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ORIGINAL ARTICLE

Higher uric acid serum levels are associated with sarcopenia among elderly in a community health center

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ABSTRACT

BACKGROUND

As people age, skeletal muscle mass and strength decrease, leading to sarcopenia, diagnosed through calf circumference, muscle mass, strength, and physical performance. Uric acid (UA), with both pro-oxidant and antioxidant properties, is an indicator of oxidative stress and may contribute to sarcopenia. This study aimed to determine the correlation between serum uric acid levels and sarcopenia in elderly in a community health center.

METHODS

A cross-sectional study was conducted involving 42 subjects aged ≥60 years, consisting of 37 female and 5 male participants. We applied Asian Working Group for Sarcopenia (AWGS) 2019 criteria to define sarcopenia. Muscle mass was measured using skeletal muscle index (SMI) based on bioimpedance analysis (BIA). Handgrip strength (HGS), physical performance, calf circumference, and blood test data were collected. A backward regression analysis was performed to investigate the relationship between UA and SMI, HGS, physical performance, and calf circumference after adjusting for gender, smoking history, upper arm circumference, and body mass index.

RESULTS

After adjusting for potential confounding variables, uric acid remained significantly associated with muscle strength (β=0.326; p=0.023) and calf circumference (β=0.264; p=0.010), but not with muscle mass (β=0.046; p=0.727) or physical performance (β=–0.171; p=0.279).

CONCLUSION

There is a significant correlation between uric acid levels and muscle strength, physical performance, and calf circumference in sarcopenia among the elderly in the community health center. Higher uric acid serum levels might slow down the progression of sarcopenia.

Keywords: Sarcopenia, uric acid levels, muscle strength, muscle mass, physical performance, calf circumference.

INTRODUCTION

The elderly population in the world continues to increase, currently reaching 962 million people.[1] In Indonesia itself, the number of elderly people currently reaches 23.66 million people (9.03% of the total population) and is expected to increase to 48.19 million people in 2035.[1] The increase in the elderly population will certainly be followed by an increase in health problems related to aging. With increasing age, the human body will experience physiological changes, such as progressive decrease in skeletal muscle mass and strength, known as sarcopenia.[2]

The diagnosis of sarcopenia is based on reduced muscle mass, muscle strength and/or physical performance.[3] The study by Hidayat and Riviati [4] at the Geriatrics clinic of Dr. Mohammad Hoesin Palembang Hospital found that the prevalence of sarcopenia was 14.23%. Factors that play a role in causing sarcopenia include systemic inflammation and oxidative stress.[5] The presence of inflammation is characterized by increased pro-inflammatory cytokines and oxidative stress causing mitochondrial dysfunction, which results in decreased ATP production. Oxidative stress itself can result from excessive production of reactive oxygen species (ROS), which can be the result of uric acid production.[5] Uric acid is believed to have pro-oxidant and antioxidant properties, and to be a reliable indicator of oxidative stress.[6] Although uric acid is widely known as a pro-inflammatory waste product from the breakdown of purine nucleotide metabolism with damaging effects, experimental results show that uric acid can be a double-edged sword in relation to the modulation of oxidative stress.[7]

A cross-sectional study using data from West China Health and Aging Trend found a positive relationship between uric acid levels and muscle strength.[8] Similarly, a study by National Health and Nutrition Examination Survey also supports the idea that higher serum uric acid levels may serve as a protective factor for muscle strength in the elderly.[9] A cross-sectional study showed that higher serum uric acid levels may be associated with better hand grip strength among Chinese adults aged over 45.[10] However, in a study of 586 Japanese men aged over 30, it was found that hyperuricemia was associated with reduced muscle strength, and uric acid levels showed an inverted J-shaped curve with handgrip strength.[11]

Based on these inconclusive results, the present study aimed to determine the correlation of serum uric acid levels with muscle mass, muscle strength, physical performance, and calf circumference in sarcopenia in the elderly in a community health center.

