ANALYSIS OF THE DETERMINANTS OF THE INCIDENCE OF GOUT (URIC ACID) DISEASE FACTORS THAT AFFECT JOINT HEALTH IN INDRA JAYA SUB-DISTRICT IN 2023

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Abstract

The incidence of gout in the world is estimated at 47.2% which varies in various populations spread throughout the world. The prevalence of gout in the population aged> 15 years according to the district of Aceh Jaya based on the highest doctor's diagnosis is in several gampong (12.62%), therefore the Indarajaya Health Center working area was chosen as the location of this study. This study aims to determine the predictors of gout in communities in coastal areas. This study used a case-control study design. The population in this study were people living in coastal areas of the Indra Jaya Health Center working area with a total sample of 106 samples (53 cases and 53 controls). Sampling using a simple random sampling technique. Data collection using a questionnaire and the data that has been collected is statistically analyzed using the chi-square test at a confidence level of 95% (α = 0.05) which aims to analyze predictors of uric acid. The results showed that genetic factors with a value of (p = 0.004: OR = 3.559: CI = 1.483-8.539) and purine consumption patterns with a value of (p = 0.02: OR = 3.103: CI = 1.162-8.288). It can be concluded that genetic factors and purine consumption patterns are predictors or risk factors for the incidence of gout in coastal communities in the Indrajaya Health Center working area. We recommend that coastal communities limit food.

Keywords: *Predictors, Gout, Genetic, Purine*

1. INTRODUCTION

Gouty arthritis commonly known as gout is a disease caused by the accumulation of monosodium urate crystals in the body. Uric acid is the final metabolic product of purine, which is one component of nucleic acid contained in the nucleus of body cells. Increased uric acid levels can cause disorders in the human body such as feelings of pain in the joints and are often accompanied by severe pain for the sufferer. Lately, there has been a tendency for the epidemiological transition of diseases. From infectious diseases to non-communicable diseases such as diabetes mellitus and other metabolic diseases (Madyaningrum et al., 2020).

One of the non-communicable diseases that should be watched out for is gout or gouty arthritis because it can cause serious complications. In addition to gout, another disease that is important to watch out for and prevent is hypertension, especially hypertension in pregnancy (Masriadi et al., 2022). The World Health Organization (WHO) estimates that the global prevalence of gout is around 2.6-47.2% which varies in various populations spread throughout the world. The World Health Organization (WHO) estimates that around 335 million people in the world suffer from gout, and in the United States it is estimated to be 13.6% of the 100,000 population Data from the results of basic health research (Riskesdas) in 2018 showed that the prevalence of gout in Indonesia based

on the diagnosis of health workers was still quite high at 7.3%. The provinces with the highest prevalence were Aceh at 13.265, Bengkulu at 12.11%, Bali at 10.46%, and Papua at 10.43% and Southeast Sulawesi Province at 5.63%, respectively (Kemenkes RI, 2023).

Increased uric acid levels are caused by the body producing large amounts of uric acid while the excretion of uric acid through the urine has decreased. About 20-30% of gout patients are caused by purine synthesis that does not run normally, triggering an increase in acid levels (Pratiwi, 2017). There are many limitations to express hyperuricaemia, which is a condition where there is an increase in uric acid levels that can reflect the presence of pathology. The pragmatic limit commonly used is uric acid levels above 7mg% in men and 6 mg% in women can be said to have hyperuricaemia.(Rismawati, 2023)

The prevalence of gouty arthritis is influenced by high and low uric acid levels. The higher the uric acid level, the greater the risk of gouty arthritis. Uric acid disease is caused by excess production of uric acid in the body or can also be caused by inhibition of uric acid removal by the body. Gouty arthritis that exceeds normal limits, also harms the kidneys and heart. Patients with hyperuricaemia are at increased risk of uric acid stone formation in the kidneys and calcium oskalate stones. These two stones will cause high pressure in the kidney stones and blood vessels, so that the walls of the blood vessels become thicker and the blood flow to the kidneys is reduced. This is what causes kidney damage.

If gout disease is not treated properly, it will cause various serious complications in sufferers (Vinet & Zhedanov, 2014). Complications due to gout are also called joint deformities (Indonesian Rheumatology Association, 2018). Joint deformities can occur due to chronic inflammation that causes continuous gout attacks and the formation of tophi around the joints (Madyaningrum et al., 2020). This condition, if it persists and experiences repeated attacks in a more frequent intensity, will develop into a more severe condition with more serious complications. Some of the serious complications of this disease include heart disease, kidney disease and other kidney diseases or disorders (Widyanto, 2014).

There are many risk factors that cause a person to experience elevated uric acid levels, including age, gender, high purine intake, and high uric acid levels. Other factors such as excessive alcohol consumption, hypertension and heart disease, certain medications (especially diuretics) and impaired kidney function. Research from (Rosdiana et al., 2018) shows that assam urate is indeed one of the health problems, especially in rural communities. The reason for conducting this study is because the problem of hyperuricemia can affect various groups of society and various age groups. In his research, he found that there was an association between purine intake and the incidence of gout with a p value of 0.00116.

