COMPARISON OF URIC ACID LEVELS IN MAN AND WOMAN AGED 45-60 YEARS

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ABSTRACT

Gout arthritis is a progressive disease due to the deposition of monosodium urate (MSU) crystals in joints, kidneys, and other connective tissues as a result of chronic hyperuricemia. The purpose of this study was to compare uric acid levels in men and women aged 45-60 years.

The type of research used in this research is observational analytic with a quantitative approach and the method used in this research is Enzymatic Colorimetric (Uricase). This method uses the aid of a spectrophotometer to measure uric acid levels. The spectrophotometer used in this research is Pentra C200.

The results of the research conducted at the UPTD Balai LABKESDA Gorontalo Province showed that abnormal uric acid levels were more in men than uric acid levels in women where the abnormal number in men was 7 respondents and in women only 4 respondents. This is because men have a higher risk of developing gout compared to women whose risk will be the same as men when entering the age or period of menopause.

Keywords : Gout, Age, Gender, Normal, Abnormal

INTRODUCTION

According to the Universe Health Organization (WHO), non-communicable diseases (NCDs) account for 63% of the world's 36 million deaths per year. The increase in PTM has a negative impact on the nation's economy and productivity. PTM treatment is usually long-lasting and expensive. Some forms of NCD are chronic or catastrophic and can disrupt the economy of patients and their families. In addition, one of the effects of PTM is the development of disability, including permanent disability. Globally, regionally and nationally, an epidemic transition from communicable to non-communicable diseases is predicted by 2030 [11].

One of the most common diseases known as gout is gout Jaliana, (2018). Gout arthritis Chronic hyperuricemia is a progressive disease caused by the deposition of monosodium urate (MSU) crystals in joints, kidneys, and other connective tissues. Without effective treatment, this condition can lead to chronic gout, tophus formation, and even severe kidney failure and poor quality of life. In daily use, it is still found that overdiagnosis and poor management of gout can cause various gout problems [23]. In the world, based on the World Health Organization, (2016), the prevalence of gouty arthritis is 335 million people experience arthritis. The prevalence of gouty arthritis is 0.5%-1% of a population. Geographically, the distribution of Gout Arthritis is uneven and

is mostly experienced by the female sex. The age range that often experiences is usually 45-65 years of age, the prevalence of gouty arthritis among adults in the United States reaches 3.9% or 8.3 million individuals, with men 5.9% or 6.1 million individuals and women as much as 2.0% or 2.2 million individuals [36].

Based on the results of Horiba medical's Basic Health Research, (2020). In Indonesia, gout (uric acid) is increasing. It was reported that the highest number of sufferers was in Aceh with 13.3%, and the lowest was in West Sulawesi with 3.2%. Based on the distribution of uric acid diagnoses, health workers in Indonesia were 11.9% and 24.7% based on diagnosis or symptoms. Age-related prevalence at the age of 75 (54.8%), from the results of Riskesda it was also obtained data that women (8.46%) exceeds the number of men (6.13%). The incidence of gout is similar in men and women over the age of 60.

Data obtained from the Regional Health Laboratory (Labkesda) of Gorontalo City, uric acid examinations during 2020 were 982 samples with the number of patients in December as many as 117 people.

High uric acid levels cause the formation of uric acid crystals. The accumulation of these crystals causes joint pain, swelling and inflammation. Uric acid levels are generally lower in men and women from birth to adolescence. After infancy, uric acid levels are higher in boys and still higher than in girls. Women's uric acid levels increase after menopause [8].

Uric acid levels can be determined from the results of blood tests and urine blood tests. The reference figure for normal blood uric acid levels in men is 3.6 – 8.2 mg/dl, while in women it is 2.3 – 6.1 mg/dl. The patient's serum is used as a sample to check the level of uric acid in the blood, antimicrobial contamination. Specimens were examined [16].

