Uric Acid Level Examination in the Elderly Using the POCT Method to Analyze Factors Associated with Hyperuricemia

Erdanela Setiawati[1*]

[1] Faculty of Medicine, Universitas Baiturrahmah, Padang, Indonesia.

Abstract: The importance of uric acid level testing in the elderly lies in prevention and early management efforts. Point-of-Care Testing (POCT) allows for rapid and easy screening in the community. Although the pathophysiology of hyperuricemia involves decreased renal excretion of uric acid due to aging, this condition is also strongly influenced by various external and internal risk factors. Risk factors commonly associated with hyperuricemia include demographics (age, gender), lifestyle (high-purine diet, physical activity), genetic factors (family history), and the presence of comorbidities. This observational-analytical study with a cross-sectional design aimed to examine uric acid levels and identify seven risk factors and pain symptoms in elderly people (≥ 60 years) in Nagari Pakan Rabaa Timur, South Solok, West Sumatra. The examination was conducted using the POCT (GCU-meter) method on a sample of 87 elderly people taken by purposive sampling. The results showed that the majority of elderly people (58.60%) experienced hyperuricemia (high uric acid levels), which confirms the elderly's vulnerability to this condition due to degenerative processes. Demographically, the sample was dominated by the Young Elderly group (60-69 years, 56.30%), women (66.70%), and had a low level of education (95.40%). Other common risk factors were a high-purine diet (57.50%) and a history of hypertension (40.20%). The majority of elderly people also reported pain symptoms (81.60%), with the level of pain felt mostly being severe (34.5%).

Keywords: Elderly; Hyperuricemia; Pain; POCT method; Uric acid levels

Introduction

Uric acid level testing is important for the elderly. Degenerative processes in the elderly make them susceptible to gout. Uric acid is the end product of purine metabolism in humans. Hyperuricemia is a metabolic disorder characterized by excessively elevated uric acid levels in the blood. Normal uric acid levels in men are < 7.00 mg/dL, while in women < 6.0 mg/dL (Saito et al., 2021). Gout is on the rise worldwide, particularly among the elderly, particularly men, with prevalence peaking at ages 70–74. Globally, the number of elderly people with gout increased from 5.316.21 cases in 1990 to 15.666.06 cases in 2019 (Yang & Liu, 2025). According to the World Health Organization (WHO),

the prevalence of hyperuricemia in the elderly worldwide ranges from 2–2.50%, with an upward trend over the past five decades. 6 The prevalence of hyperuricemia in adults and the elderly in China is 12.69% (Chen et al., 2022; Ernawati et al., 2023). In Indonesia, based on health diagnoses, the prevalence of hyperuricemia in the elderly is 18.6%. In West Sumatra, the prevalence of hyperuricemia in the elderly reaches 7.10%. No specific data on the prevalence of gout in the elderly in South Solok Regency, West Sumatra have been found. Several factors can increase a person's risk of developing gout, including age, gender, and family history. Genetic factors and lifestyle (diet or excessive purine intake, obesity, and exercise (physical activity)) also play a role in increasing the risk. Comorbidities

(hypertension, diabetes, dyslipidemia, and cardiovascular disease) and the use of certain medications (diuretics) are also risk factors for gout (Simon, 2014; Skoczyńska et al., 2020; Ni et al., 2019; Song et al., 2022).

Chronic hyperuricemia has health impacts such as joint inflammation (Gouty Arthritis), impaired kidney function (Gouty Nephropathy), kidney stones, and tophi (accumulation of uric acid in tissues) (Yang et al., 2024a; Cure et al., 2025). If untreated, complications such as stroke, kidney failure, and heart failure can occur. Hyperuricemia also impacts healthcare costs and is associated with kidney and cardiovascular disease. Another impact is loss of productivity due to frequent relapses (Liu et al., 2023). Important measures to prevent and manage gout, as well as help reduce the incidence of gout and alleviate its symptoms, include healthy lifestyle interventions such as increasing fluid intake to help the kidneys excrete uric acid and prevent the formation of uric acid crystals, weight control, improving diet, such as reducing high-purine foods such as internal organs, meat, and seafood, and reducing sugar and alcohol consumption) (Ragab et al., 2017; Mei et al., 2022), and increasing regular physical activity. Early detection of hyperuricemia in the elderly is important to maintain kidney health, cardiovascular function, and improve overall quality of life (Widjaja et al., 2023; Yokose et al., 2021).

Treating uric acid levels in the elderly is an effort to prevent gout. This examination aims to properly monitor uric acid levels in the elderly and maintain blood uric acid levels within normal limits. The uric acid examination in the elderly in this study used the Point of Care Testing (POCT) method. The advantages of POCT include faster reporting of test results because it does not require specimen transportation, allowing for faster decision-making. It is a simple laboratory test, using strips) or a fingerprick. It can be performed outside of a laboratory. It is very practical, does not require specialized personnel. The test is less expensive, and the equipment is portable (Rooney & Schilling, 2014). Pakan Rabaa Timur is a village located in Koto Parik Gadang Diateh District (KPGD), South Solok Regency, West Sumatra Province, Indonesia.

The area is 82.21 km² (24.89% of the sub-district area). This village is approximately 16 km from the sub-district center and 52 km from the district center. It consists of 10 hamlets. According to 2023 data, Pakan Rabaa Timur Village had a population of 4,187, consisting of 2.10 men and 2.08 women. An initial survey found that there were 249 elderly people. Based on the above background, a study was conducted with the aim of examining uric acid levels in the elderly using the POCT method and GCU-meter to find hyperuricemia in the elderly, as well as identifying 9 risk factors for gout

and pain symptoms experienced by the elderly. Analyzing the relationship between each risk factor and pain symptoms with the incidence of hyperuricemia and the strength of the relationship (Odds Ratio) of the related risk factors, in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

Method

Research Type and Design

This study is an observational analytical study with a cross-sectional design. A cross-sectional design is used to measure and analyze the relationship between independent variables (risk factors) and dependent variables (uric acid levels) at a specific point in time.

