International Journal of Research and Reports in Hematology

Volume 7, Issue 2, Page 188-193, 2024; Article no.IJR2H.127620

Prevalence of Hyperuricemia and Associated Factors in Gout Patients in Lebdosari Health Center, Semarang: A Cross-sectional Survey

Okty Prahalanitya [a*], Eni Mahawati [b] and Andreas Wilson Setiawan [c]

[a] Department of Clinical Pathology, Faculty of Medicine, Dian Nuswantoro University, Indonesia.
[b] Department of Enviromental Health, Faculty of Health, Dian Nuswantoro University, Indonesia.
[c] Department of Public Health, Faculty of Medicine, Dian Nuswantoro University, Indonesia.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/ijr2h/2024/v7i2154

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/127620

Original Research Article

Received: 27/09/2024
Accepted: 01/12/2024
Published: 04/12/2024

ABSTRACT

Background and Objective: Gout, or hyperuricemia, is an arthritis caused by high uric acid levels in the blood. Hyperuricemia is an excess of uric acid without symptoms, while gout occurs when uric acid crystals form in the joints, causing pain and swelling. The prevalence of gout is rising in Indonesia, especially among the elderly. This study aims to assess the prevalence of hyperuricemia and its relationship with age and gender among outpatient gout patients at the Lebdosari Health Center, Semarang.

**Corresponding author: E-mail: fk.okty.prahalanitya@dsn.dinus.ac.id;*

Cite as: *Prahalanitya, Okty, Eni Mahawati, and Andreas Wilson Setiawan. 2024. "Prevalence of Hyperuricemia and Associated Factors in Gout Patients in Lebdosari Health Center, Semarang: A Cross-Sectional Survey". International Journal of Research and Reports in Hematology 7 (2):188-93. https://doi.org/10.9734/ijr2h/2024/v7i2154.*

Methods: This descriptive quantitative study used a cross-sectional approach to assess uric acid levels in 51 outpatient gout patients, selected through purposive sampling. Data were collected using the Easy Touch GCU Meter Device on December 10, 2019, and analyzed using descriptive statistical methods.
Results: Of the 51 respondents, 80.4% had normal uric acid levels, and 19.6% had high levels. Among male patients, 3.9% had elevated uric acid, while 15.7% of females had high levels. Regarding age, 9.8% of those ≤60 years and 17.6% of those over 60 years had high uric acid levels.
Conclusion: This study shows that both gender and age influence uric acid levels, with higher levels found in females and older adults. Monitoring uric acid in these groups is crucial to prevent gout complications, and early detection and management are key to controlling the progression of gout.

Keywords: Gout; hyperuricemia; uric acid levels; outpatients; lebdosari health center.

1. INTRODUCTION

As time progresses, a person's health quality declines in line with the individual's increasing age [1]. This is marked by the weakening of organ and tissue functions in the human body. This condition triggers the onset of various degenerative diseases, one of which is gout. Gout, or in medical terms known as hyperuricemia, is a type of rheumatic disease (arthritis) in the joints caused by abnormal levels of uric acid in the blood [2] The high levels of uric acid are influenced by the accumulation of crystals in the joints due to excessive purine intake in the blood and impaired uric acid excretion, which disrupts the purine balance in the body [3]. Uric acid, or hyperuricemia, typically affects the knee, elbow, ankle, and wrist joints, characterized by severe pain, and in chronic gout cases, it can lead to permanent physical disability [4,5].

According to the World Health Organization (WHO) in 2017, the prevalence of gout reached 34.2%. [6] In Indonesia, the incidence of hyperuricemia ranks second after osteoarthritis, with an estimated rate of 1.6-13.6 per 100,000 people, which increases with age [7]. Data from health research indicates that the prevalence of gout arthritis in Central Java ranges from 2.6% to 47.2% [8]. The Health Department of Semarang City in 2016 reported 2,914 cases (0.18%) of gout arthritis. The composition of gout patients in Semarang City shows an increasing prevalence, with a higher number of female patients compared to males. Riskesdas report (2018), the incidence of hyperuricemia or gout in Indonesia based on medical diagnosis is 7.3%, and based on symptoms, it is 24.7% [9].

The causes of gout, according to Passmore and Eastwood, state that hyperuricemia is influenced by two factors: the first is genetic and environmental factors such as body mass index (BMI), diet, alcohol consumption [10]. The second factor is complications arising from other degenerative diseases. Other causes of gout are also influenced by factors such as gender, age, activity, and physical condition. The aim of this study is to understand and describe the uric acid examination profile in outpatient patients at the Lebdosari Health Center, Semarang City. The benefit of writing this article is to provide information and knowledge for readers and future researchers.