Jaliana's research, (2018) RT 04 RW 03 About factors that affect acid levels concluded that uric acid levels in blood and urine depend on age and gender. Meanwhile, conducting research on risk factors for gout for 20-44 years in 2018 and obtained the results of 122 respondents, 61 cases and 61 controls. The results of the chi-type test analysis showed that consumption patterns, stress, and family history of purine origin in 2017 were significantly related to the incidence of gout at the age of 20-44 years at the Southeast Bahatarmas Hospital. Sulaw session, the results of the analysis with the Chi-type test showed that physical activity was not significantly involved. Significant With the onset of gout between the ages of 20-44 years.

Other cases or studies related to gout and its factors studied by Nida'an, (2017) which examined 23 women aged 40 years found that almost half of them had abnormal uric acid levels with a total of 9 respondents (39.1 %) because the value is above 5.7 mg/dL. while the number of high-purine diets in 23 respondents showed that almost half of them consumed foods with high purine content with a total of 11 respondents (47.8%).

Uric acid less than 7 mg/dl in men and less than 6 mg/dl in women. may increase gradually to about 3.5 mg/dl before puberty and after puberty, reaching 5.2 mg/dl in males. Uric acid levels in women are generally lower than men of premenopausal age. In men, levels increase to approximate levels, up to 4.7mg/dl. In this case, the kidneys are more responsible for regulating uric acid in the blood and are usually within normal limits. When the production of uric acid is low in the amount of uric acid excreted, it causes the level of uric acid in the blood to increase [16].

Gout is classified into three categories; Primary, secondary and secondary effects. The secondary effect can be caused by two factors: increased production. uric acid and

decreased uric acid levels. Secondary factors affecting age, sex, and climate may coexist with other diseases (diabetes, diabetes, high blood pressure, polycythemia, leukemia, myeloma, sickle cell anemia and kidney) [16].

As mentioned above that the average level of uric acid in the blood and serum depends on age and gender, therefore it is necessary to do research on uric acid levels in men and women aged 45-60 years and compare the differences between the two. For this reason, the researchers took the research title "Comparison of uric acid levels in men and women aged 45-60 years at the Regional Health Laboratory (Labkesda) Gorontalo City in 2020".

Gout comes from the English translation as “uric acid”. one of the constituents of nucleic acids. nucleus of cells in the body. Of course purines It is found in our bodies and our diet, such as foods (meat, fish, vegetables etc.), plants (beans) and in small groups of animals (beef and poultry) [23].

Factors Affecting Gout Atrithis include: a. Age

Gout is caused by old age, especially in postoperative women, between 45-60 years. Komariah, download 2015 This year, gout is becoming more and more common. After menopause in women, uric acid levels increase along with a decrease in estrogen levels (Festy, 2010). This disease usually occurs at the age of 51.4 years, but in 10% of women [14].

b. Generation (genetic)

A close family history of (severe) gout increases the risk. In fact, this part of the body is also influenced by other environmental factors, therefore individuals can be exposed to gout. Having a history of gout in the family increases the risk of gout [14].

c. Gender

Men are at a higher risk of developing gout, while the percentage of women is smaller and appears only after menopause. Male uric acid levels increase with age (puberty).

Women have the hormone estrogen. Production of this hormone increases with puberty, so young women rarely develop hyperuricemia. Quoted from Komariah, 2015. This estrogen hormone helps in clearing uric acid. Hyperuricemia is more common in pregnant women, one of which is a decrease in the hormone estrogen (Price & Wilson, 2013) which is supported by Sacher and Mc Pherson (2012) Who claims that the hormone estrogen plays a role in stimulating follicular growth by inhibiting the activation of protein kinases, which accelerate and accelerate cell proliferation Metabolic activity, including purine metabolism. If gout attacks a woman, women who are most often affected are women who have been infected with gout. In postmenopausal women, estrogen levels are higher.

d. Obesity

Obesity is a disease associated with the development of inflammatory bowel disease. Another function of inflammatory bowel disease is that it occurs as a result of moving cells in the body. Diseases in this category include type 2 diabetes, stroke, high blood pressure, heart disease, and dyslipidemia. Obesity is often associated with obesity, type II diabetes, high blood pressure and hypercholesterolemia (dyslipidemia) [2].