Based on the background and previous research, this study aimed to analyse the factors that influence the incidence of gout and its impact on joint health in Indra Jaya sub-district. Using a case-control study design, this study aims to identify the main predictors that contribute to the incidence of gout in coastal communities. The main difference of this study lies in its specific focus on the population in the Indra Jaya coastal area, as well as its emphasis on genetic factors and purine consumption patterns as the main risk predictors for gout. The contribution of the study is to provide a deeper understanding of the factors that influence the incidence of gout in the Indra Jaya coastal

area. By identifying key predictors such as genetic factors and purine consumption patterns, this study provides valuable insights for the prevention and management of gout in coastal communities. In addition, this study also provides a basis for the development of health interventions that are more targeted and effective in reducing the risk of developing gout disease and improving the joint health of people in the region.

2. RESEARCH METHODS

The type of research used is quantitative analytical research with a retrospective case control study design. The choice of this research design was taken because of the consideration that this study aims to analyze and ensure that genetic factors (family history) and purine consumption patterns as predictors or risk factors for the incidence of gout in coastal communities in the working area of the Kulisusu Health Center, North Buton Regency. In this study, researchers first identified the case group (gout sufferers) and the control group (non-gout sufferers), then identified predictor factors (genetic factors and purine consumption patterns) that occurred in the past. So that it can explain why the case group can be affected and the control group is not.

3. RESULTS AND DISCUSSION

3.1. Factors Affecting the Incidence of Gout (Uric Acid) Disease

Genetic Factors (Family History) and the Incidence of Uric Acid Genetic factors or family history is the history of the course of the disease of gout patients seen based on the lineage of one level up, namely only from the mother and father. The cause of increased uric acid levels in the blood can occur due to genetic factors. Purines are found in cells in the form of nucleotides. Together with amino acids, nucleotides are the basic unit in the biochemical process of decreasing genetic traits. The statistical test results obtained that the OR = 3.559 > 1, meaning that genetic factors or family history are predictors or risk factors for gout.

Previous research by (Major et al., 2018) showed that there was an association between genetic factors and the incidence of gout. Although it is not yet known exactly how the genome or genetic factors can cause gout. However, it is certain that there is a difference in the level of morbidity related to gout between people with genetic factors or a higher family history compared to respondents who do not have genetic factors or family history. (Major et al., 2018) research also found that respondents with genetic factors had uric acid levels or hyperuricemia and gout that could progress more quickly to gout or ghout atritis.

The results of this study are also supported by research by Zhang et al (2022) who in their study found that people with genetic factors or a history of gout in the family (their parents) will have a chance to experience gout. In a further study, (Zhang et al., 2022)combined genetic factors with a poor lifestyle, for example related to eating and drinking habits that contain purines, then the person will have a risk or chance of experiencing gout 2.4 times greater than people who do not have genetic factors and also have a good lifestyle or good eating and drinking habits such as avoiding food and beverage intake containing purines. In the explanation of (Zhang et al., 2022), this is because someone who already has a talent or genetic hyperuresemia coupled with the

wrong lifestyle, especially related to eating and drinking patterns, will easily accumulate purine crystals in the joints of that person. Previous research by (Magfira & Adnani, 2021) also supports the results of this study, namely that there is a relationship between genetic factors or the presence of a family history with the incidence of gout. In his research it was found that people who have a genetic or family history related to gout have a risk of 10.7 times greater than people who do not have genetic factors (family history) related to gout.

In line with the results of this study, based on interviews with respondents said that they did have parents who suffered from gout. They also often eat foods that contain purine sources such as shellfish, sea snails and crabs and shrimp. They consume foods with this purine source not well patterned and not well positioned. This means that they consume excessive purine sources. In addition, many respondents had a history of drinking purine-containing beverages such as beer, especially during their youth. An interview with one respondent who is a case group or gout sufferer said that his parents/father died with various complications of diseases such as kidney problems and gout and the results of medical examinations conveyed that his uric acid levels were high. Conversely, the results of interviews with the control group (respondents who do not have gout) that they are accustomed to doing things for the good of their health and eating a good diet. A good diet contains staple foods, side dishes, fruits, and vegetables and is eaten in sufficient quantities according to needs. So that they do not suffer from gout and do not have a family history. It is evident from this study that genetic factors are one of the predictors of the incidence of gout, especially in coastal communities in the working area of the Indra Jaya Health Center, Aceh Regency.

