed is directly proportional to the amount of uric acid present in the sample.

RESULTS

280 patients of Gout were included in this study, out of which 140 were males and 140 were females. Subjects are evenly distributed in the age group of 25 years to 70 years. Cases are divided into two groups:

Group 1: In relation to diet.

Group 2: Serum uric acid level of a different community.

Group 1: Subdivided into three sub-groups a, b and c.

Group 1: (a) Person with vegetarian dietary habits.

Group 1: (b) Persons with nonvegetarian + alcohol dietary habits.

Group 1: (c) Persons with nonvegetarian - alcohol dietary habits.

Table 1 Communities with types of diet and levels of uric acid

Community	Total respondent	Veg	High uric acid	Non-Veg(- Alcohol)	High uric acid	Non-Veg(+ Alcohol)	High uric acid
Bodo	40	0	0	17	1	23	6
Ahom	40	0	0	19	0	21	6
Adivasi	40	0	0	28	0	12	5
Bengali	40	0	0	35	0	5	2
Manipuri	40	0	0	19	0	21	7
Marwari	40	40	0	0	0	0	0

Table 1 depicts the absent high uric acid level among vegetarian category whereas nonvegetarian + alcohol groups having significant high uric acid level.

Table 2 Variation of the uric acid level among different groups

Source of variation	SS	df	MS	F
Between groups	40.43	6	6.73	5.64
Within group	325.84	273	1.19	
Total	366.27	279		
All are significant at 5% level				

Table 2 depicts the variation in high uric acid level recorded among the Boro community followed by Ahom, Karbi, Adivasi, Bengali, Manipuri significantly. No cases of the high uric acid level were recorded in the Marwari community.

DISCUSSION

Present Study reveals comparative serum uric acid level in relation to diet, people of different communities, viz., Ahom, Adivasi, Bodo, Bengali, Karbi, Manipuri, Marwari. Vegetable which is rich in micronutrient folate and dietary fibre were found to have significant protective role against hyperuricemia.^{4,10}

Intake of fibre shows lower risks of developing hyperuricemia as observed in the present study. Previous research has shown that approximately two-thirds of the

uric acid produced each day is excreted in urine and that one third is eliminated directly in intestinal secretions and saliva.^{11,12}

Some non-vegetarians take vegetarian diet in most of the days in a week; only twice a week they take non-vegetarian diets (Manipuri community and some community take a non-vegetarian diet with alcohol daily according to their social customs and religious ritual. Boro, Ahom, Adivasi, Karbi and Bengali takes mixed veg and non-veg with alcohol. The Marwari community are strict vegetarians and takes vegetarian diet and dairy products daily.¹³

In the non-vegetarian group, they consumed alcohol daily according to social customs and religious rituals. It was observed that serum uric acid level is high in the Boro community. The Boro are mostly non-vegetarian and consume alcohol and pork daily.^{3,8,14}

Alcohol is strongly associated with hyperuricemia because of the ethanol and purine content in alcohol. Uric acid is insoluble in alcohol. As the alcohol content of the blood increases; the blood is not able to dissolve as much uric acid and the excess crystallizes. Alcohol increases purine catabolism in the liver and increases the formation of lactic acid which blocks urate secretion by the renal tubules.¹⁵ Beer is reported to have high guanosine content from yeast and barely fermentation.¹⁶ A possible mechanism for the association of alcohol intake with gout includes the overproduction of lactic acid and fatty acid; which affect the pH values of body and alter the renal excretion of uric acid. Excessive alcohol consumption can have severe negative effects in the ability of the kidneys to maintain the body's fluid, and electrolyte; and acid-base balance.¹⁷

CONCLUSION

Serum uric acid level shows significant variation in relation to dietary habits. It has been seen that intake of non-veg with alcohol, which has high purine content shows significant high serum uric acid level in comparison to non-veg without alcohol and also who are strictly vegetarian. Furthermore, the Boro community have a high uric acid level in comparison to other communities because of their special dietary habits. It was seen that there is no significant rise of the high uric acid level in Marwari who are strictly vegetarian.

Serum uric acid may be a marker for the presence of an adverse cardiovascular disease and it is strongly related to hypertension; hyperlipidemia and diabetes mellitus.