Research Time and Location
Research Location

This study was conducted in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

Research Time

The study was planned and implemented for six months, from July to December 2025.

Research Population and Sample
Population

The population in this study was all elderly residents of Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

Sample

Sampling Technique: Initially, the researcher used a total sampling method with the aim of selecting the entire elderly population. However, after applying exclusion criteria, the final sample was determined using purposive sampling. Sample Size: The number of samples obtained based on the purposive sampling method was 87 elderly people.; Exclusion Criteria: Elderly people excluded from this study (exclusion criteria) included: Elderly people who were not in the Nagari when the uric acid examination was conducted; Elderly people who refused to undergo uric acid examination using the fingerprick method; Elderly people who could not communicate effectively.

Research Flowchart and Research Conceptual Framework

The activities carried out during the proposed timeframe are shown in the flowchart in Figure 1. In the first phase, data on gout risk factors was collected. Seven risk factors and pain symptoms were collected: age, gender, education, family history of gout, exercise (physical activity), diet (organ meats and seafood), hypertension, and pain symptoms experienced by the elderly. At this stage, trained enumerators (students

from the Faculty of Medicine) collected data on 87 elderly individuals. In the second phase, data were inputted, edited, and coded. In the third phase, data analysis was conducted.
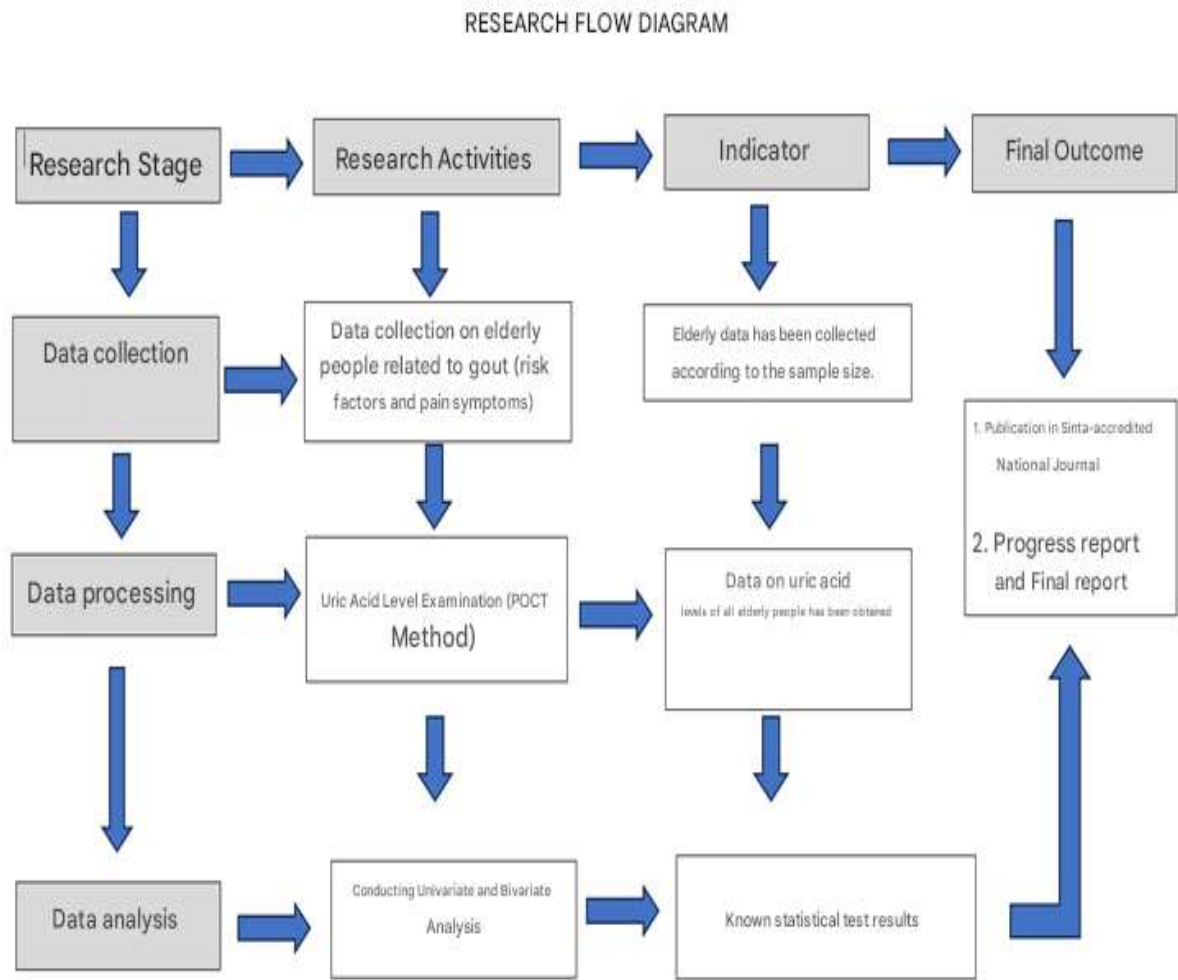
RESEARCH FLOW DIAGRAM

Figure 1. Research flowchart

Research Analysis

The data for this study will be analyzed using Statistical Product and Service Solution (SPSS) version 26.0. Univariate analysis was performed to describe uric acid levels in the elderly or the incidence of hyperuricemia in the elderly, as well as seven risk factors and pain symptoms in the elderly: age, gender, education, family history, diet (organ meats and seafood), exercise (physical activity), hypertension, and pain symptoms, using a frequency distribution and percentages. Bivariate analysis was performed to determine whether or not there was a relationship between each risk factor and uric acid levels in the elderly or the incidence of hyperuricemia in the elderly using the Chi-square statistical test with a 95% confidence level. Furthermore, the strength of the association between each associated risk factor was analyzed using the Odds Ratio (OR).

