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Overview of Nutritional Status, Protein and Purine Intake in Gout Patients at Banyu Urip Community Health Center

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ABSTRACT

Gout is a metabolic disorder influenced by diet, nutritional status, and lifestyle, and may lead to serious complications. However, limited data are available on the dietary and nutritional profiles of gout patients in primary healthcare. This study aimed to describe the nutritional status, protein intake, and purine consumption among gout patients at the Banyu Urip Community Health Center, Surabaya. A descriptive quantitative design was used from October 2023 to April 2024, involving 50 respondents selected by purposive sampling. Data were collected through anthropometric measurements, digital uric acid testing, and 2×24-hour dietary recall, then analyzed using descriptive statistics in SPSS. Results showed that 52% of respondents had hyperuricemia, 36% had overnutrition or obesity, and 52% consumed excessive protein. Additionally, 34% had high to very high purine intake. Excessive intake was predominantly observed among individuals with excess body weight. The study highlights a high prevalence of hyperuricemia, overnutrition, and excessive protein and purine intake, underscoring the need for targeted dietary counseling and lifestyle interventions at the primary healthcare level.

INTRODUCTION

Gout is a metabolic disorder caused by increased purine production, decreased renal excretion, and the excessive intake of purine-rich foods[1]. Clinical manifestations include the formation of large sodium urate crystals, joint inflammation, kidney impairment, and arthritis[2]. A purine-rich diet contributes significantly to hyperuricemia, which can be managed through a low-purine dietary approach[3]. In addition, nutritional status, poor eating habits, and obesity are well-known factors influencing uric acid levels[4].

Globally, the number of individuals affected by hyperuricemia continues to rise, with an estimated 1–4% of the population experiencing gout[5]. The condition is more prevalent among men across various countries[6]. In the United States, approximately 5.7 million people suffer from gout, and this number is projected to reach 8 million by 2030[7]. In Indonesia, a similar upward trend is observed, particularly in East Java, where Surabaya has reported the highest prevalence, reaching 56.8% among individuals aged 45–54 years[8].

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Beyond its increasing prevalence, gout is associated with a heightened risk of serious complications such as cardiovascular disease, kidney failure, and premature death. Studies have shown that individuals with gout have a 30% higher risk of cardiovascular mortality compared to those without the condition[9]. Renal complications are also common, including kidney stone formation and acute renal failure due to the accumulation of urate crystals in renal tissues[10]. Furthermore, gout has been linked to increased risk of infections, metabolic disorders such as diabetes, and reduced quality of life resulting from chronic joint pain and progressive disability[11].

Therefore, managing dietary intake, adopting healthy eating habits, and maintaining an ideal body weight are essential in lowering uric acid levels and preventing complications[10]. Implementing a healthy lifestyle including balanced nutrition and regular physical activity plays a crucial role in long-term gout management. A preliminary study conducted at the Banyu Urip Community Health Center in Surabaya revealed that 19% of gout sufferers were under the age of 40, although the majority remained in older age groups. This emerging trend of younger patients raises public health concerns and underscores the importance of early preventive efforts. However, descriptive data regarding the nutritional status, protein intake, and purine consumption among gout patients particularly at the primary healthcare level remain limited. This study aims to describe the nutritional status, protein intake, and purine consumption among gout patients at the Banyu Urip Community Health Center.

MATERIALS AND METHODS

This study used a descriptive quantitative design and was conducted at the Banyu Urip Community Health Center, Surabaya City, from October 2023 to April 2024. The total population consisted of 99 individuals, with a final sample of 50 respondents selected using a Non-Probability Sampling technique, specifically purposive sampling. Inclusion criteria included individuals aged 18 years and older who were willing to participate and did not have any physical or mental conditions that could interfere with the data collection process. Exclusion criteria included individuals with incomplete data or those experiencing acute illness or other health conditions that could affect nutritional or dietary assessments.

Prior to data collection, all participants were informed about the study procedures and provided written informed consent. Anthropometric measurements, including body weight and height, were conducted to assess nutritional status using Body Mass Index (BMI). Uric acid levels were measured using a digital uric acid test device to assess hyperuricemia status. Dietary intake data were collected using the 2 × 24-hour recall method, which had been previously validated. The recall form was used to assess protein and purine intake. All collected data were processed and analyzed using SPSS

(Statistical Package for the Social Sciences). This study received ethical approval from the Health Research Ethics Commission of Polytechnics of the Ministry of Health Surabaya.