2. METHODS

This study is a descriptive quantitative research with a cross-sectional approach to assess the uric acid examination profile of outpatient patients at the Lebdosari Health Center [11]. The population in this study consisted of all outpatient gout patients at the Lebdosari Health Center, with a total sample of 51 respondents. The sampling technique used was Non-Probability Sampling with Purposive Sampling [12]. Data collection was performed by measuring the uric acid levels using the Easy Touch GCU Meter Device. Data collection was conducted on Tuesday, December 10, 2019, at the Lebdosari Health Center, Semarang City. The collected data will be processed, analyzed, and presented in the form of tables along with their descriptions.

3. RESULTS

1. Respondent Characteristics

a. Gender

The table above shows that out of the total of 51 respondents, 15 were male (29.4%) and 36 were female (70.6%).

b. Age

In the table, the age of respondents is divided into two categories: ≤ 60 years and > 60 years. Among the respondents, 26 (51.0%) were ≤ 60 years old, while 25 (49.0%) were > 60 years old.

2. Results of Measurements on Research Subjects

a. Distribution of Uric Acid Levels in Outpatients

Based on the uric acid level measurement using the Easy Touch GCU Meter Device, uric acid levels are categorized into two: normal and high. The reference values used (Easy Touch GCU) are 3 – 7.2 mg/dl for males and 2 – 6 mg/dl for females. It was found that 41 respondents (80.4%) had normal uric acid levels, while 10 respondents (19.6%) had high uric acid levels.

b. Distribution of Uric Acid Levels by Gender of Respondents

Based on the table, it can be seen that 2 male respondents (3.9%) had high uric acid levels, while 8 female respondents (15.7%) had high uric acid levels.

c. Distribution of Uric Acid Levels in Elderly Based on Age Groups

Based on the distribution table, it can be seen that among respondents aged ≤ 60 years, 5 (9.8%) had high uric acid levels. Meanwhile, among respondents aged > 60 years, 9 (17.6%) had high uric acid levels.

4. DICUSSION

Respondent Characteristics: Based on the research in Table 2, the larger sample of women compared to men (36 women, 15 men, with proportions of 70.6% and 29.4%, respectively) can be explained by the following reasons: Availability of Female Patients at the Puskesmas: One main reason could be that more female patients visit the Puskesmas Lebdosari compared to male patients. This could be due to women being more likely to seek medical care or being more attentive to their health compared to men. Difference in Gout Prevalence between Men and Women: In some populations, the prevalence of gout or hyperuricemia is indeed higher in men. However, after the age of 60, the prevalence in women tends to increase due to hormonal changes (such as a decrease in estrogen levels). This may explain why more women are being examined in the older age group.

In this study, the age distribution among the respondents was nearly equal, with 51% of respondents aged 60 years or younger (≤ 60) and 49% of respondents aged over 60 years (> 60). This balanced distribution is important because it allows for a comprehensive assessment of uric acid levels across different age groups, reflecting both younger and older populations. The presence of almost equal numbers in both age groups also suggests that both younger and older individuals are affected by hyperuricemia or gout. While it is widely recognized that the risk of gout increases with age, especially after 60, the study's results highlight the significant presence of hyperuricemia even in individuals under 60. The 49% of respondents over 60 years old align with the general epidemiological understanding that older adults are at greater risk of developing gout due to factors such as kidney function decline, hormonal changes, and the accumulation of purine deposits in the joints. Furthermore, this age distribution helps inform healthcare providers about the necessity of monitoring uric acid levels in both younger and older patients, especially as gout may manifest differently at different life stages. Early detection and management of hyperuricemia in younger individuals could potentially prevent or delay the onset of gout in older age.

Table 1. Respondent characteristics by gender

No	Gender	F	%
1.	Man	15	29.4
2.	Women	36	70.6
	Total	51	100.0

Table 2. Respondent characteristics by age group

No	Age Group (years)	F	%
1.	≤ 60	26	51.0
2.	> 60	25	49.0
	Total	51	100.0

In this study (Table 3), 80.4% of respondents showed normal uric acid levels, while 19.6% had high uric acid levels. This indicates that the majority of the patients examined did not

experience hyperuricemia (elevated uric acid levels in the blood). Elevated uric acid levels can be a risk factor for diseases like gout, and although the proportion of patients with high uric acid is relatively small, they still require medical attention for further prevention or management. Based on the reference values used (3 – 7.2 mg/dl for men and 2 – 6 mg/dl for women), these results suggest that most patients are within the normal uric acid range.