Result and Discussion

Frequency Distribution of Uric Acid Levels or Hyperuricemia Incidences in the Elderly in Pakan Rabaa Timur Village

Table 1. Frequency distribution of uric acid levels or hyperuricemia incidences in the elderly in Pakan Rabaa Timur Village

	f	(%)	95%CI
Uric Acid Levels in the Elderly			
Mean uric acid level ± SD		6.81 ± 1.76	
Uric Acid min-max levels (mg/dl)		3 – 13	
High (Hyperuricemia)	51	58.60	49.70– 68.40
Men > 7 mg/dl	15		
Women > 6 mg/dl	36		
Normal	36	41.40	31.60– 50.30
Men > 7 mg/dl	14		
Women > 6 mg/dl	22		
Total		87	

The results of the univariate analysis of uric acid levels and hyperuricemia incidence in the elderly in Pakan Rabaa Timur Village, South Solok Regency, West Sumatra Province are described in Table 1.

Based on Table 1, we can determine the uric acid levels, or incidence of hyperuricemia, of 87 elderly people living in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province. The average uric acid level was 6.81 with a standard deviation of 1.76. The minimum uric acid level was 3 mg/dl and the maximum was 13 mg/dl. The majority of elderly people (51) had hyperuricemia, consisting of 15 men and 36 women.

Frequency Distribution of 7 Risk Factors for Gout in the Elderly in Nagari Pakan Rabaa Timur

The results of the univariate analysis of 7 risk factors for gout in 87 elderly people living in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province, are described in Table 2.

Table 2. Frequency distribution of 7 risk factors for gout in the elderly in Pakan Rabaa Timur Village (n = 87)

Risk Factors for Gout	f	(%)	95% CI
Age			
Average age of elderly ± SD 67.75 ± 6.44			
Min-max age (years) 60–93			
Older adults (80 years and older)	5	5.70	1.10–10.10
Middle-aged adults (70–79 years)	33	37.90	27.60–48.00
Younger adults (60–69 years)	49	56.30	47.40–67.60
Total	87	100	
Gender			
Male		33.30	23.50–41.40
Female		66.70	58.60–76.50
Total	87	100	
Education			
Low (No schooling–elementary school)	83	95.40	89.90–98.90
Secondary (middle school– high school)	4	4.60	1.10–10.10
Total	87	100	
Family/Genetic History			
There is	29		21.10–43.70
There isn't any	58		56.30–77.90
Total	87	100	
Diet (Likes Offal and Seafood)			
Like	50	57.50	48.50–68.70
Do not like	37	42.50	31.30–51.50
Total	87	100	
Sports (physical activity)			
None	23	26.40	18.70–36.80
Yes	64	73.60	63.20–81.30
Total	87	100	
Hypertension			
Yes	35	40.20	29.90–50.60
No	52	59.80	49.40–70.10
Total	87	100	

Table 3. Comorbidities of the elderly in Pakan Rabaa Timur Village

Disease Name	Amount
Hypertension	35
Arthritis (joint pain)	68
Diabetes	7
Hyper cholesterol	7
Kidney	5
One elderly person has more than one disease	

Based on Table 2, it can be seen that the frequency distribution of 7 risk factors for gout disease from 87 elderly people living in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province is as follows: The average age of the elderly is 67.75 years with a Standard Deviation of 6.44. The minimum age of the elderly is 60 years and the maximum age is 93 years. The majority of the elderly are in the age group, Young Elderly (60-69 years) as many as 49 (56.30%) elderly, female as many as 58 (66.70%) elderly, have a low level of education (No school - Elementary School) as many as 83 (95.40%) elderly, no elderly have higher education. The majority of elderly people do not have a family or genetic history (58 (66.70%)), have a diet that likes offal

and seafood (50 (57.5%)), do sports (physical activity) (64 (73.60%)), have hypertension (35 (40.20%)). An analysis of the relationship between seven risk factors and uric acid levels or the incidence of hyperuricemia in the elderly is as follows: Data on the number of elderly people with comorbid diseases can be seen in Table 3.

Frequency Distribution of Pain Symptom Levels Experienced by Elderly Residents of Pakan Rabaa Timur Village

Table 4. Frequency distribution of pain symptom levels experienced by elderly residents of Pakan Rabaa Timur Village

	f	(%)	95% CI
Pain Symptom Levels in the Elderly			
Mean pain symptom level ± SD		4.52 ± 3.08	
Minimum-maximum pain level		0–10	
Severe (7 - 10)	30	34.50	24.40–46.30
Moderate (4 - 6)	23	26.40	17.20–33.30
Mild (1 - 3)	18	20.70	10.90–32.20
No pain (0)	16	18.40	10.30–26.40
Total	87	100	

The results of the univariate analysis of pain symptom levels among elderly residents of Pakan Rabaa Timur Village, South Solok Regency, West Sumatra Province are outlined in Table 4.

Based on Table 4, it can be seen the level of pain symptoms of 87 elderly people living in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province. The average level of pain symptoms in the elderly is 4.52 with a standard deviation of 3.08. The minimum level of pain symptoms is 0 and the maximum is 10. The majority of elderly people feel pain, as many as 71 (81.60%) elderly people. The majority of the level of pain felt by the elderly is severe pain, as many as 30 (34.50%) elderly people.

The Relationship of 7 Risk Factors with Uric Acid Levels or Hyperuricemia in the Elderly and the Strength of the Relationship Using Odds Ratios

The results of the bivariate analysis of the relationship between 7 risk factors for gout and uric acid levels or hyperuricemia in the elderly, along with the strength of the association (OR), are shown in Table 5.

