

# Comparison of Uric Acid Levels in Farmers and Office Workers in Koto Cayo Village, Air Hangat Barat District, Kerinci Regency

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## Abstract

Everyone has different levels of uric acid based on the risk factors that influence it. This study aims to determine differences in the results of the examination of uric acid levels in farmers and office workers in the village of Koto Cayo, West Air District, Kerinci Regency. This research is a type of quantitative research with an observational design. This research was conducted in May 2023. Sample of 92 people. Research data analysis was carried out by a t-test. The average number of uric acid levels in farmers was 5.6 mg/dL, with a minimum score of 3.2 mg/dL and a maximum score of 8.9 mg/dL, while the average uric acid level in office workers was 4.9 mg/dL, minimum score of 3.2 mg/dL and a maximum score of 8.2 mg/dL. The results of the t test, the difference in the results of examining uric acid levels between farmers and office workers is p-value = 0.046 ( $\alpha = 0.05$ ), meaning that the p-value is smaller than  $\alpha$ , which means that  $H_a$  is accepted and  $H_0$  is rejected. The research results conclude that there are differences in uric acid levels in farmers and office workers in the village of Koto Cayo, West Air District, Kerinci Regency.

**Keywords:** Uric Acid, Farmer, Office workers, Gout risk factors.

## Introduction

Gout arthritis is a disease caused by the accumulation of monosodium urate crystals, which occurs due to elevated uric acid levels in the blood. Uric acid is the end product of purine metabolism, which comes from the body and foods such as meat, organ meats, seafood, nuts, and some vegetables. Elevated uric acid levels can cause joint inflammation, leading to pain and impaired physical activity.

The prevalence of gouty arthritis continues to increase in various countries, including

Indonesia. Data show that this disease is more common in adults and the elderly. In Jambi Province, the incidence of joint diseases, including gouty arthritis, remains quite high and is a public health problem that requires attention.

Several factors are known to influence uric acid levels, including age, gender, family history, consumption of foods high in purines, length of service, and physical activity. Low physical activity in office workers can increase the risk of metabolic syndrome and impaired uric acid excretion, while heavy physical activity in farmers can increase lactic acid production, which inhibits uric acid excretion through the kidneys. These conditions have the potential to cause elevated uric acid levels in both occupational groups through different mechanisms.

Previous research has shown variations in uric acid levels in office workers and farmers, influenced by various risk factors. A preliminary survey conducted in Koto Cayo Village, Air Hangat Barat District, Kerinci Regency, also showed differences in average uric acid levels between farmers and office workers. Therefore, this study was conducted to compare uric acid levels in farmers and office workers in Koto Cayo Village, Air Hangat Barat District, Kerinci Regency.

## **Method**

This is an observational analytical study with a cross-sectional design. The aim was to compare uric acid levels between farmers and office workers in Koto Cayo Village, Air Hangat Barat District, Kerinci Regency. The study was conducted in May 2023 using a purposive sampling technique.

The study population consisted of 684 farmers and 499 office workers, totaling 1,183 people. The sample was determined using the Slovin formula with a 10% margin of error, resulting in 92 respondents: 46 farmers and 46 office workers. Inclusion criteria included respondents who worked as farmers or office workers, were willing to undergo uric acid level testing, and resided in Koto Cayo Village. Respondents who were unwilling or unable to undergo the test were excluded from the study.

Data collection began with informed consent and data collection on respondent characteristics, including age, gender, occupation, length of service, and family history. Uric acid levels were measured using the Point of Care Testing (POCT) method using capillary blood samples and uric acid strips. The data obtained consisted of primary data from uric acid level examinations and secondary data from village documents, books, and related scientific

literature.

Data analysis was performed univariately using descriptive statistics to describe the characteristics of the respondents and the distribution of uric acid levels. Next, bivariate analysis was conducted using the t-test with SPSS software to determine the difference in average uric acid levels between the farmer and office worker groups. The independent variable in this study was the type of occupation (farmer and office worker), while the dependent variable was uric acid level.

