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Evaluation of Serum Uric Acid in Postmenopausal Women

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Abstract **Original Research Article**

Background: The evaluation of uric acid in postmenopausal women represents a crucial endeavor to unravel its role in shaping health outcomes during this significant life phase. Through a comprehensive investigation, we aim to contribute valuable insights that could aid in designing more targeted and effective strategies for promoting the health and well-being of postmenopausal women. ***Objective:*** To assess serum uric acid in postmenopausal women**.** ***Methodology*****:** This cross-sectional descriptive study was carried out at Department of Physiology of Rajshahi Medical College from July 2018 to June 2019. Where 200 healthy postmenopausal women aged 50-70 years in Rajshahi city were included as sample size. The healthy adults who were fulfill the inclusion criteria was enrolled in this study. After taking informed consent, complete history taking and physical examination was done and recorded in a preformed data sheet. ***Results*****:** Out of 200 postmenopausal women, 19.5% have hyperuricemia. Remaining 80.5% of postmenopausal women have normal serum uric acid level. The mean serum uric acid level among group-I of postmenopausal women were 6.06±0.94 mg/dl and group-II of postmenopausal women were 6.35±1.02 mg/dl, which does not differ significantly. ***Conclusion*****:** Heightened serum uric acid levels were detected among postmenopausal women, reinforcing the finding that as women in this group age, there is a noteworthy rise in their serum uric acid levels. This highlights the imperative need for consistent monitoring of serum uric acid in this specific demographic.

Keywords: Serum uric acid, postmenopausal women.

INTRODUCTION

Uric acid, a natural byproduct of purine metabolism, is a compound that plays a significant role in human health. Its levels in the bloodstream are influenced by a combination of dietary intake, genetic predisposition, and various physiological factors. In recent years, the relationship between uric acid and various health conditions has attracted substantial attention from the medical and research communities. Of particular interest is its potential link to postmenopausal women's health. The postmenopausal phase represents a critical period in a woman's life, characterized by hormonal changes, altered metabolism, and shifts in body composition. This transition is associated with an increased risk of several chronic conditions, including cardiovascular disease, metabolic syndrome, and osteoporosis. In this context, uric acid's role in influencing these health outcomes has emerged as a subject of investigation [1].

Uric acid's intricate relationship with postmenopausal health is multi-faceted. On one hand, higher levels of uric acid have been associated with an increased risk of developing conditions like hypertension, diabetes, and cardiovascular disease, all of which are prevalent concerns in postmenopausal women. On the other hand, uric acid also possesses antioxidant properties that may confer protective effects against oxidative stress-related damage. This dichotomy underscores the importance of comprehensively evaluating uric acid levels in the context of postmenopausal health [2].

Postmenopausal women experience a complex interplay of hormonal changes, metabolic shifts, and alterations in body composition. This transition is associated with an increased risk of chronic diseases,

including cardiovascular disease, type 2 diabetes, and osteoporosis. These conditions have sparked interest in exploring uric acid's potential role as both a biomarker and a mediator of health in this population.

Serum uric acid (SUA) represents the final product resulting from the metabolic breakdown of purines in the human body. When SUA accumulates excessively, it can contribute to the development of various diseases [2]. In recent times, the link between SUA levels and the incidence of Metabolic Syndrome (MetS) has garnered increased attention. Nevertheless, this connection remains a subject of contention, particularly when examining SUA levels within the spectrum from normal to high, concerning their association with MetS.

Gender assumes a pivotal role in the intricate relationship between hyperuricemia and MetS. Earlier investigations that conducted gender-specific analyses have reported a more pronounced correlation between SUA levels and MetS in females compared to males [3,4]. Notably, menopause emerges as a significant factor influencing SUA levels, with this phase of life being associated with elevated SUA levels, while the use of postmenopausal hormones is linked to decreased SUA levels among postmenopausal women [5].

Objective: To assess the evaluation of uric acid in postmenopausal women.

METHODOLOGY

This cross-sectional descriptive study was carried out at Department of Physiology of Rajshahi Medical College from July 2018 to June 2019. Where 200 healthy postmenopausal women aged 50-70 years in Rajshahi city were included as sample size.