METHODS

Research design

This study was an observational analytic study with a cross-sectional approach and was conducted at Posyandu Lansia in Palembang from September 2024 to December 2024.

Research subjects

The sample size was determined using a correlation-based formula according to the study objective. The calculation used a Type I error of 5% ($Z\alpha=1.96$), a Type II error of 10% ($Z\beta=0.8416$), and a minimal meaningful correlation coefficient of $r=0.45$ based on Molino-Lova et al.[12] Substitution of these values into the standard correlation sample size formula yielded a minimum requirement of 38 subjects. To anticipate potential dropouts, an additional 10% was added, resulting in a final target sample size of 42 participants. Participants were selected through a consecutive sampling technique. This method was chosen for its practicality in community settings, allowing the inclusion of all eligible respondents during the study period. Such an approach helps minimize selection bias and ensures that the sample adequately represents the available target population. The inclusion criteria were individuals aged ≥60 years who were diagnosed with sarcopenia based on the Asian Working Group for Sarcopenia (AWGS) criteria,[3] as described in the Methods section of the present study, under the heading of Definition of sarcopenia. Other criteria were ability of the subjects to communicate well and intelligibly, their willingness to participate in this study after signing informed consent.

The exclusion criteria for this study were subjects with autoimmune diseases, liver disorders, malignant diseases, impaired kidney function with a glomerular filtration rate <30 mL/minute without hemodialysis, acute diseases, neurological disorders, depression according to the geriatric depression scale (score >10), and refusal to participate in the study.

Definition of sarcopenia

We defined sarcopenia according to the Asian Working Group for Sarcopenia (AWGS) criteria,[3] consisting of reduced muscle mass measured using the Bio Impedance Analysis (BIA) examination tool (men: <7.0 kg/m^2, women: <5.7 kg/m^2), reduced muscle strength determined using a handgrip dynamometer (men: <28 kg, women: <18 kg), and/or reduced physical performance in the 6-meter walk test (<1 meter/second). Grip tests were performed on two independent occasions using the dominant hand and the largest value was recorded. The walking time was recorded using a kind of infrared sensor and the acceleration phase was strictly excluded.[8] The participants were asked to perform the test by walking at a normal pace. Subjects stood at the starting point and upon the starting command, walked forward at a normal pace to the 4-m line. During the test, subjects wore common shoes, could use mobility aids, but could not be assisted. There were no time limits to the assessments and subjects could stop and rest if necessary. Sitting down was prohibited. The participants performed 2 trials, and the results were averaged to the nearest 0.01 m/s. The cutoff of gait speed was defined as less than 1.0 m/s.[8] Appendicular skeletal muscle index (ASMI) was used to assess the amount of muscle mass in the upper and lower extremities and to diagnose sarcopenia in elderly persons.[13]

Demographic data and blood sample collection

The data collected in this study included socio-demographic data (age, gender, educational level, smoking history, and alcohol consumption), comorbid diseases, anthropometric data, such as height, weight, upper arm circumference, calf circumference, nutritional assessment data [Mini Nutritional Assessment (MNA)]; functional status (Activity of Daily Living (ADL) score); mental status data (the Geriatric Depression Scale (GDS); cognitive status data (Abbreviated Mental Test (AMT)); and sarcopenia screening data, including calf circumference, muscle strength (Jamar hydraulic hand dynamometer J00105), walking speed (the 6-meter walk test), muscle mass (Bio Impedance Analysis (BIA) tool [Tanita BC545N]). Blood samples were drawn from the median cubital vein in the morning after a minimum of 8 h of fasting. Blood collection and handling were performed under strictly standardized conditions. Serum uric acid levels were measured at Prodia Laboratory using an enzymatic colorimetric uricase method on an automated analyzer. Results were expressed in milligrams per deciliter (mg/dL), with reference ranges of 3.6–8.2 mg/dL for men and 2.3–6.1 mg/dL for women.