RESULTS

This research involved 50 respondents, both male and female, with most aged over 56 years. 50 Respondents had different levels of education, ranging from no school to graduate college graduates, with various jobs ranging from housemaids to civil servants. There is several respondents whose families suffered from gout did not suffer from it.

Table 1 Respondent Characteristics

Variable	Number of Sufferers	
	n	%
Age (Years)		
15-25	1	2
26-35	5	10
36-45	12	24
46-55	12	24
>56	20	40
Gender		
Man	19	38
Woman	31	62
Education		
No/not yet at school	1	2
Didn't finish elementary school	2	4
Finished elementary school	3	6
Completed junior high school	12	24
Finished high school	29	58
Completed D1/D2/D3/PT	3	6
Work		
Student/Students	1	2
Private employees	11	22
Laborer/Driver/Maid	9	18
Self-employed	9	18
Other	1	2
Farmers/farm laborers	0	0
PNS/TNI/Polri/BUMN/BUMD	1	2
Not working	18	36
Family History		
There is	29	58
There isn't any	21	42

Source: Primary, 2024

Table 1 shows the characteristics of the 50 respondents involved in this study. The majority of participants were aged over 56 years (40%), followed by those aged 36–45 and 46–55 years, each accounting for 24%. Most respondents were female (62%), while males comprised 38% of the sample.

In terms of educational background, more than half of the participants (58%) had completed high school, followed by 24% who had completed junior high school. Only a small portion had attained higher education (6%), and 12% had not completed elementary school or had never attended school.

Regarding occupational status, the largest group was those not working (36%), followed by private employees (22%), laborers/drivers/maids (18%), and self-employed individuals (18%). A very small proportion were students, government or military employees, or from other occupational categories. In terms of family history, more than half of the respondents (58%) reported having a family history of gout, indicating a possible genetic or hereditary factor in the incidence of the condition among the study population.

Gout is a condition where blood uric acid levels increase due to various factors such as lack of activity, stress, genetic factors, smoking habits and also inappropriate nutritional intake, either less or more, which can have an impact on a person's nutritional status[12]. Age gout sufferers are predominantly aged >56 years, namely 40%. This is in line with research which states that the risk of developing gout is 2.18 times higher in respondents aged 56 years and over. This can happen because at that age the function of the body's organs has decreased decreases due to the aging process, and the body's immune system also does not work optimally[13].

Female respondents tend to have a greater risk of developing gout, this happens because menopausal process. Lack of physical activity can affect several things, one of which is work[14]. Most of the female respondents who are busy as housewives, respondents who do not work tend to have a higher incidence rate stress levels, this occurs due to daily socio-economic conditions and also deprivation factors these activities, so that they can improve the nutritional status of respondents[15]. People who lack physical activity cause fat deposition to increase, which causes it gout. Another factor is lack of exercise which increases the risk of obesity, which increases the risk of high uric acid levels[16]. Apart from lack of physical activity, Family history is also a factor in the occurrence of gout. In theory, genetic factors are involved in the regulation of metabolism[17]. If both parents suffer from gout, there is a possibility that their child will also suffer from gout. This research is in line with the research above, this could happen due to other factors has been mentioned.

Table 2 distribution of education, uric acid levels, nutritional status, protein and purine intake

Variable	Number of Respondents	
	n	%
Education Category		
Once	16	32
Never	34	68
Uric Acid Level Category		
Low	4	8
Normal	20	40
Hyperuricemia	26	52
Nutritional Status Category		
Malnutrition	4	8
Normal	15	30
Overweight	18	36
Obesity I	8	16
Obesity II	5	10
Protein Intake		
More	26	52
Normal	17	34
Light level deficit	2	4
Medium level deficit	3	6
Severe level deficit	2	4
Purine Intake		
Very low	9	18
Low	9	18
Moderate	15	30
High	14	28
Very high	3	6

Source: Primary, 2024

Table 2 presents the distribution of respondents based on education, uric acid levels, nutritional status, and protein and purine intake. It shows that 68% of respondents had never received nutrition education, which may contribute to poor dietary choices and mismanagement of gout. More than half of the respondents (52%) were categorized as having hyperuricemia, while only 40% had normal uric acid levels. In terms of nutritional status, 36% were classified as overweight and 26% fell into the obesity categories (Obesity I and II), indicating a tendency toward excessive body weight. Malnutrition and undernutrition were observed in only a small proportion (8%). These findings highlight the potential link between poor nutritional awareness and increased risk of gout-related complications due to excessive body mass and elevated uric acid levels.

