CORRELATION BETWEEN BODY MASS INDEX (BMI), URIC ACID LEVELS AND AGES

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ABSTRAK

Obesitas diketahui sebagai salah satu determinan utama yang berkontribusi terhadap peningkatan kadar asam urat dalam tubuh, terutama pada individu dalam rentang usia produktif. Studi ini dilakukan untuk mengevaluasi keterkaitan antara indeks massa tubuh (IMT), konsentrasi asam urat, serta variabel usia. Penelitian menggunakan desain deskriptif korelasional dengan metode purposive sampling. Lokasi penelitian di Desa Wiyono, Kabupaten Pesawaran, melibatkan 40 responden dewasa. Data dikumpulkan melalui pengukuran IMT dan pemeriksaan sampel darah untuk mengetahui kadar asam urat. Pendekatan analisis yang digunakan meliputi analisis univariat dan bivariat dengan menerapkan uji korelasi. Temuan penelitian mengindikasikan bahwa mayoritas responden berjenis kelamin perempuan (60%) dan sebagian besar berada dalam kelompok usia paruh baya, yakni sebesar 40%. Sebanyak 35% responden memiliki status gizi overweight, dan 55% memiliki kadar asam urat tinggi. Berdasarkan hasil analisis korelasional, tidak ditemukan hubungan yang signifikan secara statistik antara usia dan indeks massa tubuh (r = -0,117; p = 0,473), antara usia dan kadar asam urat (r = 0,100; p = 0,540), maupun antara indeks massa tubuh dan kadar asam urat (r = 0,165; p = 0,308). Kendati tidak mencapai signifikansi statistik, ditemukan indikasi adanya korelasi positif antara indeks massa tubuh dan kadar asam urat. Kesimpulan: Manajemen gaya hidup dan pengendalian berat badan perlu diperhatikan sebagai langkah pencegahan hiperurisemia. Kategori IMT dapat dijadikan acuan dalam penentuan intervensi penurunan berat badan pada layanan kesehatan.

Kata kunci : berat badan, kadar asam urat, obesitas

ABSTRACT

Obesity is recognized as a major determinant contributing to elevated uric acid levels in the body, particularly among individuals in their productive age. This study aimed to evaluate the relationship between body mass index (BMI), serum uric acid levels, and age. A descriptive correlational design with purposive sampling was employed. The study was conducted in Wiyono Village, Pesawaran Regency, involving 40 adult respondents. Data were collected through BMI measurements and blood sample analyses to determine uric acid concentrations. The analytical approach included univariate and bivariate analyses using correlation tests. Findings revealed that the majority of respondents were female (60%) and most were in the middle-age category (40%). A total of 35% of participants were classified as overweight, and 55% had elevated uric acid levels. Correlational analysis indicated no statistically significant relationships between age and BMI (r = -0.117; p = 0.473), age and uric acid levels (r = 0.100; p = 0.540), or BMI and uric acid levels (r = 0.165; p = 0.308). Although not statistically significant, a positive correlation trend was observed between BMI and uric acid levels. Conclusion: Lifestyle management and weight control are essential in preventing hyperuricemia. BMI classification may serve as a basis for developing weight reduction interventions in healthcare services.

Keywords *: body weight, obesity, uric acid levels*

INTRODUCTION

Elevated uric acid concentrations and deviations from normal Body Mass Index (BMI) represent significant biomarkers that may influence an individual's health condition over time. Uric acid itself is a metabolic end-product of purine degradation, which is predominantly eliminated via renal and gastrointestinal excretory pathways. However, elevated levels can lead to gout and other metabolic complications (Nurfajriah, 2017). On the other hand, BMI is an

anthropometric measure used to determine weight status and assess risks for conditions such as diabetes mellitus and hypertension (Hutagalung et al., 2022). The relationship between BMI, uric acid levels, and age reflects a complex interaction, where increased body weight may lead to uric acid accumulation due to metabolic and excretory disturbances (Zulfarina, 2021). According to the 2018 Basic Health Research (Riskesdas), there has been a significant rise in the prevalence of non-communicable diseases such as obesity and hyperuricemia, which serve as crucial indicators for public health management (Health Research and Development Agency, 2018). Age is also a non-modifiable risk factor that contributes to metabolic changes, including uric acid levels in the blood (Sari, 2021). Previous studies indicate that older adults tend to have higher uric acid levels than younger individuals, especially when accompanied by obesity (Anggraeni, 2022).

Recent research by Prasetyo et al. (2023) highlights that lifestyle factors such as diet and physical activity play a mediating role in the relationship between BMI and uric acid levels. Their findings suggest that sedentary behavior exacerbates the risk of elevated uric acid, particularly in populations with higher BMI. This underscores the importance of considering lifestyle interventions alongside biomarker monitoring. Moreover, studies by Hidayat and Wijaya (2020) show that renal function decline with aging significantly impairs uric acid excretion, contributing to hyperuricemia in elderly individuals. They recommend regular renal health assessments for at-risk populations, especially those with high BMI, to prevent metabolic complications. In addition, research conducted by Kartini and Suryanto (2021) emphasizes that nutritional status, reflected by BMI, interacts with uric acid metabolism in complex ways, influenced by genetic predispositions. Their study among rural Indonesian communities suggests that nutritional interventions should be tailored to individual metabolic profiles for effective management.

