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The Relationship Between Diet and Physical Activity with Uric Acid Levels in the Elderly in the Working Area of the Padasuka Central Cimahi Health Center

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ABSTRACT

This study aims to determine the relationship between diet and physical activity with uric acid levels in the elderly in the Padasuka Health Center Working Area. Cross sectional research design. A sample of 78 respondents was taken with the Stratified Random Sampling Technique. Primary data collection was obtained through interviews and checking the community in RW 14. Based on Univariate Results most respondents with high purine consumption patterns were 40 people (51.3%). Most respondents with moderate physical activity were 28 people (35.9%). Then most of the respondents with abnormal uric acid levels were 48 people (61.5%). Bivariate results showed no relationship between diet and uric acid levels in the elderly in RW 14 Padasuka Village, Padasuka Health Center Working Area (p = 0.070). There is no relationship between physical activity and uric acid levels in the elderly in RW 14 Padasuka Village, Padasuka Health Center Working Area (p = 0.819). There is no relationship between diet and physical activity with uric acid levels in the elderly in RW 14 Padasuka Village. It is expected for the RW 14 community to better maintain their diet and lifestyle so that uric acid levels are not high.

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1. INTRODUCTION

Uric acid is a compound derived from purines or the end product of purine breakdown. The body can produce guanic acid (GMP), insonic acid (IMP), and adenic acid (AMP) through the metabolism of endogenous purine nucleotides, which accounts for about 85% of uric acid. In normal levels, uric acid in the body functions as a natural antioxidant.[1] Uric acid in the human body is normal because everyone has uric acid along with blood in the blood vessels because uric acid is a natural end product of the body's metabolism. The human body produces uric acid regularly through metabolic processes. Uric acid disease is also more prevalent in the elderly population.[2]

According to data from the National Statistics Agency in 2018, more elderly people in Indonesia live in cities (51.60% compared to those living in villages (48.40%. The prevalence of the elderly in Indonesia is dominated by the young elderly, namely the age group 60–69 years, which reaches 63.3%; the rest are the middle elderly, namely the elderly group aged 70–79 years, at 27.92%; and the last elderly, namely the elderly group aged 80 and over, at 8.69%.[3] The prevalence of gout, according to the results of the Ministry of Health in Indonesia, has increased. In 2018, the incidence of gout in Indonesia was 7.3%, which is included in the joint group according to signs and symptoms. Data from the Indonesian Ministry of Health in 2019 stated that the prevalence of gout according to the diagnosis of health workers in West Java was ranked second largest with a prevalence of 27.1%.[4]

Risk factors that cause gout are age, excessive intake of purine-containing food patterns, gender, excessive alcohol consumption, overweight or obesity, hypertension, heart disease, certain

drugs (diuretics), and impaired kidney function. However, according to the results of the research that has been done, other risk factors that can also cause gout are exercise or physical activity.[5] The factor that causes gout, besides diet, is physical activity. Physical activity can be done by applying BBTT (good, right, measured, regular). Good means that the physical activity is suitable for the condition or physical abilities of each person. Correct, that is, someone does the physical activity gradually. Measured, that is, doing physical activity has been adjusted to the intensity and time that have been measured, and the last is regular, physical activity that is carried out regularly 3-5 times within 1 week.[6]

Based on the results of preliminary studies that have been carried out by reviewing secondary documents, namely the results of examinations from the Padasuka Cimahi Health Center laboratory regarding gout in 2022, it is known that the total number of people suffering from gout is 805 people, with 236 men (30%) and 569 women (70%). The results of interviews with 5 elderly people in the Padasuka Health Center Working Area on March 31–April 1, 2023, revealed that 5 people had high uric acid levels seen from a diet that often consumed foods such as kale, cassava leaves, cauliflower, offal, and chicken meat. In addition, judging from physical activity, there are 3 people who do physical activities such as gardening, washing clothes, shopping at the market, and taking a leisurely walk, and there are 2 people who do activities such as hoeing, lifting building materials, and going up and down stairs while carrying loads. Of the 5 people, it can be categorized that the physical activity carried out is included in moderate to heavy physical activity.