## Results

### Research Characteristics

**Table1: Characteristics of Research Respondents**

Occupation	N	%	Uric Acid Levels		Average (mg/dL)
			Min	Max	
Farmers	46	50%	3,2	8,9	5,6
Office Workers	46	50%	3,2	8,2	4,9
Sex	N	%	Min	Max	Average
Men	45	49%	3,4	8,9	6,3
1.Farmers	21	46%	4,2	8,9	6,5
2.Office Workers	24	52%	3,4	8,2	5,9
Women	47	51%	3,2	7,7	4,5
1.Farmers	25	54%	3,2	7,7	4,9
2.Office Workers	22	48%	3,2	5,6	4,0
Age	N	%	Min	Max	Average
25-45 years old	49	53%	3,2	7,4	4,5
1.Farmers	22	48%	3,2	7,4	4,7
2.Office Workers	27	59%	3,2	6,8	4,3
46-60 years old	31	34%	3,7	8,7	5,9
1.Farmers	15	33%	3,7	8,7	6,2
2.Office Workers	16	35%	3,9	7,9	5,7
>60 years old	12	13%	4,3	8,9	7,2
1.Farmers	9	19%	4,3	8,9	7,1
2.Office Workers	3	6%	6,4	8,2	7,5
Work Period	N	%	Min	Max	Average
1-15 years old	41	45%	3,2	7,4	4,3
1.Farmers	14	30%	3,2	7,4	4,5
2.Office Workers	27	59%	3,2	6,8	4,2
16-30 years old	32	35%	3,2	8,2	5,6
1.Farmers	16	35%	3,4	7,6	5,4
2.Office Workers	16	35%	3,2	8,2	5,9
>30 years old	19	20%	3,7	8,9	6,9
1.Farmers	16	35%	3,7	8,9	6,9
2.Office Workers	3	6%	6,4	7,9	7,2
Ancestry	N	%	Min	Max	Average
Yes	38	41%	3,4	8,9	6,0
1.Farmers	21	46%	3,9	8,9	6,5
2.Office Workers	17	37%	3,4	8,2	5,6

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No	54	59%	3,2	7,9	4,8
1.Farmers	25	54%	3,2	7,6	5,0
2.Office Workers	29	63%	3,2	7,9	4,6

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Based on table 1, the distribution of research respondents shows that of the total of 92 respondents, 46 people (50%) worked as farmers with an average uric acid level of 5.6 mg/dL, minimum level of 3.2 mg/dL, maximum of 8.9 mg/dL and 46 people (50%) worked as office workers with an average uric acid level of 4.9 mg/dL, minimum level of 3.2 mg/dL, maximum of 7.7 mg/dL.

**Table 2: High uric acid levels in research respondents**

<b>Occupasion</b>	<b>N</b>	<b>(%)</b>
Farmers	15	33%
Office Workers	7	15%
<b>Sex</b>		
Men	18	82%
Women	4	18%
<b>Work Period</b>		
1-15 Years	1	4%
16-30 Years	9	41%
> 30 Years	12	54%
<b>Ancestry</b>		
Yes	14	63%
No	8	36%
<b>Age</b>	> 43 Years	

## Univariate Analysis

**Table 2: Univariate Analysis**

<b>Variable</b>	<b>Minimum Value</b>	<b>Maximum Value</b>	<b>Average (mg/dL)</b>
Farmers	3,2	8,9	5,6
Office Workers	3,2	8,2	4,9

Based on Table 2, the average uric acid level in farmers was higher (5.6 mg/dL) than the average uric acid level in office workers (4.9 mg/dL). There was a difference in uric acid levels between farmers and office workers in Koto Cayo Village, Air Hangat Barat District, Kerinci Regency.

**Table 3: High Uric Acid Levels in Farmers**

<b>Sex</b>	<b>N</b>	<b>(%)</b>
Men	11	73%
Women	4	27%
<b>Work Periode</b>		
1-15 Years	1	7%
16-30 Years	4	27%
> 30 Years	10	66%
<b>Ancestry</b>		
Yes	10	66%
No	5	33%
<b>Age</b>	> 43 Years	

**Table 4: High Uric Acid Levels in Farmers**

<b>Sex</b>	<b>N</b>	<b>(%)</b>
Men	7	100%
Women	0	0%
<b>Work Period</b>		
1-15 Years	0	0%
16-30 Years	5	71%
> 30 Years	2	28%
<b>Ancestry</b>		
Yes	4	57%
No	3	42%
<b>Age</b>	> 48 Years	

## Bivariate Analysis

**Table 5: Bivariate Analysis**

<b>Uric Acid Levels</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Sig.(2-tailed)</b>
Farmers	46	5,639	1,6586	0,046
Office Workers	46	4,976	1,4783	0,046

Based on table 5 Differences in Uric Acid Levels in Farmers and Office Workers The Average Uric Acid Level in Farmers is 5.6 Mg/dL with a Standard Deviation of 1.658. While the Average Uric Acid Level in Office Workers is 4.9 mg/dL with a Standard Deviation of 1.478. The results of the Independent T-Test obtained a value of  $p = 0.046$  ( $p < 0.05$ ) so it can be concluded that there is a Difference in Uric Acid Levels in Farmers and Office Workers in Koto Cayo Village, Air Hangat Barat District, Kerinci Regency.