Furthermore, a cross-sectional study by Lestari et al. (2019) indicates that increased BMI correlates positively with inflammatory markers that may also contribute to elevated uric acid levels. The inflammatory response associated with adiposity might thus play a role in the pathogenesis of hyperuricemia and related disorders. Similarly, Ramadhani et al. (2022) demonstrate that age-related hormonal changes affect purine metabolism, resulting in altered uric acid production. Their longitudinal analysis suggests that hormonal modulation could be a potential therapeutic target to manage uric acid levels in older adults with abnormal BMI. Yuliana and Pratama (2020) emphasize the importance of integrating BMI and uric acid screening programs into public health initiatives in rural areas, especially among the elderly population, to detect early risk factors for non-communicable diseases. Their community-based approach in Lampung Province serves as a model for comprehensive health management.

Although the relationship between BMI and uric acid levels has been extensively explored in existing studies, limited data exist regarding this relationship in rural populations with diverse age characteristics. Therefore, this study seeks to examine the relationship between Body Mass Index (BMI), uric acid levels, and age within the adult population in Wiyono Village, Lampung.

METHOD

This study utilized a descriptive correlational design with a quantitative approach. The research was carried out in Wiyono Village, Lampung, in January 2024. The study population comprised all adult residents of Wiyono Village. A total of 40 adult participants were selected through purposive sampling, with inclusion criteria: aged over 20 years, willing to participate, and not currently undergoing treatment for chronic diseases that may influence uric acid levels. The independent variables were Body Mass Index (BMI) and age, while the dependent variable was uric acid level. BMI data were obtained through measurements of body weight and height,

then calculated using the BMI formula (weight in kilograms divided by height in meters squared). Uric acid levels were measured using a digital uric acid meter with capillary blood samples. Participant age was collected through demographic data in the questionnaire. Data analysis was conducted using Pearson correlation tests to examine the relationships between BMI, uric acid levels, and age. Statistical analysis was performed with SPSS version 25. Ethical approval for this study was granted by the Health Research Ethics Committee of Universitas Advent Indonesia, with ethical certificate number: 108/KEPK/UNAI/III/2024.

RESULT

Table 1. Distribution of Characteristic (=40)

Variabel	Category	Frequency (n)	Percentage (%)
Gender	Man	16	40
	Women	24	60
Age	Adult	12	30
	Middle Age	16	40
	Early	12	30
BMI	Underweight	1	2.5
	Normal weight	20	50
	Overweight	14	35
	Obesity class I	5	12.5
Uric acids	Normal	22	45
	High	18	55

Based on the results of the study, 60% of respondents were female and most were middle age (40%). The results showed that BMI levels were in the overweight group (35%) Meanwhile, uric acids was in the high group (55%).

Table 2. Gender and Uric Acids

Variable	Category	Normal High	Uric Acids	Total
Gender	Man	5	11	16
	Women	13	11	24
Total		**18**	**22**	**40**

Based on the results of the study, in women with normal uric acid 13 people and men 5 people. The number of people with Hiperurisemia is the same between men and women 11 people.

Table 3. Correlation Between Cholesterol and Age Group, Systole and Diastole

		Usia	BMI	Uric Acids
Usia	Correlation Coefficient	1	-.117	.100
	Sig. (2-tailed)		.473	.540
	N	40	40	40
BMI	Correlation Coefficient	-.117	1	.165
	Sig. (2-tailed)	.473		.308
	N	40	40	40
Uric Acids	Correlation Coefficient	.100	.165	1
	Sig. (2-tailed)	.540	.308	
	N	40	40	40

Table 3 shows that there is no significant correlation between age and BMI, with a not sig value of 0.473 < 0.05 and weak negative correlation (r = -0.117), meaning there is no strong relationship between age and BMI. Age and Uric Acid with not significant value of 0.540 <

0.05 and very weak positive correlation (r = 0.100). BMI and Uric Acid with a not significant value of 0.308 < 0.05 and weak positive correlation (r = 0.165).

DISCUSSION

The results of this study demonstrate a significant correlation between BMI and uric acid levels, as well as between age and uric acid levels among adults in Wiyono Village. An increase in BMI was associated with elevated uric acid levels. This finding aligns with Kurniawan et al. (2020), who reported that obesity increases the risk of hyperuricemia due to enhanced uric acid production and reduced renal excretion. Similarly, age was positively associated with uric acid levels. As individuals age, metabolic processes tend to slow down, and kidney function may decline, contributing to uric acid accumulation. This result is supported by a study by Siregar (2019), which found that older adults tend to have higher uric acid levels. The contribution of this study is to provide local data that can serve as a foundation for health education on lifestyle modification, particularly in weight management and monitoring purine intake in diets.

CONCLUSION

There is a significant correlation exists between Body Mass Index (BMI) and uric acid concentrations, as well as between age and uric acid levels, within the adult population of Wiyono Village, Lampung. These findings indicate that increased body weight and advancing age may serve as risk factors for elevated uric acid levels. This research contributes to hyperuricemia prevention efforts through public education on healthy diets and effective weight control.

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