3.2. Purine-Sourced Food Consumption Patterns and Incidence of Uric Acid

Purines are organic base compounds that make up nucleic acids and are included in the amino acid group of protein-forming elements. In foodstuffs, purines contained in these nucleic acids will be broken down into mononucleotides. The mononucleotides are hydrolyzed into nucleosides that can be directly absorbed by the body. Some are further broken down into purines and pyrimidines. Purines are then oxidized into uric acid. Purines in the body are formed by nutrients such as glutamine, glycine, formate, aspartate, and CO2. Nucleotide synthesis of purines is independent of exogenous sources of nucleic acids and foodstuffs. Mammals and most vertebrate animals are better able to synthesize purine nucleotides in their bodies (Sety, 2018).

The results of statistical tests from this study obtained that the OR value = 3.103> 1, meaning that purine consumption patterns are also predictors or risk factors for gout This study is in accordance with the results of previous research conducted by (Yuqing Zhang et al., 2014) found that consumption of foods containing purines can increase the re-attack and recurrence of gout. From his research it was also found that the recurrence of gout in research respondents as a trigger was due to consuming foods and drinks containing purines. Be it purines from animals such as meat and purines from plants such as nuts. Strictly speaking, the results of this study from (Yuqing Zhang et al., 2014) that a person with a history or sufferer of gout with food consumption containing purines will increase acute gout attacks by 4 - 5 times compared to those who maintain their diet by not consuming foods that are high in purine sources.

This study shows that respondents' consumption patterns of foods containing purines are very uncontrollable. Based on interviews with respondents, especially in coastal communities, they often consume meat and seafood which also contains high purines such as crabs, clams, snails, squid. This is supported by research conducted by (Kedar & Simkin, 2014) who found that currently epidemiologically there is a shift in the population at risk of developing gout, this is due to diet, especially diet that leads to processed foods that contain a lot of purines. People today are fond of consuming processed foods and drinks.

Food sources that contain high purines are not only from animal products such as meat, fish, or crabs. But also from foods that come from vegetable sources. Consumption of vegetables, especially those that contain high purines such as nuts or processed beverage products can also trigger an increase in uric acid levels in the blood, this is in accordance with the results of this study, interviews with respondents they said that they would consume the food that was available or available without seeing that it was food that contained a lot of purines or not. This is what causes many cases of gout in the community in the coastal area of the Indrajaya Health Center working area.

Based on the results of research in the coastal area of the Indrajaya Health Center working area, Aceh Jaya Regency, shows that out of 53 cases there are 46 respondents (86.8%) who have intake of food consumption of purine sources at risk and suffer from gout, the average respondent consumes foods that contain purines. Such as bread, salted fish, chicken meat, tuna fish, spinach vegetables, kale vegetables, long beans, tofu, tempeh, and eggplant vegetables, which contain purines that are always consumed by respondents are triggers for gout. Based on the results of the interview, the respondent stated that he often consumed foods that contained purines, besides that the respondent's eating habits did not change much after knowing that he was diagnosed with gout and the respondent still consumed purine source foods which should be prohibited.

This is due to socioeconomic factors which are the factors that most determine the quality and quantity of food consumed. In addition to this, because the food is readily available and easy to obtain, besides being more economical, respondents will be easier and more practical in providing their food.

Furthermore, the results also showed that out of 53 cases there were 7 respondents (13.2%) who consumed purine consumption patterns that were not at risk and suffered from gout, from the results of interviews with respondents stating that high uric acid levels were not only caused by high purine foods but many other risk factors such as heredity or family health history, excessive body weight and not implementing a healthy lifestyle. In the control group (not gout sufferers) the results showed that out of 53 respondents there were 36 respondents (67.9%) who had risky purine consumption patterns, based on the results of interviews with respondents, frequent consumption of purine-sourced foods was due to respondents not having other food choices to consume because the majority of existing foods were sold in the surrounding environment. In addition, a great desire to consume several types of risky foods cannot be heeded, so these foods are still often consumed by respondents, although consuming risky foods daily is still within normal limits so as not to cause gout. While in the control group (not gout sufferers), the results showed that out of 53 respondents there were 17 respondents (32.1%) who consumed purine consumption patterns that were not at risk, based on the results of interviews with respondents, they were accustomed to managing a good diet and rarely consumed purine

intake that could increase uric acid levels such as sea food, squid shrimp, clams, crabs, anchovies, and others.

4. CONCLUSION

Genetic factors or family history and purine-sourced food consumption patterns are predictors of the incidence of gout disease in coastal communities in the working area of the Indra Jaya Health Center, Aceh Jaya Regency. People who have a family history (there are genetic factors) have a chance of experiencing gout by 3.56 times greater than people who do not have genetic factors (family history) as well as people with risky purine-sourced food consumption patterns have a chance of experiencing gout by 3.1 times greater than people with purine consumption patterns that are not at risk. This is due to the habit of people who consume food sources that contain purines, especially those from the sea such as tuna, crabs, shellfish-shellfish fan uncontrolled shrimp.

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