So from the above study, it can be inferred that sound dietary habits need to be placed in the context of overall health promotion; disease prevention and disease treatment with appropriate attention to nutritional needs. It shows that there is a definite rise of serum uric acid level in relation to diet and also a risk factor for the development of gout.

A further study is needed regarding the quantitative and qualitative evaluation of the constituent of nonvegetarian diet in the different community without changing their dietary habit.

Conflict of interest: None declared.

Ethical clearance: Taken.

Source of funding: None declared.

Author disclosure: (1) The article is original with the author(s) and does not infringe any copyright or violate any other right of any third party. (2) The article has not been published (whole or in part) elsewhere and is not being considered for publication elsewhere in any form, except as provided herein. (3) All author(s) have contributed sufficiently in the article to take public responsibility for it and (4) all author(s) have reviewed the final version of the above manuscript and approved it for publication.

REFERENCES

1. Mahan K, Escott-Stump S. Krause's Food, nutrition on and diet therapy. 10th ed. WB Saunders Company: Philadelphia; 2000;p.43-8.
2. Choi HK. Purine-rich foods, dairy and protein intake, and the risk of gout in men. *NEJM* 2004;3(5):1093-103.
3. Singh PP, Singh LB, Prasad SN and Singh MG. *American J of Clinical Nutrition* 2007; 131(15):15-9.
4. Darmawan J, Valkenburg HA, Muirden KD, Wigley RD. The epidemiology of gout and hyperuricemia in a rural population of Java. *J Rheumatol* 1992;19:1595-9.
5. Chou CT, Pai L, Chang DM, Lee CF, Liang MH, Schu-acher HR. Prevalence of Rheumatic diseases in Taiwan: a population study of urban, suburban, rural differences. *J Rheumatol* 1994;21:302-6.
6. Chang HY, Pan Yeh WT, Tasi KS. Hyperuricemia and gout in Taiwan. *J Rheumatol* 2001;15(4):164-8.
7. Prior A, Rose BS, Harvey HP, Davidson F. Hyperuricaemia, gout, and diabetic abnormality in Polynesian people. *J Assoc Physicians India* 2012; 60(60):23-6.
8. Gibson T, Waterworth R, Hatiueld P, Robinson G, Bremner K. Hyperuricemia, gout and kidney function in New Zeland Maori men. *Br J Rheumatol* 1984;23:276-82.
9. Chang SJ, Chen C, Cinkotai FF, Chang FT, Wang TN and Ko YC. High prevalence of gout and related risk factors in Taiwan's aborigines. *J Rheumatol* 1997;24:1364-9.
10. Li Y, Stamler J, Xiao Z, Folsom A, Tao S, Zhang H. Serum uric acid and its correlates in Chinese adult

- populations, urban and rural, of Beijing. The PRC-USA Collaborative Study in Cardiovascular and Cardiopulmonary Epidemiology. *Int J epidemiol* 1997;26:288-96.
11. Chou P, Soong LN, Lin HY. Community-based epidemiological, a study on hyperuricemia in Taiwan. *J formos Med Assoc* 1993;92:597-602.
 12. Nishioka K and Mikanagi K. Hereditary and environmental factors inuencing on the serum uric acid throughout ten years of the population study in Japan. *Adv Exp Med Biol* 1980;122:155-9.
 13. Lin KC, Lin HY, Chou P. Community based epidemiological study on hyperuricemia and gout. *J Rheumatol* 2000;27:1045-50.
 14. Wortmann RL, Kelleys WN. Gout and Hyperuricemia. *Kelley's Textbook Rheumatology*, 7th ed Elsevier Saunders; 2005;p.1042-29.
 15. Chopra A, Patil J, Billempelly V, Relwani J, Tandle H. Prevalence of rheumatic diseases in a rural population in western India: A WHO-ILAR copcord Study. *J Assoc Physicians India* 2001;49:240-6.
 16. Bhatt AD, Sane SP, Vaidya AB, Bolar HV. Patterns of rheumatic diseases and antirheumatic drug usage in 11931 Indian patients. *J Assoc Physicians India* 1993;41(9):571-2.
 17. Mahajan A, Asrotia DS, Manhas AS, Amwal SS. Prevalence of major rheumatic disorders in Jammu. *JK Science*;2003;5(2):63-6.