The healthy adults who were fulfill the inclusion criteria was enrolled in this study. After taking informed consent, complete history taking and physical examination was done and recorded in a preformed data sheet.

After 12 hours over night fasting by all the study subjects 4 ml of fasting venous blood sample were collected from the median cubital vein by disposable plastic syringe with all aseptic precaution. The needle got detached from the nozzle and blood were transfered immediately into dry, clean test tube with a gentle push to avoid haemolysis. The test tube were kept in standing position till the formation of clot. Centrifuging the blood at 3000 rpm for 5 ms, serum were separated and all the biochemical tests were carried without delay.

The obtained data was analyzed by using a software statistical package for the social science (SPSS version 22). Results of the analysis was expressed as mean standard deviation. Unpaired t-test was employed for the statistical analysis of data to find out significant variation among this group. P-value less than 0.05 was taken as the significant value.

RESULTS

According to the Figure-1 postmenopausal women were divided into two age groups. Group-I was considered from 50 years to 60 years. Number of respondents in group-I was 76%. Group-II was considered from 61 years to 70 years. Number of respondents in group-II was 24%.

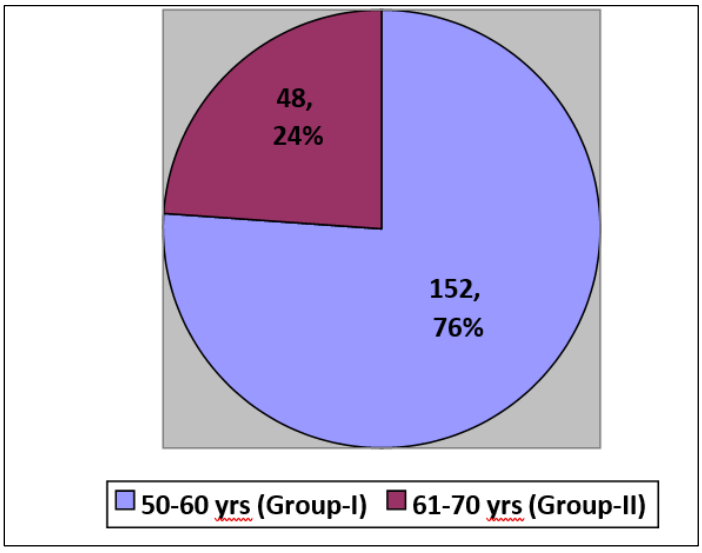

Figure-1: Distribution of age among postmenopausal women

Figure-2 shows out of 200 postmenopausal women, 19.5% have hyperuricemia. Remaining 80.5% of postmenopausal women have normal serum uric acid level.

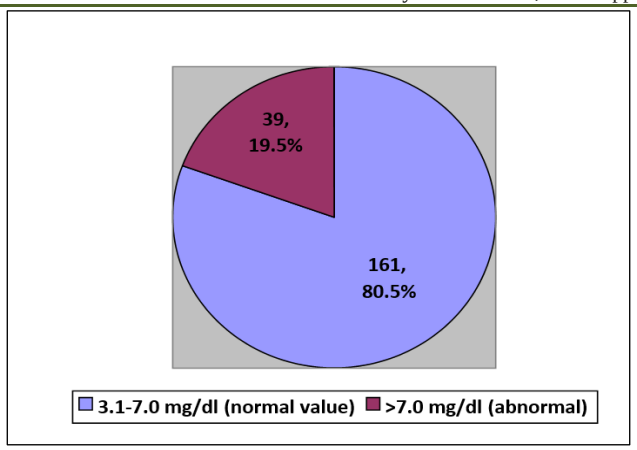

Figure-2: Frequency of serum uric acid among postmenopausal women (n=200)

Table-I shows serum uric acid level in different age groups of postmenopausal women. The mean serum uric acid level among group-I of postmenopausal women were 6.06±0.94 mg/dl and group-II of postmenopausal women were 6.35±1.02 mg/dl, which does not differ significantly.

Table I: Serum uric acid level in different age groups of postmenopausal women

	Age group		
Parameter	50-60 yrs (N=152) (mean±SD)	61-70 yrs (N=48) (mean±SD)	P-value
Serum uric acid level in mg/dl	6.06±0.94	6.35±1.02	0.073 ns

ns=Not significant.