Data analysis

Data were processed and analyzed using the SPSS 26 for Windows program. Data were presented in tables and graphs. A backward regression analysis was performed to analyze the data.

Ethical consideration

The research ethics approval was received from the Medical Research Ethics Committee (*Komite Etik Penelitian Kesehatan*, KEPK) of Mohammad Hoesin Hospital, Palembang, under No.DP.04.03/D.XVIII.06.08/ETIK/200/2024. The research subjects were given an explanation of the purpose of the research and procedures related to the research and signed an agreement to participate in this research.

RESULTS

Characteristics of research subjects

Table 1 presents the characteristics of the research subjects. Most subjects were aged 60–70 years (54.7%) and were predominantly female (88.1%). The most frequent educational level attained was senior high school (40.5%), followed by diploma/bachelor's degree (31.1%), and elementary school (21.3%). A total of 24 participants were married (57.1%), while 18 were widows or widowers (42.9%). Most subjects had middle economic status (85.7%), and only 14.3% were classified as having low economic status. Regarding smoking history, 11.9% were current or former smokers, while 88.1% had never smoked. Most subjects had normal nutritional status (66.7%), while 33.3% were underweight. The majority were functionally independent (59.5%), whereas 40.5% were mildly dependent. The most common comorbidity was hypertension (45.3%), followed by arthritis (9.5%), diabetes mellitus (7.1%), and osteoporosis (7.1%). All subjects demonstrated normal cognitive and mental status, as reflected by a mean Abbreviated Mental Test (AMT) score of 9.59 ± 0.59 and a mean Geriatric Depression Scale (GDS) score of 0.36 ± 0.63. The mean Physical Activity Scale for the Elderly (PASE) score was 53.63 ± 29.88, and the mean Charlson Comorbidity Index (CCI) score was 0.78 ± 0.75. Anthropometric measurements showed a mean body weight of 45.80 ± 8.95 kg, mean body mass index of 18.90 ± 2.99 kg/m², mean upper arm circumference of 21.16 ± 3.10 cm, and mean calf circumference of 26.00 ± 2.68 cm. Muscle mass averaged 6.44 ± 0.86 kg/m² in men and 5.54 ± 0.47 kg/m² in women. Muscle strength averaged 28.0 ± 8.6 kg in men and 17.5 ± 5.3 kg in women, while the mean 6-meter walking speed was 9.59 m/s. Regarding sarcopenia status, 45.3% of participants had moderate sarcopenia and 54.7% had severe sarcopenia.

Table 1. Characteristics of the research subjects (n=42)

Variable	n (%)
Age (years)	
60 – 70	23 (54.7
≥71	19 (45.3)
Gender	
Men	5 (11.9)
Women	37 (88.1)
Education	
Elementary school	9 (21.3)
Junior high school	3 (7.1)
Senior high school	17 (40.5)
Diploma/ Bachelor's degree	13 (31.1)
Marital status	
Married	24 (57.1)
Widow / Widower	18 (42.9)
Economic status	
Adequate	36 (85.7)
Poor	6 (14.3)
Smoking history	
Smoking/have smoked	5 (11.9)
Never smoked	37 (88.1)
Nutritional status	
Normal	28 (66.7)
Underweight	14 (33.3)
Functional status	
Independent	25 (59.5)
Mildly dependent	17 (40.5)
Comorbid	
Hypertension	19 (45.3)
Diabetes mellitus	3 (7.1)
Arthritis	4 (9.5)
Osteoporosis	3 (7.1)
Cognitive status	
Normal	42 (100)
Moderate memory impairment	0 (0)
Abbreviated mental test score	0.36 ± 0.62
Mental status	
Normal	42 (100)
Possible depression	0 (0)
Geriatric depression scale score	0.36 ± 0.62
Physical activity scale for the elderly score	53.63 ± 29.88
Charlson comorbidity index score	0.79 ± 0.75
Weight (kg)	45.8 ± 8.95
Body mass index (kg/m^2)	18.9 ± 2.99
Upper arm circumference (cm)	21.17 ± 3.10
Calf circumference (cm)	26.04 ± 2.68
Muscle mass (kg/m^2)	
Men	6.44 ± 0.86
Women	5.54 ± 0.47
Muscle strength (kg)	
Men	28.0 ± 8.6
Women	17.5 ± 5.3
Physical Performance (m/s)	9.59 ± 2.30
Degree of sarcopenia	
Sarcopenia	19 (45.3)
Severe sarcopenia	23 (54.7)
Uric acid	
Normal	36 (85.7)
High	6 (14.3)