Many terms are needed to define obesity and moderate obesity. Weight gain is an increase in body weight relative to normal. A person is considered overweight if his fat is 10-20% more than usual. Moderate size is an increase in body fat. More in the stomach than in the buttocks, thighs, and arms. It is important to determine

the weight. This is because it is related to the metabolic syndrome. The measurement most commonly used to determine the degree of obesity is also known as the mass index. As the volume of omental fat increases, so does the risk of hyperuricemia. Therefore, obesity should be classified as a major factor in the development of hyperuricemia [15].
e. Drugs.

The use of certain medications can help increase acid levels or relieve acid reflux. Drugs that help the process of excretion of uric acid are uricosuric drugs such as probenecid.

The same is true for high-dose antibiotics that have the same effect as aspirin. Blood chemicals have the effect of interfering with the function of lipid metabolism. Krisnatuti said thiazides is an antidepressant that has the effect of increasing uric acid levels. (Lingga, 2012).

f. Alcohol consumption

Alcohol consumption is a risk factor for gout in men. Alcohol Contains purines and ethanol but prevents the excretion of uric acid. Consumption of fructose-rich drinks such as soda is also minimized. increase the risk of gout, especially in men. As a byproduct of normal alcohol metabolism, the level of lactate in the blood increases, which prevents the excretion of uric acid from the kidneys [1].

RESEARCH METHODS

The approach in this study is a quantitative research approach with the aim of comparing and looking for differences in uric acid levels in male and female sexes at the age of 45-60 years.

This type of research is analytical observational analysis, namely research that explains the relationship between variables through hypothesis testing Sugiyono (2017) In this case, researchers want to find a relationship between gender and age 45-60 years with uric acid levels at the Gorontalo City Regional Health Laboratory. This research was conducted in a period of one month starting from July to August.

The type of data in this study is the type of data that is measured or calculated directly, in the form of information or explanation expressed in numbers or in the form of numbers. In this case, the required quantitative data is the result of uric acid levels in men and women at the age of 45-60 years. Primary data sources are the results of examination of uric acid levels and Secondary Data are the results of observations in the form of initial observation notes on male and female patients aged 45-60 years at the Regional Health Laboratory (Labkesda) Gorontalo City.

The population in this study were all patients who would have their uric acid levels checked at the Regional Health Laboratory (Labkesda) of Gorontalo City as many as 24 people. The sample in this study were some patients who were going to have their uric acid levels checked at the Gorontalo City Regional Health Laboratory (Labkesda) with ages between 45 and 60 years. The sample size in this study was calculated using the Stanley Lemeshow calculation formula.

Formula :

$$n = \frac{NZ^{21-\alpha/Z}\,P(1-P)}{(N-1)\,d2 + Z21-\alpha/ZP(1-P)}$$

The sampling technique used in this research is using Accidental Sampling, namely the sample obtained is directly used as the main sample for examination.

RESEARCH RESULT

Based on research conducted on 23 to 29 August 2021 in the UPTD clinical chemistry laboratory, the Regional Health

Laboratory of Gorontalo Province regarding the comparison of uric acid levels in men and women aged 45-60 years with a total of 24 samples being examined.

The results of the comparative examination of uric acid levels in men and women aged 45-60 years which were obtained were then described in the form of a table along with the following narrative;

Table. 1 Characteristics of Respondents Based on Age

No Age Frequency Percentage %

1. Adult (45 years) 8 33.3%

2. Elderly (46-60 years old) 16 66.7%

3. Total 24 100%

(Source: Primary Data 2021)

Based on table 4 shows that of the 24 respondents, who are included in the adult age category (45 years) as many as 8 respondents with a percentage of 33.3%, while those belonging to the elderly category (46-60 years) are 16 respondents with a percentage of 66.7%.