Regarding nutrient intake, 52% of respondents had excessive protein intake, while only 34% had normal intake. Additionally, 30% of respondents had moderate purine intake, and 34% had high to very high purine intake. These data suggest that inappropriate dietary intake, particularly high consumption of protein and purine, may be contributing to hyperuricemia among respondents. Although excessive energy intake is not directly associated with uric acid elevation, high protein and purine intake is directly linked to uric acid accumulation and weight gain. While protein plays a vital role in supporting immune function and energy metabolism, excessive intake of purine-rich protein

sources can lead to increased uric acid production during purine breakdown[18]. Therefore, dietary education and intervention are essential to help patients manage protein and purine consumption to prevent the worsening of gout symptoms.

Table 3 cross-tabulation of protein intake, purines and nutritional status

Variabel	Nutritional Status Category										Amount	
	Malnutrition		Normal Nutrition		More Nutrition		Obesity I		Obesity II		n	%
	n	%	n	%	n	%	n	%	n	%		
Protein Intake Category												
More	1	25	10	66.7	8	44.4	4	50	3	60	26	100
Normal	2	50	4	26.7	7	38.9	2	25	2	40	17	100
Mild deficit	0	0	1	6.7	1	5.6	0	0	0	0	2	100
Moderate deficit	1	25	0	0	1	5.6	1	12.5	0	0	3	100
Heavy deficit	0	0	0	0	1	5.6	1	12.5	0	0	2	100
Purine Intake Category												
Very low	1	25	1	6.7	5	27.8	2	25	0	0	9	100
Low	1	25	2	40	3	16.7	2	25	1	20	9	100
Moderate	1	25	6	40	3	16.7	2	25	3	60	15	100
High	1	25	4	26.7	6	33.3	2	25	1	20	14	100
Very high	0	0	2	13.2	1	5.6	0	0	0	0	3	100

Source: Primary, 2024

Table 3 presents a cross-tabulation of protein and purine intake with respondents' nutritional status, providing a descriptive overview without assessing statistical relationships. Among respondents with excessive protein intake (n=26), the largest proportion were categorized as having normal nutrition (66.7%) and more nutrition (44.4%), with a noticeable proportion also falling into the obesity categories. Interestingly, high and very high purine intake was most frequently observed in respondents with overnutrition, obesity I, and obesity II. These patterns suggest that elevated protein and purine intake tend to cluster in individuals with excess body weight. Although this table does not analyze causality, it offers a preliminary depiction of how dietary patterns might be distributed across different nutritional statuses in the studied population. This reinforces the importance of monitoring not only total energy intake, but also the quality and composition of nutrients, particularly in individuals at risk of hyperuricemia and gout.

DISCUSSION

This study aims to describe protein and purine intake and its relationship with nutritional status in gout patients at the Banyu Urip Health Center in Surabaya. The results showed that 52% of respondents had hyperuricemia, 36% had an over-nutritional status (including obesity), 52% consumed excessive protein, and 26.7% had high purine intake. These findings highlight a possible

link between a diet high in protein and purine and increased uric acid levels and non-ideal nutritional status in people with gout.

Excess protein intake, especially from animal sources such as red meat, offal, and seafood, has long been associated with increased uric acid levels. Purines from food will be metabolized into uric acid, and if kidney excretion is not optimal, it can accumulate in the blood and form uric crystals in the joints[19,20]. Recent meta-analytical research by Wen et al. (2024) showed that consumption of red meat and seafood significantly increased the risk of hyperuricemia with odds ratios (OR) of 1.31 and 1.47[21].