Table 5. Relationship between 7 risk factors with uric acid levels or hyperuricemia in the elderly in Nagari Pakan Rabaa Timur

Risk Factors	Uric Acid Levels		OR	
	High (Hyperuricemia) f (%)	Normal f (%)	p- value	95% CI Lower-Upper
Elderly Age				
Old and Middle-aged Elderly	22 (57.90)	16 (42.10)	1.000	Not related
Young Elderly	29 (59.20)	20 (40.80)		
Gender				
Male	15 (51.70)	14 (48.30)	0.48	0.38
Female	36 (62.10)	22 (37.90)		
Education				
Low	51 (61.40)	32 (38.60)	0.02	0.38
Middle	0 (0.00)	4 (100)		0.29 – 0.50
Family History				
Yes	21 (72.40)	8 (27.60)	0.10	Not related
No	30 (51.70)	28 (48.30)		
Dietary Patterns				
Likes	32 (64.00)	18 (36.00)	0.33	Not related
Dislikes	19 (51.40)	18 (48.60)		
Exercise (Physical Activity)				
No	15 (65.20)	8 (34.80)	0.61	Not related
Yes	36 (56.30)	28 (43.80)		
Hypertension				
Yes	20 (57.10)	15 (42.90)	0.99	Not related
No	31 (59.60)	21 (40.40)		
Total	51 (58.60)	36 (41.40)		

Table 6. Relationship between pain symptoms and uric acid levels or hyperuricemia incidence in the elderly in Nagari Pakan Rabaa Timur

Pain Symptoms Level	Uric Acid Levels		p- value	95%CI Lower-Upper
	High (Hyperuricemia) f (%)	High (Hyperuricemia) f (%)		
Pain	47 (66.20)	24 (33.80)	0.006	5.87
No Pain	4 (25)	12 (75)		1.71–20.17
	51 (58.60)	36 (41.40)		

Analysis of the Relationship between Age and Uric Acid Levels or the Incidence of Hyperuricemia in the Elderly in Nagari Pakan Rabaa Timur

The highest prevalence of hyperuricemia was among the younger (60-69 years) elderly (59.20%). Meanwhile, among the older (> 80 years) and middle-aged (70-79 years), hyperuricemia was also high, at 22 (57.90%); The statistical test results obtained a p-value of 1.000 (> 0.05), meaning: There is no relationship between age and high uric acid levels (hyperuricemia) in the elderly in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

Analysis of the Relationship between Gender and Uric Acid Levels or the Incidence of Hyperuricemia in the Elderly in Nagari Pakan Rabaa Timur

The majority of elderly people with hyperuricemia were female (36 individuals, 62.10%). Meanwhile, there were also many elderly people with hyperuricemia, male (15 individuals, 51.70%); The statistical test results showed a p-value of 0.48 (> 0.050), meaning: There is no association between gender and high uric acid levels (hyperuricemia) in elderly people in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

Analysis of the Relationship between Education and Uric Acid Levels or the Incidence of Hyperuricemia in Elderly People in Nagari Pakan Rabaa Timur

The majority of elderly people with hyperuricemia had low education (no schooling - elementary school) (51 individuals, 61.40%). Meanwhile, there were no elderly people with hyperuricemia with secondary education (junior high school - high school) (0.0%). There was a difference in the proportion of hyperuricemia between elderly people with low and secondary education; The statistical test results yielded a p-value of 0.02 (< 0.05), meaning: There is a relationship between education and high uric acid levels (hyperuricemia) in the elderly in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province; The strength of the relationship (OR) of 0.38 means: Elderly people with secondary education, compared to those with low education, have a 0.4 times greater risk of developing hyperuricemia.

Analysis of the Relationship between Family History of Gout and Uric Acid Levels or the Incidence of Hyperuricemia in the Elderly in Nagari Pakan Rabaa Timur

The majority of hyperuricemic elderly people had no family history (genetic) (30 (51.70%), while 21 (72.40%) had a family history of hyperuricemia; The statistical test results obtained a p-value of 0.106 (> 0.05), meaning: There is no association between family or genetic history and uric acid levels or the incidence of hyperuricemia in the elderly in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

Analysis of the Relationship between Dietary Patterns (Offal and Seafood) and Uric Acid Levels or the Incidence of Hyperuricemia in the Elderly in Nagari Pakan Rabaa Timur

The majority of hyperuricemic elderly were those with a diet that favored offal and seafood (32 (64.0%)), while 19 (51.40%) were elderly with hyperuricemia who disliked offal and seafood; The statistical test results obtained a p-value of 0.33 (> 0.05), meaning: There is no association between dietary patterns and uric acid levels or the incidence of hyperuricemia in the elderly in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

Analysis of the Relationship between Exercise (Physical Activity) and Uric Acid Levels or Hyperuricemia in Elderly People in Nagari Pakan Rabaa Timur

Most hyperuricemic elderly people exercised (36 (56.30%), while 15 (65.20%) hyperuricemic elderly people did not exercise; The statistical test results showed a p-value of 0.61 (> 0.05), meaning:There is no relationship between exercise (physical activity) and hyperuricemia in elderly people in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

Analysis of the Relationship between Hypertension and Uric Acid Levels or Hyperuricemia in Elderly People in Nagari Pakan Rabaa Timur

Most hyperuricemic elderly people did not have hypertension (31 (59.60%)), while 20 (57.10%) hyperuricemic elderly people had hypertension; The statistical test results obtained a p-value of 0.99 (> 0.05), meaning: There is no relationship between hypertension and the incidence of hyperuricemia in the elderly in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province.

The Relationship between Pain Symptoms and Uric Acid Levels or Hyperuricemia in the Elderly and the Strength of the Relationship Using Odds Ratios

The results of the bivariate analysis of the relationship between pain symptoms and uric acid levels or hyperuricemia in the elderly and the strength of the relationship (OR) are shown in Table 6.