Note : data presented as n (%), except for Abbreviated mental test score, Geriatric depression scale score, Physical activity scale for the elderly score, Charlson comorbidity index score, Weight, Body mass index, Upper arm circumference, Calf circumference (cm), Muscle mass, Muscle strength, as mean ± SD

Multivariate analysis testing the relationship between uric acid and ASMI

In this analysis, uric acid, gender, smoking history, upper arm circumference, and body mass index (BMI) were tested to assess the role of each variable that could affect ASMI. The results of the analysis are presented in Table 2, showing that uric acid did not have a significant relationship and influence on ASMI (B=0.012; β=0.046; t=0.352; p=0.727). On the other hand, smoking history and body mass index are variables that have an influence on ASMI. Regression analysis of smoking history showed that it had a significant relationship with a fairly strong positive influence on ASMI (B=0.939; β=0.717; p=0.000), signifying that individuals with a history of smoking will increase in ASMI value by 0.939 kg/m^2.

Table 2. Multiple linear regression model testing the relationship between uric acid and ASMI after adjusting for relevant confounders

Model	Variable	B	β	95% CI (Lower, Upper)	p value
1	Uric acid	0.012	0.046	-0.635, 0.659	0.727
	Gender	0.311	0.238	-0.140, 0.762	0.184
	Smoking history	0.680	0.519	0.266, 1.094	0.003
	Upper arm circumference	-0.011	-0.076	-0.050, 0.028	0.602
	Body mass index	0.035	0.241	-0.006, 0.076	0.112
2	Gender	0.337	0.258	-0.084, 0.758	0.125
	Smoking history	0.688	0.525	0.282, 1.094	0.002
	Upper arm circumference	-0.012	-0.086	-0.049, 0.025	0.546
	Body mass index	0.037	0.261	-0.000, 0.074	0.061
3	Gender	0.297	0.227	-0.101, 0.695	0.151
	Smoking history	0.713	0.544	0.317, 1.109	0.001
	Body mass index	0.030	0.206	0.003, 0.057	0.045
4	Smoking history	0.939	0.717	0.680, 1.198	0.000
	Body mass index	0.032	0.220	0.005, 0.059	0.035

Note: B: regression coefficient; β: standardized regression coefficient; CI: confidence interval; ASMI: appendicular skeletal muscle index

Body mass index also had a significant relationship with ASMI. This relationship was statistically significant with positive influence, although the strength was not too great (B=0.032; β=0.220; p=0.035). This means that every 1kg/m^2 increase in BMI will increase the ASMI value by 0.032 kg/m^2. However, because the effect is not too strong, other factors may also play a role in determining ASMI muscle mass.

Multivariate analysis testing the relationship between uric acid and muscle strength

The data from the multivariate analysis are presented in Table 3. The final results of the backward regression analysis of this study were that uric acid and smoking history were variables that influenced the muscle strength of the research subjects. The analysis value of the uric acid variable was B=1.246; β=0.326; p=0.023 on muscle strength, indicating that uric acid levels had a fairly strong and significant positive effect on muscle strength. This means that the higher the uric acid levels, the greater the muscle strength of the research subjects, where every 1 mg/dL increase in uric acid levels will increase muscle strength by 1.246 kg. Smoking history has a positive and significant effect on muscle strength (B=8.633; β=0.449; p=0.002), which means that individuals who have smoked tend to have an increase in muscle strength of 8.633 kg compared to individuals who do not smoke.