Table 3. Uric acid levels of respondent

No	Uric Acid Level (mg/dl)	F	%
1.	Normal	41	80.4
2.	High	10	19.6
	Total	51	100.0

Table 4 shows the differences between genders in the distribution of uric acid levels. Among the 15 men tested, only 2 (3.9%) had high uric acid levels, while 13 men (25.5%) had normal uric acid levels. In contrast, among the women, 28 (54.9%) had normal uric acid levels, while 8 (15.7%) had high uric acid levels. From these results, it can be observed that more women have high uric acid levels compared to men. This may be related to biological differences between men and women, as well as differences in lifestyle or health management. In many populations, men tend to experience hyperuricemia at a younger age, while women are more likely to develop it after menopause, when estrogen levels decline.

Based on Table 5, the distribution of uric acid levels by age group shows that older adults (≥60 years) have higher uric acid levels compared to those under 60. In the ≤60 years group, 9.8% had high uric acid levels, whereas in the >60 years group, 17.6% had high uric acid levels. These findings are consistent with the understanding that the prevalence of gout and elevated uric acid levels tends to increase with age, particularly after 60. Factors such as reduced kidney function, decreased estrogen levels in postmenopausal women, and unhealthy dietary habits may contribute to elevated uric acid levels in older adults. Therefore, it is important to regularly monitor uric acid levels in the elderly to prevent more serious complications such as gout.

4.1 Uric Acid Levels in Outpatients

Uric acid is the final product of purine metabolism, which is poorly soluble in water [13]. During normal metabolism, the digestion of protein-rich foods containing purines results in the production of uric acid, which is then excreted through feces, kidneys, or sweat. The blood can hold uric acid up to a certain level, as long as the plasma uric acid does not exceed its solubility threshold.[13] If this happens, the plasma will become oversaturated, which can cause uric acid levels to rise above the normal threshold (>7 mg/dl), a condition known as hyperuricemia [14]. The normal threshold for uric acid levels differs between men and women; for men, it ranges from 3 – 7.2 mg/dl, and for women, it ranges from 2 – 6 mg/dl [15]. Of the 51 outpatient respondents in the study, 41 individuals (80.4%) had normal uric acid levels. This is a dominant figure, considering the high number of respondents who are free from gout or hyperuricemia. Meanwhile, 10 respondents (19.6%) were diagnosed with elevated uric acid levels.

Table 4. Distribution of uric acid levels by gender

Gender	Uric Acid Level (mg/dl)				Total	
	Normal		High			
	N	%	N	%	Sigma	%
Man	13	25.5	2	3.9	15	29.4
Women	28	54.9	8	15.7	36	70.6
Total	41	80.4	10	19.6	51	100.0

Table 5. Distribution of uric acid levels by age group

Age Group	Uric Acid Level (mg/dl)				Total	
	Normal		High			
	N	%	N	%	Sigma	%
≤ 60	21	41.2	5	9.8	26	50.9
> 60	16	31.4	9	17.6	25	49.1
Total	37	72.6	14	27.7	51	100.0

4.2 Uric Acid Levels in Outpatients Based on Gender

Based on Table 4, it is observed that male outpatient respondents had 13 individuals (25.5%) with normal uric acid levels and 2 individuals (3.9%) with high uric acid levels. Meanwhile, female outpatient respondents had 28 individuals (54.9%) with normal uric acid levels and 8 individuals (15.7%) with high uric acid levels. From this data, it can be concluded that there are more female respondents with gout compared to male respondents.

In general, men are more at risk of developing gout because they tend to have higher serum uric acid levels compared to women. However, this difference tends to equalize in both sexes after the age of 60 [16]. The data above cannot be directly compared due to the disparity in the number of male and female respondents. Another reason why women are less likely to develop gout is the presence of the hormone estrogen, which plays a role in excreting uric acid levels through urine [17].

4.3 Uric Acid Levels of Outpatient Patients Based on Age

Based on the data in Table 5, it can be seen that outpatient respondents in the age range of ≤ 60 years have a composition of 21 (41.2%) people with normal uric acid levels and 5 (9.8%) people with high uric acid levels. On the other hand, outpatient respondents in the age group of > 60 years have a composition of 16 (31.4%) people with normal uric acid levels and 9 (17.6%) people with high uric acid levels. From this data, it can be concluded that the age group of > 60 years has the highest number of respondents with elevated uric acid levels compared to the ≤ 60 years age group.

The conclusion above aligns with the statement from Professor and joint expert Theodore Fields, MS, in the journal [18] which mentions that as the human body ages, kidney function also declines, resulting in increased uric acid levels. Another reason why age is a risk factor for gout is that the aging process can inhibit the uricase enzyme produced by the body, which is responsible for oxidizing uric acid into allantoin, making it easier for the body to excrete it [19].

5. CONCLUSION

The respondents in the outpatient uric acid examination with normal uric acid levels amounted to 41 individuals (80.4%), while 10 individuals (19.6%) had high uric acid levels.

Among the male respondents in the outpatient uric acid examination, 2 individuals (3.9%) had high uric acid levels, while 8 female respondents (15.7%) had high uric acid levels.