Table. 2 Characteristics of Respondents Based on Gender

No Gender Frequency (f) Percentage %

1. Man 12 50% 2. Woman 12 50% 3. Total 24 100.0

(Source: Primary Data 2021)

Based on table 4 shows that there are 12 male respondents with a percentage of 50% and female respondents with a percentage of 50%.

Table. 3 Characteristics of Respondents Based on Purine Consumption

No Purine Consumption Frequency (f) Percentage %

1. Alcohol 4 16.7% 2. Frequent consumption of offal/seafood 12 50% 3. Rarely Consume Both 6 25% 4. Don't Consume Both 2 8.3% 5. Total 24 100.0

(Source: Primary Data 2021)

Based on table 4 shows that respondents who consume alcohol there are 4 respondents with a percentage of 16.7%, respondents who often consume offal or seafood foods are 12 respondents with a percentage of 50%, while respondents who rarely consume alcohol or food offal or seafood are 6 respondents with percentage of 25%, and respondents who do not consume both there are 2 respondents with a percentage of 8.3%.

Table. 4 Characteristics of Respondents Based on Obesity

No Obesity Frequency (f) Percentage %

1. Not Obesity 9 37.5% 2. Obesity Level 1 13 54.2%

3. Obesity Level 2 2 8.3% 4. Total 24 100.0

(Source: Primary Data 2021)

Based on table 4 shows that respondents who are not obese there are 9 respondents with a percentage of 37.5%, respondents who have level 1 obesity are 13 respondents with a percentage of 54.2%, and while respondents have obesity level 2 there are as many as 2 respondents with a percentage of 8 ,3%.

Table. 5 The Average Value of Uric Acid Levels in Men and Women

No Gender Referral Value Average Value of Uric Acid Level

1. Man 3.0 – 7.0 mg/dl. 6.7 mg/dl 2. Woman 4.0 – 6.0 mg/dl. 5.1 mg/dl *(Source: Primary Data 2021)*

Based on table 4.5, the average value of uric acid levels in men is 6.7 mg/dl and women 5.1 mg/dl which is higher than the average value of uric acid levels in men. on women. **Table. 6** Normality Test Results

		Statistics	df	Sig.
Age	Normal	.688	13	.000
	Gout	.486	11	.000

	Gout	*Shapiro-Wilk*

Gender	Normal	.628	13	.000
	Gout	.625	11	.000

(Source: Primary Data 2021)

Before the frequency distribution test was carried out on the comparison of the results of the examination of uric acid levels in men and women aged 45-60 years, the data normality test was carried out first. In this study, the number of samples was 24 respondents. So this study uses normality analysis using the Shapiro Wilk test.

According to Setyo (2014), in the Shapiro-Wilk test the data is said to be normally distributed if the significant value is more than the significant level (5% or 0.05).

Table. 7 Mann-Whitney Test Results

Uric acid level check	Significant (2 Tailed)	Significant level	description
	.000	0.05	significant

(Source: Primary Data 2021)

Based on the table above, the results of the comparative analysis on the comparison of the results of examination of uric acid levels in men and women aged 45-60 years are .000 <0.05, from the results obtained the null hypothesis (H0) is rejected and the alternative hypothesis (Ha) is accepted. , so it can be concluded that the data obtained there are differences in uric acid levels between men and women aged 45-60 years.

DISCUSSION

Uric acid is the end result of the breakdown of purines, where purines are a form of nucleoprotein derivative, which is one of the components of nucleic acids found in the nucleus of body cells. Uric acid is a normal part of blood and urine. Uric acid is produced from food or the breakdown of purine nucleotides and waste products produced by the body. Uric acid can be absorbed through the intestinal mucosa and excreted through the urine [37].

The research was conducted at the UPTD Regional Health Laboratory of Gorontalo Province. This study aims to compare and at the same time look for differences in uric acid levels in male and female sex at the age of 45-60 years. as many as 7 people have high uric acid levels, compared to female respondents, which is only 4 people. In addition to gender, age can also affect uric acid levels in a person.