2. METHOD

This research has a cross-sectional design. The hypothesis in this study is an alternative hypothesis (Ha): there is a relationship between diet and physical activity with uric acid levels in the elderly in the Padasuka Health Center working area, while the null hypothesis (Ho): there is no relationship between diet and physical activity with uric acid levels in the elderly in the Padasuka Health Center working area. The population in this study were all elderly people in the Padasuka Health Center working area, totaling 352 people. The sample in this study amounted to 78 elderly people who were taken with the stratified random sampling technique.

The research data were analyzed using univariate analysis, namely frequency distribution. In this study, the univariate analysis was diet, physical activity, and uric acid levels in the Padasuka Cimahi Central Health Center working area. Meanwhile, bivariate analysis used the Chi Square (x2) test. Bivariate analysis in this study aims to see the relationship between diet and physical activity and uric acid levels in the elderly in the Padasuka Cimahi Central Health Center work area.

3. RESULTS AND DISCUSSION

Based on The research that has been carried out aims to determine the effectiveness of facial soap and aloe vera gel with the level of acne vulgaris in students at SMA Negeri 2 Bayang with 20 respondents, the authors can describe the results of the research in the exposure below:

Characteristics of respondents

Age

The results showed that the distribution of the age frequency of students in SMA Negeri 2 Bayang can be described as follows

Table 1. Frequency Distribution of Diet in the elderly in the working area of Padasuka Cimahi Health Center Year 2023

Variable	Frequency (F)	Percentage (%)
Low Purine Consumption Pattern	38	48,7
High Purine Consumption Pattern	40	51,3
Total	78	100

Based on the results of the analysis in table 1 above, it can be seen that of the 78 respondents, low purine consumption patterns were 38 people (48.7%), high purine consumption patterns were 40 people (51.3%).

Table 2 Distribution of Physical Activity in the Elderly in the Padasuka Cimahi Health Center Working Area in 2023

Variable	Frequency (F)	Percentage (%)
Heavy physical activity	24	30,8
Moderate physical activity	28	35,9
Light physical activity	26	33,3
Total	78	100

Based on the results of the analysis in table 2 above, it can be seen that of the 78 respondents, light physical activity was 24 people (30.8%), moderate physical activity was 28 people (35.9%) and heavy physical activity was 26 people (33.3%).

Table 3 Distribution of Uric Acid Levels in the Elderly in the Padasuka Cimahi Health Center Working Area in 2023.

Variable	Frequency (F)	Percentage (%)
Asam Urat Normal	30	38,5
Asam Urat Tinggi	48	61,5
Total	78	100

Based on the results of the analysis in table 3 above, it can be seen that of the 78 respondents, normal uric acid levels were 30 people (38.5%), and high uric acid levels were 48 people (61.5%).

Table 4 Age Distribution of the Elderly in the Padasuka Cimahi Health Center Working Area in 2023

Variable	Frequency (F)	Percentage (%)
60-70	70	89,7
71-80	8	10,3
Total	78	100

Based on the results of the analysis in table 4 above, it can be seen that of the 78 respondents. Respondents with ages ranging from 60-70 years were 70 people (89.7%) and respondents with ages ranging from 71-80 years were 8 people (10.3%).

Table 5 Distribution of Gender in the Elderly in the Padasuka Cimahi Health Center Working Area in 2023

Variable	Frequency (F)	Percentage (%)
Laki-Laki	33	42,3
Perempuan	45	57,7
Total	78	100

Berdasarkan hasil analisa pada tabel 5 di atas dapat diketahui bahwa dari 78 responden. Responden laki-laki sebanyak 33 orang (42,3%) dan responden perempuan sebanyak 45 orang (57,7%).

Table 6 Distribution of Employment in the Elderly in the Padasuka Cimahi Health Center Working Area in 2023

Variable	Frequency (F)	Percentage (%)
Laborer	2	2,6
Housewife	39	50
Retirement	25	32,1
CIVIL SERVANT	1	1,3
Not Working	5	6,4
Self-employed	3	3,8
Entrepreneur	3	3,8
Total	78	100

Based on the results of the analysis in table 6 above, it can be seen that of the 78 respondents. Respondents who worked as laborers as many as 2 people (2.6%), housewives as many as 39 people (50%), retired as many as 25 people (32.1%), not working as many as 5 people (6.4%), self-employed as many as 3 people (3.8%) and entrepreneurs as many as 3 people (3.8%).