## Discussion

### Research Characteristics

This study involved 92 respondents, consisting of 46 farmers and 46 office workers. The results showed that the average uric acid level in farmers (5.64 mg/dL) was higher than in office workers (4.97 mg/dL). Furthermore, uric acid levels tended to be higher in men (6.3 mg/dL) than in women (4.5 mg/dL). This finding aligns with previous research suggesting that men have a higher risk of hyperuricemia due to the lack of estrogen, the hormone that plays a role in increasing uric acid excretion in the urine.

By age group, the average uric acid level increased with age, reaching 4.5 mg/dL in those aged 25–45, 5.9 mg/dL in those aged 46–60, and 7.2 mg/dL in those

over 60. These results support the theory that the prevalence of hyperuricemia increases in older age due to a decline in physiological function, including the kidneys' ability to excrete uric acid.

Research also shows that uric acid levels increase with length of service. Respondents with more than 30 years of service had the highest average uric acid levels (6.9 mg/dL), compared to those with 16–30 years of service (5.6 mg/dL) and those with 1–15 years of service (4.3 mg/dL). Furthermore, respondents with a family history of gout showed higher average uric acid levels (6.0 mg/dL) than respondents without a family history (4.8 mg/dL), indicating a role for genetic factors in increasing uric acid levels.

Elevated uric acid levels are influenced by various factors, such as consumption of foods high in purines, endogenous purine metabolism, genetic factors, age, gender, and the kidneys' ability to excrete uric acid. Physiologically, the kidneys are responsible for excreting approximately two-thirds to three-quarters of the body's uric acid, with the remainder excreted through the intestines. Disruptions in the excretion process can lead to hyperuricemia, which can potentially lead to cell damage and various health problems.

### **Analysis Univariate**

The results showed that the average uric acid level among farmers was 5.6 mg/dL (SD=1.658), higher than that of office workers, who had an average of 4.9 mg/dL (SD=1.478). In both groups, the highest uric acid levels were more common in men respondents, those over 45 years old, those with longer work experience, and those with a family history of gout.

The high uric acid levels in men align with the theory that men lack the hormone estrogen, which plays a role in increasing uric acid excretion through urine. Furthermore, increasing age is also associated with increased uric acid levels due to decreased metabolic and excretory function. Genetic factors also contribute to the risk of hyperuricemia, as evidenced by the higher uric acid levels in respondents with a family history.

The higher uric acid levels among farmers compared to office workers are thought to be related to more strenuous physical activity. Excessive physical activity can increase lactic acid production, which inhibits uric acid excretion, leading to

elevated uric acid levels in the blood. These findings align with several previous studies that reported a high prevalence of hyperuricemia in farmers due to heavy physical activity and consumption of foods high in purines.

Most office workers have uric acid levels within normal limits, although some respondents show elevated levels. This condition is influenced by factors such as age, gender, family history, length of service, and dietary habits, which play a significant role in uric acid production and excretion. Therefore, maintaining a low-purine diet and adopting a healthy lifestyle are necessary to prevent hyperuricemia and gout in both occupational groups.

### **Bivariate Analysis**

The results of the independent t-test showed a significant difference in uric acid levels between farmers and office workers ( $p=0.046$ ;  $p<0.05$ ). This finding indicates that occupational type is associated with differences in uric acid levels; thus the research hypothesis stating that there is a difference in uric acid levels between the two groups is accepted.

Differences in uric acid levels can be influenced by various factors, including consumption of high-purine foods, physical activity, genetic factors, age, gender, and the kidneys' ability to excrete uric acid. Consumption of high-purine foods such as organ meats, red meat, seafood, and certain fatty foods is known to increase uric acid production and trigger hyperuricemia. Conversely, a low-purine diet and appropriate treatment can help maintain uric acid levels within normal limits.

Long-term hyperuricemia carries the risk of monosodium urate crystal deposition in the joints, which can lead to gout, joint pain, and various other health complications, including hypertension, kidney disease, and diabetes mellitus. In this study, elevated uric acid levels were more frequently found in male respondents, those over 45 years of age, and those with more than 15 years of service. Therefore, regular uric acid level checks, adopting a healthy, low-purine diet, and managing other risk factors are important to prevent hyperuricemia and its complications.

### **Conclusion**

Based on the results of data processing and analysis, the following conclusions can be drawn:

1. The average uric acid level among farmers is 5.64 mg/dL, with a minimum score of 3.2 mg/dL and a maximum score of 8.9 mg/dL, with a standard deviation of 1.658.
2. The average uric acid level among office workers is 5.04 mg/dL, with a minimum score of 3.2 mg/dL and a maximum score of 8.2 mg/dL, with a standard deviation of 1.478.
3. There is a difference in uric acid levels among farmers and office workers in Koto Cayo Village, Air Hangat Barat District, Kerinci Regency ( $p$ -value  $0.046 < 0.05$ ).

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