1. Age

According to the theory put forward by Jaliana (2018), age is a unit of time that measures the existence of an object or creature, both living and dead. Human age is measured from the time he was born until the time that age was calculated. Where the age of development of gouty arthritis before the age of 30 years is more common in men than women. However, the incidence of gouty arthritis became the same between the sexes after the age of 60 years. The prevalence of gouty arthritis in men increases with age and peaks between the ages of 75 and 84 years. Women have an increased risk of gouty arthritis after menopause, then the risk starts to increase at the age of 45 years with decreasing estrogen levels because estrogen has a uricosuric effect, this makes gouty arthritis rare in young women.

Based on the research results obtained on the age characteristics shown in table 4 above, that of the 24 respondents who are included in the adult age category (45 years) as many as 8 respondents with a percentage of 33.3%, and those belonging to the elderly category (46-65 years). as many as 16 respondents with a percentage of 66.7%. Where when a person enters menopause the risk of developing gout is higher.

This study is in line with research conducted by (2019) that the proportion of respondents aged > 40 years who have high blood uric acid levels, namely 132 respondents (69.8%) compared to respondents aged 40 years, which is only 57 respondents (30.2%). From the many theories regarding the age of gout sufferers and the findings of the field results that are in line with these theories, it can be said indirectly that gout has the highest risk when a person is over 40 years old.

2. Gender

Gender is something that shows the biological differences between men and women. Biological differences and biological functions of men and women are not interchangeable between the two, and their functions remain with men and women on earth. Gender is often a differentiator of roles and tasks in everyday life and in terms of work [3].

Based on the results of the research obtained on the gender characteristics shown in table 4 above, that the male respondents were 12 respondents with a percentage of 50% and for female there were 12 respondents with a percentage of 50%.

This study is in line with previous research conducted by Fandi Wahyu Widyanto (2014) with the title Gout Arthritis and its Development which explains that a person who is male suffers from hyperuricemia more than women. This is because the high risk of hyperuricemia in women is common after menopause and is influenced by a decrease in the hormone estrogen. Meanwhile, in high-risk men, hyperuricemia can occur at any time without being influenced by the hormone progesterone.

3. Consumption of Purines

According to the theory put forward by Kusmayanti (2018) Purine is a nucleotide compound. These compounds have a wide role in various biochemical processes of the body. Together with amino acids, nucleotides are the basic unit of the biochemical process of genetic inheritance. Where these purines can come from foods such as liver offal, gizzard, chicken and beef intestines and alcohol consumption.

Based on the research results obtained on the characteristics of purine consumption in table 4.3 above, it shows that respondents who consume alcohol are 4 respondents with a percentage of 16.7%, respondents who often consume offal or seafood are 12 respondents with a percentage of 50%, and while respondents who rarely consume alcohol or food offal or seafood there are 6 respondents with a percentage of 25%, and respondents who do not consume both there are 2 respondents with a percentage of 8.3%. Where the abnormal results are also supported by a questionnaire that has been given to respondents, from 7 male respondents with high uric acid levels, there are 4 respondents who claim to often consume alcoholic beverages.

Abnormal uric acid levels in women obtained in the results of the study were 4 respondents, less than the results of examination of abnormal uric acid levels in men. This is because women have a lower risk of developing gout at a young age, but the risk will be the same as men when entering menopause. From the abnormal number obtained, respondents often consume foods that contain lots of purines and are also caused by age factors that have entered the premenopausal period or even those who have experienced menopause.

This study is in line with research conducted by Jaliana (2018) where consuming alcohol is an additional source of purines and can inhibit the

excretion of uric acid. Blood lactate levels increase as a by-product of normal alcohol metabolism, thereby inhibiting renal excretion of uric acid. While there are 3 abnormal samples that are influenced by age, this is in line with the theory that men have a higher risk of developing gout starting at the age of under 40 years compared to women whose risk of developing gout increases after entering menopause.