Table 7 The relationship between diet and uric acid levels in the elderly in the Padasuka Cimahi Health Center working area in 2023

Purine consumption pattern	Uric Acid Levels				Total		P Value
	Not Normal		Normal				
	n	%	n	%	n	%	
High	29	72,5	11	27,5	40	100	
Low	19	50	19	50	38	100	0,070
Total	48	61,5	30	38,5	78	100	

Based on the results of the analysis in table 7 above, it can be seen that the results of the analysis of the relationship between purine consumption patterns and uric acid levels. The statistical test results obtained a p value of 0.070, meaning that there is no relationship between diet and uric acid levels in the elderly in the Padasuka Health Center working area in 2023.

Table 8 The relationship between physical activity and uric acid levels in the elderly in the Padasuka Cimahi Health Center working area in 2023.

Physical Activity	Uric Acid Levels				Total		P Value
	Not Normal		Normal				
	n	%	n	%	n	%	
Heavy physical activity	17	65,4	9	34,6	26	100	0,819
Moderate physical activity	16	57,1	12	42,9	28	100	
Light physical activity	15	62,5	9	37,5	24	100	
Total	48	61,5	30	38,5	78	100	

Based on the results of the analysis in table 8 above, it can be seen that the results of the analysis of the relationship between physical activity and uric acid levels in the elderly obtained that the statistical test results obtained a p value of 0.819, meaning that there is no relationship between physical activity and uric acid levels in the elderly in the Padasuka Health Center working area in 2023.

Frequency Distribution of Diet in the Elderly in the Working Area of Padasuka Cimahi Health Centre in 2023

Based on the results of the analysis in the research that has been done, the results of the univariate analysis show that most respondents with high purine consumption patterns are 40 people (51.3%). This can be seen from the answers of each respondent, who mostly answered the type of food consumed once a year. Then, for the type of legume food, most respondents answered> 3 times a week, and for the type of vegetable food, most respondents answered that they could consume cauliflower, spinach, cassava leaves, and kale 2-3 times a week. Then, for the types of extra meat foods, canned foods, meat, poultry, foods that contain fat, and fruits, most respondents consume them 2-3 times in a month or once a year.

Diet, or eating habits, is an individual's behaviour in choosing and consuming food that is alanced, healthy, and in accordance with the needs of the body. Balanced or healthy food is food that consists of four healthy, five-perfect, clean ingredients and contains ingredients that are safe for consumption.[7]

Distribution of Physical Activity to the Elderly in the Padasuka Cimahi Health Centre Working Area in 2023

Based on the results of the analysis in the research that has been done, the results of the univariate analysis show that most respondents with moderate physical activity are 28 people (35.9%). This can be seen from the answers of each respondent in their daily lives: on average, they do activities such as cooking, washing dishes, ironing, washing clothes, sweeping, and mopping for 30 minutes to 1 hour. Then, for leisure activities such as watching TV and chatting, most respondents do them for 1-3 hours a day. Then most respondents rarely do light or heavy exercise because they feel too tired and lazy to do sports. From the results of the study, most respondents had moderate physical activity. If the respondent has heavy activity, they tend to consume more water so that it can help remove uric acid from the body through urine.

According to WHO 2017 in[8], physical activity is a body movement produced by skeletal muscles that requires energy and includes activities carried out while working, playing, doing household chores, travelling, and engaging in recreational activities.

Distribution of Physical Activity to the Elderly in the Padasuka Cimahi Health Centre Working Area in 2023

Based on the results of the analysis in the research that has been done, the results of the univariate analysis show that most respondents with abnormal uric acid levels are 48 people (61.5%). This can be seen from the results of examining uric acid levels, most of which are abnormal uric acid levels or high uric acid levels. In general, uric acid levels in men are higher than in women. This is because men do not have high ooestrogen hormone levels like in women, where ooestrogen hormones play a role in helping to excrete uric acid through urine. However, judging from the characteristics of the respondents, most of whom are women who have entered menopause, they have the same high risk of developing gout due to a decrease in hormones in the body.[9]

Gout is called gouty arthritis. However, in society, this disease is better known as gout. Gout is an inflammatory joint disease that can cause pain, heat, swelling, and stiffness in the joints caused by excess uric acid content in the blood, resulting in the accumulation of uric acid crystals in the joints and other soft tissues.[1]

Age Distribution in the Elderly in the Working Area of Padasuka Cimahi Health Center, Year 2023

Based on the results of the analysis in the research that has been done, the results of the univariate analysis show that most of the respondents with ages ranging from 60 to 70 years are 70 people (89.7%). It can be seen from the questionnaire sheet of 78 respondents that elderly respondents with a range of 60–70 years were 70 people (89.7%), and respondents with an age range of 71–80 years were 8 people (10.3%).