The test of significance was calculated using unpaired independent t-test.

DISCUSSION

According to our study, postmenopausal women were divided into two age groups.Group-I was considered from 50-60 years. Number of respondents in group-I was 76%. Group-II was considered from 61-70 years. Which was similar to other study where mean age of postmenopausal women was 54.67 ± 4.43 years [6].

Uric acid is the final product of purine metabolism and exereted via urine. Epidemiological studies have revealed an age-related increase in serum urate in women. Serum uric acid level are dependent on uric acid production and excretion. It has previously demonstrated that estrogen does not directly influence renal elimination of urate. A possible explanation would be that the menopause causes changes in body fat distribution that lead to a more insulin resistant state. This, in turn, concomitantly influences serum uric acid levels [7].

Many studies showed that uric acid was highly related to hypertension, dyslipidemia, insulin resistance, obesity and kidney disease, all of which are also well known as strong predictors of cardiovascular disease. However, recent epidemiological studies have demonstrated that uric acid is an independent risk factor for cardiovascular disease [8].

Moreover, our study revealed that serum uric acid level in different age groups of postmenopausal women were almost same, which does not differ significantly.

The present study revealed clear evidence that, 19.5% postmenopausal women had significantly higher level of serum uric acid. This was in agreement with the findings detected by Joo, JK *et al*., (2014), Hak, AE, *et al*., (2008), Prasad, M *et al*., (2017), Lee, HJ *et al*., (2010), Sharma, P *et al*., (2015), Koga, M *et al*., (2009), Rashad, NM *et al*., (2015), Wingrove, CS *et al*., (1998), Liu, PJ *et al*., (2014), Stöckl, D *et al*., (2012), Dawood, RM *et al*., (2013), Sciacqua, A *et al*., (2015) [7-18].

Elevated concentration of ALP in this study supported by Mukaiyama *et al*., study, in which they concluded that the elevated concentration of ALP is caused by higher bone turnover [19]. Japanese post-menopausal women manifested the positive association between UA and ALP by Ishii *et al*., [20] similar to our study where 19.5% have hyperuricemia. Remaining 80.5% of postmenopausal women have normal serum uric acid level.

Besides that, another study reported that serum UA has a strong protective effect at post-menopausal women (age ≥50 years) [21]. Which again similar to our study where mean serum uric acid level among group-I (50-60 years) of postmenopausal women were 6.06±0.94 mg/dl and group-II (60-70 years) of postmenopausal women were 6.35±1.02 mg/dl.

CONCLUSION

Elevated levels of serum uric acid were observed in postmenopausal women, prompting the conclusion that as the age advanced in postmenopausal women, a notable increase in serum uric acid levels was observed, underscoring the importance of regular monitoring of serum uric acid in this demographic.