Among the respondents in the outpatient uric acid examination, 5 individuals (9.8%) in the age group ≤ 60 years had high uric acid levels. Meanwhile, 9 respondents (17.6%) in the age group > 60 years had high uric acid levels

6. SUGGESTION

Patients with gout in outpatient care, it is crucial to consistently follow their prescribed treatment plan and adopt a healthier lifestyle. This includes taking medications as directed, maintaining a balanced diet, and engaging in regular physical activity to help manage uric acid levels and prevent flare-ups. For the general public, prevention is always better than treatment. Individuals should focus on maintaining good physical health by following a nutritious diet, avoiding excessive consumption of purine-rich foods, staying well-hydrated, and exercising regularly. Regular check-ups and the early detection of high uric acid levels can significantly reduce the risk of developing gout and other related health issues.

DATA AVAILABILITY

All relevant data are included in the paper and its supporting information files. This study will assist researchers in identifying critical areas for Uric Acid Testing Practices In Lebdosari Health Center: Patterns And Clinical Implications For Outpatient Management.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The authors hereby state that no generative AI tools such as large language models (ChatGPT, COPILOT, etc.) or text-to-image generators were utilized in the creation or editing of this work.

CONSENT

It is not applicable.

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Organization WH. Decade of healthy ageing: baseline report. World Health Organization; 2021.
2. Lusiana N, Lainjong EAR. Comparison of Uric Acid Levels in Man and Woman Aged 45-60 Years, J. Heal. Technol. Sci. 2022;3(3):45–55.
3. Guha U, Sen S. The Uric Acid Handbook: A Beginner's Guide to Overcoming Hyperuricemia (Strategies for Managing: Gout, Kidney Stones, Diabetes, Liver Disease, Heart Health, Psoriasis, and More). Simon and Schuster; 2023.
4. Fang Z, Waizy H. Current concepts in the treatment of gouty arthritis," Orthop. Surg. 2013;5(1):6–12.
5. Punzi L, Scanu A, Spinella P, Galozzi P, Oliviero F. One year in review 2018: gout, Clin Exp Rheumatol. 2019;37(1):1–11.
6. Hidayatulloh AI, Fatimahi LB, Rahmadiana A. Relationship Physical Activity and Eating with Gout Arthritis in Sukamaju Village, Healthc. Nurs. J. 2024;6(1):19–24.
7. Damanik DAD, EPP RW. Implementation in Providing Warm Compresses to Reduce Pain in the Elderly with Gout Arthritis at UPT Yansos Tuna Rungu and Wicara Pematangsiantar, COVID-19 J. Heal. Med. Rec. Pharm. 2024;2(01):54–57.
8. Pujiastuti DR, Karwur FF. The Relationship Between of Hyperuricemia with Hyperglycemia in Javanese Men, J. Ilmu Kesehat. Masy. 2017;8(3):464490.
9. Wulandari D. Factors Influencing Hyperuricemia: Evidence from Sukoharjo, Central Java, Indonesia, Indones. J. Med. 2019;4(4):321–328.
10. Helget LN, Mikuls TR. Environmental triggers of hyperuricemia and gout, Rheum. Dis. Clin. North Am. 2022;48 (4):891–906.
11. Fawzy MS, AlSel BTA. Association of Serum Uric Acid Levels with Components of Metabolic Syndrome: A Cross-Sectional Analysis in a Saudi Adult Population, Int. J. Biomed. 2020;(10):457–466.
12. Rahman MM. Sample size determination for survey research and non-probability sampling techniques: A review and set of recommendations, J. Entrep. Bus. Econ. 2023;11(1):42–62.
13. Roman YM. The role of uric acid in human health: insights from the uricase gene," J. Pers. Med. 2023;13(9):1409.
14. Sharma P, Singh P, Bhinda A. Hyperuricemia: a systemic review, World J Pharm Res. 2021;10(01):911–922.
15. Moulin-Mares SRA, Zaniqueli D, Oliosa PR, Alvim RO, Bottoni JP, Mill JG. Uric acid reference values: report on 1750 healthy Brazilian children and adolescents, Pediatr. Res. 2021;89(7):1855–1860.
16. Singh JA, Gaffo A. Gout epidemiology and comorbidities, in Seminars in arthritis and rheumatism, Elsevier. 2020;S11–S16.
17. Kim GH, Jun JB. Altered serum uric acid levels in kidney disorders, Life. 2022;12 (11):1891.
18. Ma M. et al., Meta-analysis of the correlation between serum uric acid level and carotid intima-media thickness, PLoS One. 2021;16(2):e0246416.
19. Kimura Y, Tsukui D, Kono H, Uric acid in inflammation and the pathogenesis of atherosclerosis, Int. J. Mol. Sci. 2021;22 (22):12394.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/127620