4. Obesity

According to the theory put forward by Lingga (2012) Obesity is a chronic condition that is very closely related to an increased risk of a number of degenerative diseases. Obesity is an increase in body weight beyond the limits of physical needs and as a result of excessive fat accumulation in the body. Everyone needs a certain amount of body fat for energy storage, as heat insulation, shock absorption and other functions.

Based on the research results obtained on the characteristics of obesity in table 4 above, it shows that respondents who are not obese there are 9 respondents with a percentage of 37.5%, respondents who have level 1 obesity are 13 respondents with a percentage of 54.2%, and while respondents have obesity level 2 there are as many as 2 respondents with a percentage of 8.3%. This study is in line with research conducted by Jaliana, (2018) where in obesity there is an increase in uric acid production and a decrease in the rate of uric acid excretion by the kidneys. Therefore obesity has a significant effect on uric acid levels.

After obtaining the results of the examination of uric acid levels in men and women aged 45-60 years, the researchers processed the data by conducting a normality test first, which aimed to see whether the data obtained were normally distributed or not. After carrying out the normality test, a non parametric test was carried out using the Mann-Whitney test with the results that there were significant differences between uric acid levels in men and women aged 45-60 years.

Hyperuricemia is a condition where uric acid levels in the blood are more than 7.0 mg/dL in men and more than 6 mg/dL in women. The normal value for uric acid levels in men is below 7 mg/dL and in women below 6 mg/dL, before puberty is around 3.5 mg/dl and after puberty, in men the levels will increase gradually and can reach 5.2 mg. /dl. In women, uric acid levels usually remain low, but when women enter premenopausal age levels increase to close to levels in men, which can reach 4.7 mg/dl [35].

Factors that affect a person suffering from hyperuricemia apart from food factors that contain lots of purines also depend on age, gender, obesity, alcohol, drug consumption and kidney disorders. Hyperuricemia is more common in men over the age of 40, because uric acid levels in men tend to increase with age. At this age, men experience a decline in ability that is not as energetic as men aged 20 years because they have problems with muscles or joints [28].

The relationship between age and gout is where in the elderly there is a decline in cells due to the aging process which can result in organ weakness, physical decline, the emergence of various diseases such as increased uric acid levels (hyperuricemia). Before the menopause phase occurs, it is usually preceded by a premenopausal phase where in this premenopause phase there is a transition from the fertile period to the absence of fertilization (anovulatoir). Most women begin to experience premenopausal symptoms in their 40s and reach a peak at the age of 50, which is entering menopause where women are no

longer menstruating. The age range for menopause is 45-65 years [34]. In the diagnosis of a disease, it is necessary to carry out a preliminary examination, such as laboratory examinations and to obtain truly valid and thorough examination results, as with gout, an examination is carried out first in a clinical laboratory. The results of the examination are influenced by several factors, namely pre-analytical factors, analytical factors and post-analytic factors [13].

Along with the times and technological advances to carry out clinical chemistry examinations using the enzymatic colorymatic method using the aid of a spectrophotometer in measuring uric acid levels, the levels can be measured using one of the tools, the Pentra C200. This tool is used to perform various clinical chemistry tests such as uric acid, glucose, and other chemical tests [4].

Based on the results of this study, it was found that the results of the examination of abnormal uric acid levels were more in men than women, this is because the male respondents with high uric acid levels on average admitted that they often consumed drinks containing alcohol while the female respondents consume foods that contain a lot of purines such as chicken or beef offal and have an age that can be categorized as elderly.

CONCLUSION

Based on the results of research on the comparison of uric acid levels in men and women aged 45-60 years, it can be concluded that:

1. The results of the examination of uric acid levels in male respondents had an average value of 6.7 mg/dl.
2. The results of the examination of uric acid levels in female respondents had an average value of 5.1 mg/dl.
3. Men have a higher average uric acid level, which is 6.7 mg/dl compared to the average uric acid level in women which is only 5.1 mg/dl. Apart from age and gender, there are other factors that can affect acid levels. uric acid is the consumption of foods and drinks that contain purines.

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