Multivariate analysis testing the relationship between uric acid and physical performance

The results of this analysis are presented in Table 4. This study found that only the uric acid variable had an effect on physical performance. This effect showed a negative relationship (higher uric acid levels tend to have better physical performance), yet it was weak and not significant (B=-0.239; β=-0.171; p= 0.279).

The other variables, such as gender, smoking history, upper arm circumference, and body mass index (BMI), did not show a significant influence on physical performance in the subjects studied. The p-value greater than 0.05 in all of these variables indicates that these variables do not play a significant role in influencing the physical abilities of individuals in the studied group. From this statement, it can be concluded that there are possibly other factors that play a greater role in determining the physical performance compared to these variables.

Table 3. Multiple linear regression model testing the relationship between uric acids and muscle strength after adjusting for relevant confounders

Model	Variable	B	β	95% CI (Lower, Upper)	p value
1	Uric acid	0.792	0.207	-0.366, 1.950	0.189
	Gender	3.216	0.167	-4.510, 10.942	0.42
	Smoking history	7.117	0.37	-0.000, 14.234	0.057
	Upper arm circumference	-0.577	-0.283	-1.253, 0.099	0.103
	Body mass index	0.716	0.34	-0.000, 1.432	0.057
2	Uric acid	0.947	0.247	-0.143, 2.037	0.097
	Smoking history	9.161	0.476	4.047, 14.275	0.001
	Upper arm circumference	-0.479	-0.235	-1.110, 0.152	0.145
	Body mass index	0.642	0.305	-0.040, 1.324	0.076
3	Uric acid	1.016	0.265	-0.085, 2.117	0.079
	Smoking history	8.745	0.454	3.581, 13.909	0.002
	Body mass index	0.301	0.143	-0.230, 0.832	0.274
4	Uric acid	1.246	0.326	0.217, 2.275	0.023
	Smoking history	8.633	0.449	3.457, 13.809	0.002

Note : B= regression coefficient; β : standardized regression coefficient; CI : confidence interval

Multivariate analysis testing the relationship between uric acid and calf circumference

Uric acid and body mass index are two variables that have a significant effect on calf circumference. The results of this analysis found that uric acid levels have a positive and significant effect on calf circumference, which means that the higher the uric acid levels, the larger the calf circumference (B=2.162; β=0.264; p=0.010). Every 1 mg/dL increase in uric acid levels will increase the calf circumference by 2.162 cm. The same is true for body mass index, where body mass index has a very significant and strong positive effect on calf circumference (B=0.672; β=0.749; p=0.000). This means that every 1 kg/m^2 increase in BMI will increase the calf circumference by 0.672 cm. These results are presented in Table 5. Meanwhile, the other confounding variables, such as gender, smoking history, and upper arm circumference, were not significantly related in influencing the calf circumference of the subjects in this study.

Table 4. Multiple linear regression model testing the relationship between uric acids and physical performance adjusting for relevant confounders

Model	Variable	B	β	95% CI (Lower, Upper)	p value
1	Uric acid	-0.247	-0.176	-0.823, 0.329	0.407
	Gender	2.562	0.365	-1.280, 6.404	0.199
	Smoking history	-2.056	-0.293	-5.589, 1.477	0.262
	Upper arm circumference	0.017	0.023	-0.318, 0.352	0.923
	Body mass index	-0.102	-0.133	-0.457, 0.253	0.576
2	Uric acid	-0.252	-0.180	-0.811, 0.307	0.382
	Gender	2.629	0.374	-0.925, 6.183	0.155
	Smoking history	-2.085	-0.297	-5.521, 1.351	0.242
	Body mass index	-0.090	-0.117	-0.346, 0.166	0.496
3	Uric acid	-0.322	-0.230	-0.840, 0.196	0.230
	Gender	2.649	0.377	-0.879, 6.177	0.150
	Smoking history	-2.064	-0.294	-5.476, 1.348	0.243
4	Uric acid	-0.370	-0.264	-0.884, 0.144	0.167
	Gender	1.186	0.169	-1.397, 3.769	0.374
5	Uric acid	-0.239	-0.171	-0.666, 0.188	0.279