REFERENCE

1. Sui, X., Church, T. S., Meriwether, R. A., Lobelo, F., & Blair, S. N. (2008). Uric acid and the development of metabolic syndrome in women and men. *Metabolism*, *57*(6), 845-852.
2. Zhang, Q., Lou, S., Meng, Z., & Ren, X. (2011). Gender and age impacts on the correlations between hyperuricemia and metabolic syndrome in Chinese. *Clinical rheumatology*, *30*, 777-787.
3. Sturge, R. A., Scott, J. T., Kennedy, A. C., Hart, D. P., & Buchanan, W. W. (1977). Serum uric acid in England and Scotland. *Annals of the rheumatic diseases*, *36*(5), 420-427.
4. Jouyandeh, Z., Nayebzadeh, F., Qorbani, M., & Asadi, M. (2013). Metabolic syndrome and menopause. *Journal of Diabetes & Metabolic Disorders*, *12*, 1-4.
5. Mesch, V. R., Boero, L. E., Siseles, N. O., Royer, M., Prada, M., Sayegh, F., ... & Berg, G. A. (2006). Metabolic syndrome throughout the menopausal transition: influence of age and menopausal status. *Climacteric*, *9*(1), 40-48.
6. He, S. J., Chan, C., Xie, Z. D., Shi, D., Hu, X. B., Li, H. Y., ... & Bai, Y. N. (2017). The relationship between serum uric acid and metabolic syndrome in premenopausal and postmenopausal women in the Jinchang Cohort. *Gynecological Endocrinology*, *33*(2), 141-144.
7. Wingrove, C. S., Walton, C., & Stevenson, J. C. (1998). The effect of menopause on serum uric acid levels in non-obese healthy women. *Metabolism*, *47*(4), 435-438.
8. Joo, J. K., Hong, G. P., Han, S. E., Lee, Y. J., Kim, S. C., Kim, C. W., & Lee, K. S. (2014). The association between serum uric acid level and incidence of metabolic syndrome according to menopausal status in Korean women. *Journal of Menopausal Medicine*, *20*(3), 126-132.
9. Hak, A. E., & Choi, H. K. (2008). Menopause, postmenopausal hormone use and serum uric acid levels in US women–the Third National Health and Nutrition Examination Survey. *Arthritis research & therapy*, *10*(5), 1-7.
10. Prasad, M., Matteson, E. L., Herrmann, J., Gulati, R., Rihal, C. S., Lerman, L. O., & Lerman, A. (2017). Uric acid is associated with inflammation, coronary microvascular dysfunction, and adverse outcomes in postmenopausal women. *Hypertension*, *69*(2), 236-242.
11. Lee, H. J., Park, H. T., Cho, G. J., Yi, K. W., Ahn, K. H., Shin, J. H., ... & Kim, S. H. (2011). Relationship between uric acid and metabolic syndrome according to menopausal status. *Gynecological Endocrinology*, *27*(6), 406-411.
12. Sharma, P., Sharma, R., Kumar, P., & Gupta, G. (2016). Assessment of uric acid in postmenopausal osteoporotic women. *Asian Journal of Pharmaceutical and Clinical Research*, *9*(2), 138-139.
13. Koga, M., Saito, H., Mukai, M., Kasayama, S., & Yamamoto, T. (2009). Factors contributing to increased serum urate in postmenopausal Japanese females. *Climacteric*, *12*(2), 146-152.
14. Rashad, N. M., & Ibrahim, T. M. (2017). Association of hyperuricemia with Obesity and Metabolic Co-Morbidities among Post-Menopausal Egyptian Women. *International Journal of Science and Research*, 6, 1763-1768.
15. Liu, P. J., Ma, F., Lou, H. P., Zhu, Y. N., & Chen, Y. (2014). Relationship between serum uric acid levels and metabolic syndrome in Chinese postmenopausal women. *Climacteric*, *17*(2), 148-154.
16. Stöckl, D., Döring, A., Thorand, B., Heier, M., Belcredi, P., & Meisinger, C. (2012). Reproductive factors and serum uric acid levels in females from the general population: the KORA F4 study. *PloS one*, *7*(3), e32668.
17. M Dawood, R. (2013). Biochemical bone indices and serum uric acid changes in postmenopausal women. *Rafidain Journal of Science*, *24*(7), 42-49.
18. Sciacqua, A., Perticone, M., Tassone, E. J., Cimellaro, A., Miceli, S., Maio, R., ... & Perticone, F. (2015). Uric acid is an independent predictor of cardiovascular events in post-menopausal women. *International journal of cardiology*, *197*, 271-275.
19. Mukaiyama, K., Kamimura, M., Uchiyama, S., Ikegami, S., Nakamura, Y., & Kato, H. (2015). Elevation of serum alkaline phosphatase (ALP) level in postmenopausal women is caused by high bone turnover. *Aging clinical and experimental research*, *27*, 413-418.
20. Ishii, S., Miyao, M., Mizuno, Y., Tanaka-Ishikawa, M., Akishita, M., & Ouchi, Y. (2014). Association between serum uric acid and lumbar spine bone mineral density in peri-and postmenopausal Japanese women. *Osteoporosis International*, *25*, 1099-1105.
21. Lin, X., Zhao, C., Qin, A., Hong, D., Liu, W., Huang, K., ... & Fan, S. (2015). Association between serum uric acid and bone health in general population: a large and multicentre study. *Oncotarget*, *6*(34), 35395-353403.