Analysis of the Relationship between Pain Symptoms and Uric Acid Levels or Hyperuricemia in Elderly People in Nagari Pakan Rabaa Timur

Many elderly people experiencing pain have high uric acid levels (hyperuricemia), namely 47 (66.20%). Meanwhile, among elderly people without pain, 4 (25.00%) also have high uric acid levels (hyperuricemia). There is a difference in the proportion of hyperuricemia

between elderly people experiencing pain and those without pain; The statistical test results obtained a p-value of 0.006 (< 0.050), meaning: There is a relationship between pain experienced by elderly people and high uric acid levels (hyperuricemia) in elderly people in Nagari Pakan Rabaa Timur, South Solok Regency, Solok Regency, West Java Province. West Sumatra; The OR strength of the relationship is 5.87, meaning: Pain experienced by the elderly is more than five times more likely to be associated with high uric acid levels or hyperuricemia in the elderly compared to pain not experienced.

The Relationship between Age and Uric Acid Levels or Hyperuricemia Incidence in the Elderly in Nagari Pakan Rabaa Timur

Research on the relationship between age and hyperuricemia in the elderly in Nagari Pakan Rabaa Timur showed no significant association between age and high uric acid levels (p-value = 1.000). The majority of respondents were in the young-elderly group (60-69 years), and the average age of the sample was 67.75 years. Interestingly, the proportion of hyperuricemic elderly was relatively equal between the young-elderly group (59.20%) and the middle-elderly group (57.90%). These results align with several previous studies, such as Zhong et al. (2025) and Tang et al. (2025), which also found no significant association between age and uric acid levels. However, these findings contrast with several other studies such as Timsans et al. (2024) and Zheng et al. (2025), which reported a significant correlation. Theoretically, age is a major risk factor for gout because the aging process increases the risk of hyperuricemia—especially after age 60—through physiological changes, decreased renal uric acid excretion, and increased comorbidities. Researchers assume that the lack of a significant association in this study is due to the limited age range of the sample, which focused only on the elderly (≥ 60 years). Because all respondents were already in the high-risk age category, age differences between them play a less significant role in determining hyperuricemia. Therefore, researchers recommend the need for further research involving the general population with a wider age range (adolescents to the elderly) to more accurately examine the role of age.

The Relationship between Gender and Uric Acid Levels or Hyperuricemia Incidence in the Elderly in Nagari Pakan Rabaa Timur

This study focused on the relationship between gender and hyperuricemia in the elderly. The majority of respondents were women (66.70%), and statistically showed no significant association between gender and high uric acid levels (p-value = 0.48). This finding aligns with several other studies such as Wakabayashi et al. (2025) which also found no correlation. Although hyperuricemia generally affects men more frequently in young adulthood, in women, the risk increases after menopause due to a decrease in the hormone estrogen, which plays a role in uric acid excretion. Although statistically insignificant, a comparison of percentages indicates a trend whereby slightly more elderly women (62.10%) have hyperuricemia than elderly men (51.70%). The researchers suspect that the lack of a statistically significant association is due to the smaller sample size of men in the study. Nevertheless, the trend of a higher risk in women is consistent with theories regarding the impact of menopause. This finding differs from several other studies such as Guo et al. (2025) which found a significant relationship between gender and uric acid levels in.

The Relationship between Education and Uric Acid Levels or Hyperuricemia Incidence in the Elderly in Pakan Rabaa Timur Village

This study found a significant association between the education level of the elderly and the incidence of hyperuricemia (p-value = 0.02). The majority of respondents had a low level of education (No Schooling - Elementary School, 95.40%). The proportion of hyperuricemia in the low-education group was very high (61.40%), while in the secondary-education group (Junior High School - Senior High School), no cases of hyperuricemia were found (0.00%). This finding is supported by another study of Joo et al. (2020) which linked higher education to more normal uric acid levels. Theoretically, a higher level of education increases insight and knowledge about disease prevention and management. Although this association was statistically significant, the strength of the association was very weak, with an Odds Ratio (OR) of only 0.386. The researchers assume that this weak association limits the effectiveness of interventions. Therefore, although education is associated with uric acid levels, the researchers concluded that efforts to prevent gout in the elderly in Nagari Pakan Rabaa Timur that rely solely on health education or counseling methods may be inadequate and need to be supported by other intervention approaches.

The Relationship between Family History and Uric Acid Levels or Hyperuricemia Incidence in the Elderly in Nagari Pakan Rabaa Timur

This study examined the relationship between family history and the incidence of hyperuricemia in the elderly and found no statistically significant association (p-value = 0.10). The majority of elderly people (66.70%) in the sample had no family history. This finding aligns with Shimodaira et al. (2023) and Bleyer & Hart (2006),

which also found no significant association between family history and high uric acid levels. Although not statistically significant, a comparison of proportions indicates a strong trend: 72.40% of elderly people with hyperuricemia had a family history, significantly higher than those without a family history (51.70%). This trend supports the theory that genetic or hereditary factors are important risk factors, consistent with other studies such as Nicolaou & Shane (2019) and Addisu et al. (2024), that found a significant association, even indicating that having a family history can increase the risk of developing hyperuricemia by up to 5.66 times.

The Relationship between Offal and Seafood Diets and Uric Acid Levels or Hyperuricemia in the Elderly in Pakan Rabaa Timur Village

This study analyzed the relationship between dietary patterns (preference for offal and seafood) and the incidence of hyperuricemia in the elderly and found no statistically significant association (p-value = 0.33). The majority of elderly people (57.50%) in the sample had a dietary pattern that favored offal and seafood. This finding aligns with several other studies such as Yan et al. (2022), which also found no significant correlation between purine intake and uric acid levels. Although there was no statistically significant association, the proportion of elderly people with hyperuricemia who preferred offal and seafood (64.00%) was higher than those who did not (51.40%). This trend supports the theory that a high-purine diet is a risk factor. This finding contrasts with other studies such as Ou et al. (2024) and Chen (2022), which have shown a significant association, even suggesting that high purine consumption can increase the risk of hyperuricemia by up to eight times. Researchers suspect that a diet rich in offal and seafood remains a risk factor worth watching out for in this population, despite the statistically insignificant results.