Note : B= regression coefficient; β : standardized regression coefficient; CI : confidence interval

Table 5. Multiple linear regression model testing the relationship between uric acids and calf circumference after adjusting for relevant confounders

Model	Variable	B	β	95% CI (Lower, Upper)	p value
1	Uric acid	-0.625	-0.383	-1.113, -0.137	**0.017**
	Gender	1.285	0.157	-1.971, 4.541	0.444
	Smoking history	0.806	0.099	-2.187, 3.799	0.601
	Upper arm circumference	0.112	0.129	-0.172, 0.396	0.446
	Body mass index	0.592	0.661	0.290, 0.894	**0.000**
2	Uric acid	-0.620	-0.374	-1.100, -0.140	**0.017**
	Gender	1.891	0.231	-0.437, 4.219	0.120
	Upper arm circumference	0.099	0.114	-0.179, 0.377	0.489
	Body mass index	0.600	0.670	0.304, 0.896	**0.000**
3	Uric acid	-0.646	-0.396	-1.113, -0.179	**0.010**
	Gender	2.162	0.264	-0.026, 4.350	0.060
	Body mass index	0.672	0.749	0.454, 0.890	**0.000**

Note : B= regression coefficient; β : standardized regression coefficient; CI : confidence interval

DISCUSSION

This study found that gender and smoking habit had a significant effect on uric acid levels. Serum uric acid levels were higher in men than in women in this study. Previous studies also found similar results.(14,15) Hormonal differences can explain the potential mechanism of gender roles in hyperuricemia, because testosterone and estradiol affect renal uric acid excretion differently. Testosterone replacement therapy can increase uric acid levels, whereas estrogen increases uric acid excretion. In addition, serum uric acid levels increase with age, and men tend to have higher uric acid levels than women.(16)

The results of this study also showed that smoking history had a statistically significant relationship with increased uric acid levels. This is in accordance with research by Jang et al.(17) and Moon et al.(18) which stated that uric acid levels increased linearly with the increase in cigarette packs per year. Smoking can affect the immune system in various ways, namely through pro-inflammatory, anti-inflammatory, and immunosuppressive effects. These effects will then increase the levels of tumor necrosis factor-alpha and C-reactive protein (CRP), and reduce the concentration of anti-inflammatory cytokines, such as interleukin-10, which can trigger the activity of dendritic cells and macrophages. These pro-inflammatory effects can increase the risk of hyperuricemia.(19)

Appendicular skeletal muscle index (ASMI) is used to assess the amount of muscle mass in the upper and lower extremities and to subsequently diagnose sarcopenia in elderly persons. In this study, uric acid levels did not have a significant relationship with ASMI values. However, the correlation coefficient indicated weak positive correlation, which means that when uric acid levels increase, muscle mass also tends to increase.

The results of this study are in accordance with research by Liu et al.(8) that found that serum uric acid levels were positively related to muscle mass index in women and men. Similar results were also obtained by Floriano etal.(20) One possible mechanism is the strong antioxidant capacity of uric acid that can protect skeletal muscle function from oxidative damage. In addition, uric acid is also affected by dietary protein and carbohydrate intake, where lower uric that influenced muscle mass. This can be seen from the results of the multivariate analysis which found that smoking history and body mass index (BMI) were the dominant factors influencing muscle mass in the current study. The results of this study are in line with research by Lin et al.(21) which found that ASMI progressively decreased with increasing levels of smoking exposure, as well as research by Akazawa et al.(22) which stated that higher BMI had greater muscle mass in hospitalized elderly patients.