In this context, the majority of respondents with excess protein intake in this study also had overnutrition or obesity status. This suggests a potential link between high protein consumption, weight gain, and gout risk. A high body mass index (BMI) worsens hyperuricemia through decreased vein excretion due to insulin resistance and increased systemic inflammation[22,23].

Interestingly, although purines are the main contributor to the formation of uric acid, not all respondents with high purine intake experience hyperuricemia[24]. This shows the variability of purine metabolism and uric acid excretion between individuals. Some of the factors that affect the efficiency of venous excretion include kidney function, hydration, physical activity, and genetic factors[25]. Optimal hydration plays a major role in lowering the risk of hyperuricemia. Adequate fluid consumption helps increase uric acid excretion through urine by decreasing water reabsorption in the kidneys and facilitating the elimination of solutes, including uric acid[26].

Hormonal factors also need to be considered, especially in menopausal women. In this study, 62% of respondents were women, and some had gone through menopause. A decrease in the hormone estrogen during menopause is known to decrease the rate of uric acid excretion by the kidneys, thereby increasing the risk of hyperuricemia[27]. This indicates the need for a gout management approach that takes into account hormonal status, especially in elderly female patients.

In addition to food intake, physical activity levels also play an important role in controlling uric acid levels and nutritional status. Many respondents who do not work or have passive jobs show a tendency to be obese. Low physical activity leads to visceral fat buildup and insulin resistance, which further inhibits uric excretion and increases uric acid production through alternative metabolic pathways[28]. The recommended exercise is a moderate type of aerobic exercise because it shows a decrease in serum uric acid compared to strenuous exercise that can temporarily increase serum uric acid levels[29].

A plant-based diet that is rich in fiber and low in animal purine has also been shown to be beneficial. A study by Zhang et al. (2023) found that a plant-based diet lowered the risk of hyperuricemia by up to 29% compared to a diet high in meat. The antioxidant and fiber content in vegetables, nuts, and fruits has been shown to increase vein excretion and reduce oxidative stress in

gout sufferers[21]. However, public understanding of the importance of dietary regulation in gout management is still relatively low. As many as 68% of respondents have never received nutrition education related to gout, including types of foods high in purine and how to manage them. In fact, educational interventions have been proven to be effective in reducing gout attacks and uric acid levels.

It is important to emphasize that gout is not just a metabolic problem, but a multifactorial condition that is influenced by diet, lifestyle, genetics, hormones, and socio-economic status. Therefore, an effective management approach requires multidisciplinary interventions, including doctors, nutritionists, and public health educators.

This study has some limitations. First, the descriptive design of the study does not allow the drawing of causal conclusions between food intake and nutritional status or uric acid levels. Advanced research with analytical designs such as case-control or cohort is needed to understand the causal relationship. Second, the sample size is relatively small (n=50) and only covers one location (Banyu Urip Health Center), so generalization of results to the wider population must be done carefully. Third, the intake data collection method uses 2x24 hours of recall which is prone to memory bias and misreporting, especially in the elderly population. Fourth, this study did not include additional biochemical parameters such as serum creatinine, eGFR, or inflammatory parameters (CRP), which should have enriched the analysis of kidney function and metabolic status of respondents.

The practical implications of the results of this study are the importance of evidence-based nutrition education in gout patients, especially related to reducing animal purine intake, increasing fiber consumption, water, and regular physical activity. In addition, nutrition officers in first-level health facilities need to be actively involved in providing education and dietary monitoring to gout patients. For advanced research, it is recommended to use an analytical study design with larger samples and more complete biochemical parameters. Integrated nutrition education should be part of chronic disease management programs at health centers and other community health services.

CONCLUSION

This study highlights that more than half of the respondents experienced hyperuricemia and had excessive protein and purine intake, which was frequently associated with overnutrition and obesity. Although the study used a descriptive design, the findings underline the critical role of dietary habits in influencing uric acid levels and nutritional status in individuals with gout.

These results emphasize the need for targeted and continuous nutrition education programs at the primary healthcare level, especially regarding the risks of excessive consumption of purine-rich animal protein and the importance of adopting balanced diets rich in fiber and adequate hydration. Future research should adopt analytical study designs with larger samples and incorporate

comprehensive biochemical assessments to explore causal relationships and support evidence-based interventions for gout prevention and management.

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