The Relationship between Exercise (Physical Activity) and Uric Acid Levels or Hyperuricemia Incidence in the Elderly in Nagari Pakan Rabaa Timur

This study investigated the relationship between exercise or physical activity and the incidence of hyperuricemia in the elderly and found no statistically significant association (p-value = 0.61). The majority of elderly people in the sample (73.60%) reported exercising or engaging in physical activity. However, the proportion of elderly people with hyperuricemia who did not exercise (65.20%) was slightly higher than those who did (56.30%). This lack of association is consistent with several other studies conducted in elderly (Zhang et al., 2024) and non-elderly (Qin & Hua, 2024) populations, which also reported no significant correlation between physical activity levels and uric acid

levels. However, this finding contrasts with several other studies such as Hou et al. (2021) and He et al. (2025), which show that regular physical activity can significantly reduce uric acid levels and the prevalence of hyperuricemia. Although a chi-square analysis showed a higher proportion of elderly people with hyperuricemia who did not exercise, the researchers speculated that the lack of a statistically significant association in this study may be due to the irregularity of exercise among the elderly. This suggests that not only the presence of physical activity, but also the frequency and intensity of that activity are important in influencing uric acid levels (Yang et al., 2024b).

The Relationship between Hypertension and Uric Acid Levels or Hyperuricemia Incidence in the Elderly in Nagari Pakan Rabaa Timur

This study analyzed the relationship between hypertension and hyperuricemia in the elderly and found no statistically significant association (p-value = 0.99). The majority of the elderly in the sample (59.80%) had no history of hypertension. Furthermore, the proportion of hyperuricemia was nearly equal between those with hypertension (57.10%) and those without (59.60%). This finding of no association aligns with research by Montezano & Touyz (2012) and Piani et al. (2021). Theoretically, complex mechanisms link increased uric acid levels to hypertension, such as activation of the renin-angiotensin-aldosterone system and increased oxidative stress, both of which lead to vasoconstriction and microvascular damage. Although the pathophysiological mechanisms show a strong correlation, and several other studies by Volgman et al. (2024), have found a significant association between the two conditions, the results in this study differ. The researchers assume that the lack of a significant association is due to the fact that the majority of the elderly in this study sample did not have hypertension. Thus, the researchers concluded that the incidence of hyperuricemia in Nagari Pakan Rabaa Timur seems to be more influenced by the low level of education or knowledge of the elderly compared to their hypertension status.

The Relationship between Pain Symptoms and Uric Acid Levels or Hyperuricemia Incidence in the Elderly in Nagari Pakan Rabaa Timur

This study investigated the relationship between pain symptoms experienced by older adults and the incidence of hyperuricemia. The results showed a significant association between pain and high uric acid levels (p-value = 0.006), with a strong association (OR = 5.87). This means that older adults with hyperuricemia are 5.87 times more likely to experience pain. The majority of older adults (81.60%) reported pain, with an

average pain level of 4.52, with the most common pain level being severe (34.50%). The proportion of older adults with hyperuricemia who experienced pain was also very high (66.20%). These findings align with other studies such as Comberg & Schach (2016) and Zhang et al. (2023), indicating that lower uric acid levels are associated with reduced pain levels. Pathophysiologically, gout pain is caused by excessive uric acid levels (hyperuricemia), which trigger the deposition of monosodium urate crystals in the joints, which then triggers a severe inflammatory response. Researchers assume that hyperuricemia is the primary cause of pain experienced by the elderly in the sample, supported by the fact that only a small number of elderly people with hyperuricemia experienced no pain. Pain experienced by elderly people not caused by hyperuricemia is most likely related to other musculoskeletal conditions such as rheumatoid arthritis or osteoarthritis.

Conclusion

The study entitled 'Examination of Uric Acid Levels in the Elderly for Analysis of Factors Associated with Hyperuricemia' conducted in Nagari Pakan Rabaa Timur, South Solok Regency, West Sumatra Province found the following: The majority of elderly people have high uric acid levels or suffer from hyperuricemia. Of the seven risk factors and one pain symptom studied, two were associated with hyperuricemia: elderly education (p-value = 0.02 and OR = 0.36) and pain symptoms experienced by the elderly (p-value = 0.006 and OR = 5.87). Unrelated risk factors were age (p-value = 1.00), gender (p-value = 0.48), family history (p-value = 0.10), diet of offal and seafood (p-value = 0.33), exercise (physical activity) (p-value = 0.61), and hypertension (p-value = 0.99).

References

Addisu, B., Sefew, A. T., Milkit, A., Hika, A., Kelem, A., & Hirigo, A. T. (2024). Hyperuricemia and Associated Factors in Adult Cardiac Patients in Western Oromia, Ethiopia. *Nutrition and Metabolic Insights*, *17*, 11786388241288668. https://doi.org/10.1177/11786388241288668

Bleyer, A. J., & Hart, T. C. (2006). Genetic Factors Associated with Gout and Hyperuricemia. *Advances in Chronic Kidney Disease*, *13*(2), 124–130. https://doi.org/10.1053/j.ackd.2006.01.008

Chen, C. (2022). Hyperuricemia – A Narrative Review. *Tungs' Medical Journal*, *16*(2), 43–46. https://doi.org/10.4103/ETMJ.TMJ-111008