The results of the multivariate analysis found that muscle strength had a significant relationship with serum uric acid levels. This was in line with a study of 2361 adults aged 50-85 years from the National Health and Nutrition Examination Survey (NHANES). They found that uric acid levels were positively associated with muscle strength in older men and women, and it seems that uric acid levels are a protective factor for muscle strength in older adults regardless of gender.[23] Several other studies, such as studies by Liu et al.[8] in China, Lee et al.[24] in Korea, and Kawamoto et al.[25] in Japan, also found similar results.

The possible mechanism by which uric acid is positively associated with muscle strength in the elderly is likely due to the antioxidant effect of uric acid. Excess oxidative stress is one of the causes of low muscle strength in older adults due to its effects on fiber activation and excitation-contraction. Because uric acid is a powerful antioxidant, increased uric acid has lower oxidative stress and can therefore increase muscle strength.[22]

Excessive physical activity or physical performance can trigger the accumulation of uric acid in the blood. This is caused by the excessive use of lactic acid as a source of muscle energy that can decrease uric acid secretion in the kidneys. As a result, this can trigger the accumulation of uric acid in the blood. This mechanism is supported by Prasetyawan and Hidayati [25] who stated that there was a significant relationship between the intensity of physical activity and uric acid levels in gouty arthritis sufferers in the Sobo Health Center work area, Banyumas Regency, in 2016, as well as by the research of Molino-Lova et al.[12]

In the multivariate analysis, it was found that physical performance did have a significant relationship with uric acid levels, consistent with the findings of previous studies by Floriano et al.[20] and Rahbek et al.[27] The mechanism proposed in both studies was an increase in oxidative stress in hyperuricemia patients such that walking speed was reduced. However, after removing all confounding variables that could affect the physical performance of the research subjects using backward regression analysis, uric acid is the variable that is most likely to affect the physical performance in the current study.

Zhou et al.[28] and He et al.[16] found that high serum uric acid levels have a protective effect on sarcopenia, signifying that individuals with sarcopenia tend to have lower uric acid levels. Oxidative stress is an important pathogenetic process in age-related sarcopenia, which is accompanied by excessive production of reactive oxygen species (ROS). Uric acid, a potent antioxidant, can protect muscle health by scavenging ROS and reducing oxidative damage.[29]

This study has several limitations. First, the use of consecutive sampling may introduce selection bias in the recruitment of research subjects, potentially affecting the study results. This is evident in the highly unequal distribution of research subjects based on gender, with only 5 male participants compared to 37 female participants. Gender can influence factors such as muscle mass, muscle strength, muscle performance, calf circumference, and serum uric acid levels. Additionally, as a cross-sectional observational study, this research cannot establish a causal relationship between sarcopenia (assessed through muscle strength, muscle mass, physical performance, and calf circumference) and serum uric acid levels.

CONCLUSION

Our study indicated that uric acid levels had a significant correlation with muscle strength, physical performance, and calf circumference in sarcopenia among the elderly in the afore-mentioned community health center.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research.

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Author Contributions

ADF: Conceptualization of the study, study design, data collection, statistical analysis, data interpretation, manuscript drafting, and final approval of the manuscript. NR: Supervision of the research process, validation of methodology and results, critical review, and editing of the manuscript. EB: Guidance in research methodology, assistance with statistical analysis, manuscript revision, and critical feedback on the study findings. MP: Supervision of the research process MR: Supervision of the research process CI and IA: data collection. All authors have read and approved the final manuscript

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Data Availability Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request. Due to privacy and ethical considerations, access to the data will be granted following approval by the ethics committee. Data will be shared with qualified researchers for the purpose of further academic research upon request.

Declaration the Use of AI in Scientific Writing

Nothing to declare.

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