Chen, F., Yuan, L., Xu, T., Liu, J., & Han, S. (2022). Association of Hyperuricemia with 10-Year Atherosclerotic Cardiovascular Disease Risk Among Chinese Adults and Elders. *International Journal of Environmental Research and Public Health*, *19*(11), 6713. https://doi.org/10.3390/ijerph19116713

Comberg, H.-U., & Schach, S. (2016). Hyperuricemia is Associated with Musculo-skeletal Pain—Results from a Cross-sectional Study. *The Open Pain Journal*, *9*(1), 15–25. https://doi.org/10.2174/1876386301609010015

Cure, O., Yigit, E., Yigit, M. H., & Uzun, H. (2025). GDF-15 Levels in Gouty Arthritis and Correlations with Decreasing Renal Function: A Clinical Study. *Biomedicines*, *13*(7), 1767. https://doi.org/10.3390/biomedicines13071767

Ernawati, E., Adjie, E. K. K., Firmansyah, Y., Yogie, G. S., Setyanegara, W. G., & Kurniawan, J. (2023). Pengaruh Kadar Profil Lipid, Asam Urat, Indeks Massa Tubuh, Tekanan Darah, dan Kadar Gula Darah Terhadap Penurunan Kapasitas Vital Paru pada Pekerja Usia Produktif. *Malahayati Nursing Journal*, *5*(8), 2679–2692. https://doi.org/10.33024/mnj.v5i8.10414

Guo, C., Lin, N., Cao, A., Han, C., Jin, Q., Liu, Y., Bian, X., Shan, F., Sun, Z., Zhang, S., & Chen, X. (2025). Gender Differences in the Predictive Value of Serum Uric Acid for Major Adverse Cardiovascular Events in Patients with Acute Coronary Syndromes: A Retrospective Cohort Study. *BMC Cardiovascular Disorders*, *25*(1), 784. https://doi.org/10.1186/s12872-025-05262-x

He, L., Yang, W., & Liu, J. (2025). Uric Acid-Lowering and Anti-Hyperuricemia Effects of Plant-Based Nutraceuticals and Foods: A Review. *Food Chemistry International*, *1*(3), 216–250. https://doi.org/10.1002/fci2.70019

Hou, Y., Ma, R., Gao, S., Kaudimba, K. K., Yan, H., Liu, T., & Wang, R. (2021). The Effect of Low and

Moderate Exercise on Hyperuricemia: Protocol for a Randomized Controlled Study. *Frontiers in Endocrinology*, *12*, 716802. https://doi.org/10.3389/fendo.2021.716802

Joo, H. J., Kim, G. R., Choi, D.-W., Joo, J. H., & Park, E.-C. (2020). Uric Acid Level and Kidney Function: A Cross-Sectional Study of the Korean National Health and Nutrition Examination Survey (2016–2017). *Scientific Reports*, *10*(1), 21672. https://doi.org/10.1038/s41598-020-77702-x

Liu, J., Lu, N., Shen, S., & Zhang, W. (2023). Effect of Comprehensive Nursing Intervention on Quality of Life and Treatment Outcomes in Elderly Patients with Gout and Hyperuricemia Complicated with Hypertension. *Pakistan Journal of Medical Sciences*, *40*(3). https://doi.org/10.12669/pjms.40.3.7535

Mei, Y., Dong, B., Geng, Z., & Xu, L. (2022). Excess Uric Acid Induces Gouty Nephropathy Through Crystal Formation: A Review of Recent Insights. *Frontiers in Endocrinology*, *13*, 911968. https://doi.org/10.3389/fendo.2022.911968

Montezano, A. C., & Touyz, R. M. (2012). Molecular Mechanisms of Hypertension—Reactive Oxygen Species and Antioxidants: A Basic Science Update for the Clinician. *Canadian Journal of Cardiology*, *28*(3), 288–295. https://doi.org/10.1016/j.cjca.2012.01.017

Ni, Q., Lu, X., Chen, C., Du, H., & Zhang, R. (2019). Risk Factors for the Development of Hyperuricemia: A STROBE-Compliant Cross-Sectional and Longitudinal Study. *Medicine*, *98*(42), e17597. https://doi.org/10.1097/MD.0000000000017597

Nicolaou, N., & Shane, S. (2019). Common Genetic Effects on Risk-Taking Preferences and Choices. *Journal of Risk and Uncertainty*, *59*(3), 261–279. https://doi.org/10.1007/s11166-019-09316-2

Ou, G., Wu, J., Wang, S., Jiang, Y., Chen, Y., Kong, J., Xu, H., Deng, L., Zhao, H., Chen, X., & Xu, L. (2024). Dietary Factors and Risk of Gout: A Two-Sample Mendelian Randomization Study. *Foods*, *13*(8), 1269. https://doi.org/10.3390/foods13081269

Piani, F., Cicero, A. F. G., & Borghi, C. (2021). Uric Acid and Hypertension: Prognostic Role and Guide for Treatment. *Journal of Clinical Medicine*, *10*(3), 448. https://doi.org/10.3390/jcm10030448

Qin, H., & Hua, Y. (2024). Association of Sedentary Behaviour with Gout and the Interaction Effect of Hyperuricemia: A Cross-Sectional Study from 2007 to 2018. *BMC Public Health*, *24*(1), 3428. https://doi.org/10.1186/s12889-024-20937-4

Ragab, G., Elshahaly, M., & Bardin, T. (2017). Gout: An Old Disease in New Perspective – A Review. *Journal of Advanced Research*, *8*(5), 495–511. https://doi.org/10.1016/j.jare.2017.04.008

Rooney, K. D., & Schilling, U. M. (2014). Point-of-Care Testing in the Overcrowded Emergency Department – Can It Make a Difference? *Critical Care*, *18*(6), 692. https://doi.org/10.1186/s13054-014-0692-9

Saito, Y., Tanaka, A., Node, K., & Kobayashi, Y. (2021). Uric Acid and Cardiovascular Disease: A Clinical Review. *Journal of Cardiology*, *78*(1), 51–57. https://doi.org/10.1016/j.jjcc.2020.12.013

Shimodaira, M., Minemura, Y., & Nakayama, T. (2023). Elevated Serum Uric Acid is a Risk Factor for Progression to Prediabetes in Japanese Women: A 5-Year Retrospective Chort Study. *Journal of Diabetes Investigation*, *14*(11), 1237–1245. https://doi.org/10.1111/jdi.14064

Simon, A. (2014). Hyperuricemia. In A. S. Merseburger, M. A. Kuczyk, & J. W. Moul (Eds.), *Urology at a Glance* (pp. 107–109). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-54859-8_23

Skoczyńska, M., Chowaniec, M., Szymczak, A., Langner-Hetmańczuk, A., Maciążek-Chyra, B., & Wiland, P. (2020). Pathophysiology of Hyperuricemia and Its Clinical Significance – A Narrative Review. *Rheumatology*, *58*(5), 312–323. https://doi.org/10.5114/reum.2020.100140

Song, J., Jin, C., Shan, Z., Teng, W., & Li, J. (2022). Prevalence and Risk Factors of Hyperuricemia and Gout: A Cross-Sectional Survey from 31 Provinces in Mainland China. *Journal of Translational Internal Medicine*, *10*(2), 134–145. https://doi.org/10.2478/jtim-2022-0031

Tang, X., Deng, D., & Wu, Q. (2025). Global, Regional, and National Burden of Gout Among Older Adults (≥ 65) from 1990 to 2021 and Projections for 2050. *Frontiers in Public Health*, *13*, 1540190. https://doi.org/10.3389/fpubh.2025.1540190

Timsans, J., Palomäki, A., & Kauppi, M. (2024). Gout and Hyperuricemia: A Narrative Review of Their Comorbidities and Clinical Implications. *Journal of Clinical Medicine*, *13*(24), 7616. https://doi.org/10.3390/jcm13247616

Volgman, A. S., Koschinsky, M. L., Mehta, A., & Rosenson, R. S. (2024). Genetics and Pathophysiological Mechanisms of Lipoprotein(a)-Associated Cardiovascular Risk. *Journal of the American Heart Association*, *13*(12), e033654. https://doi.org/10.1161/JAHA.123.033654

Wakabayashi, I., Daimon, T., & Yamamoto, T. (2025). Gender Differences in the Associations between Serum Urate and Cardiometabolic Risk Factors in Age-Matched Middle-Aged Japanese. *Women's Health Reports*, *6*(1), 26884844251379364. https://doi.org/10.1177/26884844251379364

Widjaja, Y., Kurniawan, J., Marcella, A., & Firmansyah, Y. (2023). Kewaspadaan Penyakit Dementia Melalui

Edukasi Gaya Hidup dan Skrining Albuminuria, Low-Density Lipoprotein (LDL), serta Asam Urat. *SEWAGATI: Jurnal Pengabdian Masyarakat Indonesia*, 2(2), 24–36. https://doi.org/10.56910/sewagati.v2i2.640

Yan, M., Liu, Y., Wu, L., Liu, H., Wang, Y., Chen, F., Pei, L., Zhao, Y., Zeng, L., Dang, S., Yan, H., & Mi, B. (2022). The Association between Dietary Purine Intake and Mortality: Evidence from the CHNS Cohort Study. *Nutrients*, 14(9), 1718. https://doi.org/10.3390/nu14091718

Yang, S., Liu, H., Fang, X.-M., Yan, F., & Zhang, Y. (2024a). Signaling Pathways in Uric Acid Homeostasis and Gout: From Pathogenesis to Therapeutic Interventions. *International Immunopharmacology*, 132, 111932. https://doi.org/10.1016/j.intimp.2024.111932

Yang, T., Bi, S., Zhang, X., Yin, M., Feng, S., & Li, H. (2024b). The Impact of Different Intensities of Physical Activity on Serum Urate and Gout: A Mendelian Randomization Study. *Metabolites*, 14(1), 66. https://doi.org/10.3390/metabo14010066

Yang, Y., & Liu, Z. (2025). The Changing Burden of Gout in Adults Aged 70 and Above Based on the Global Burden of Disease 2019. *Frontiers in Public Health*, 13, 1455726. https://doi.org/10.3389/fpubh.2025.1455726

Yokose, C., McCormick, N., & Choi, H. K. (2021). The Role of Diet in Hyperuricemia and Gout. *Current Opinion in Rheumatology*, 33(2), 135–144. https://doi.org/10.1097/BOR.0000000000000779

Zhang, J., Sun, W., Gao, F., Lu, J., Li, K., Xu, Y., Li, Y., Li, C., & Chen, Y. (2023). Changes of Serum Uric Acid Level During Acute Gout Flare and Related Factors. *Frontiers in Endocrinology*, 14, 1077059. https://doi.org/10.3389/fendo.2023.1077059

Zhang, T., Liu, W., & Gao, S. (2024). Exercise and Hyperuricemia: An Opinion Article. *Annals of Medicine*, 56(1), 2396075. https://doi.org/10.1080/07853890.2024.2396075

Zheng, G., Lu, M., Ouyang, Y., Chen, S., Hu, B., Xu, S., & Sun, G. (2025). Assessment of Drug Induced Hyperuricemia and Gout Risk Using the FDA Adverse Event Reporting System. *Scientific Reports*, 15(1), 22856. https://doi.org/10.1038/s41598-025-06114-6

Zhong, L., Li, D., Xu, F., Wu, Y., & Zhang, Y. (2025). Higher Cardiometabolic Index Elevates the Risk of Hyperuricemia in the Elderly: Findings from the China Health and Retirement Longitudinal Study. *Annals of Medicine*, 57(1), 2572309. https://doi.org/10.1080/07853890.2025.2572309