A person's age can affect uric acid levels, showing that high uric acid levels are more common at the age of 60 and above. The biggest change occurs in the elderly, namely loss of body mass, bone mass, muscles, and organs, while fat mass increases. When the quality of hormones drops, it can mess up the production of the enzyme Hypoxanthine Guanine Phosphoribosyl Transferase (HGRT). This enzyme functions to convert purines into purine nucleotides.[10]

Gender Distribution of the Elderly in the Padasuka Cimahi Health Center Work Area in 2023

Based on the results of the analysis in the research that has been done, the results of the univariate analysis show that most of the respondents of female gender are 45 people (57.7%) and 33 male respondents (42.3%). Generally, gout is experienced by someone aged 40 and over. Men do not have high estrogen hormone levels like in women, where estrogen hormones play a role in helping to excrete uric acid through urine. However, judging from the characteristics of the respondents, most of whom are women who have entered menopause, they have the same high risk of developing gout due to a decrease in hormones in the body.[9]

Distribution of Employment to the Elderly in the Padasuka Cimahi Health Center Work Area in 2023

Based on the results of the analysis in the research that has been done, the results of the univariate analysis show that most of the respondents are housewives as many as 39 people (50%), retired as many as 25 people (32.1%), not working as many as 5 people (6.4%), self-employed as many as 3 people (3.8%), entrepreneurs as many as 3 people (3.8%), and laborers as many as 2 people (2.6%).

Work is generally related to the activities a person does. Strenuous activity can aggravate gout or gout disease, which is characterized by an increase in uric acid levels in the blood. Exercise or physical movement will cause an increase in lactic acid levels. Increased lactic acid in the blood will cause a decrease in uric acid excretion by the kidneys. The increase in lactic acid levels cannot be measured precisely because we cannot be sure when the body's muscles contract anaerobically.

The relationship between diet and uric acid levels in the elderly in the Padasuka Cimahi Health Center working area in 2023

The results of the research that has been done explain that of the 40 respondents, those with high purine consumption patterns mostly have abnormal uric acid levels, as many as 29 people (72.5%). Analysis results show that the statistical test results obtained p-value = 0.070 > alpha value of 0.05. This indicates that Ho is accepted, and it can be concluded that there is no relationship between diet and uric acid levels in the elderly in the Padasuka Health Center working area in 2023.

This study shows that diet has no relationship with uric acid levels in the elderly in RW 14 Padasuka Village in 2023. This can be seen from the answers of many respondents who rarely consume high-purine foods because many respondents consume offal, seafood, and meat 2-3 times a month or 1-2 times a year. Types of food such as offal, seafood, and meat are types of food that contain very high levels of 100–1000 mg/100 grams, but because most of the respondents are women, even though respondents have avoided consuming types of food that contain high levels of purines, they still have a high risk of developing gout because, in general, the elderly experience physical and psychological deterioration.

The relationship between physical activity and uric acid levels in the elderly in the Padasuka Cimahi Health Center working area in 2023

The results of the research that has been done explain that of the 26 respondents, respondents with heavy physical activity mostly have abnormal uric acid levels, as many as 17 people (65.4%), and respondents with heavy physical activity, a small portion, have normal uric acid levels, as many as 9 people (34.6%). Then respondents with moderate physical activity mostly had abnormal uric acid levels in as many as 16 people (57.1%), and respondents with moderate physical activity had normal uric acid levels in as many as 12 people (42.9%). Then respondents with mild physical activity mostly had abnormal uric acid levels of as many as 15 people (62.5%), and respondents with mild physical activity, a small portion, had normal uric acid levels of as many as 9 people (37.5%). Analysis results show that the statistical test results obtained p-value = 0.819> alpha value of 0.05, which indicates that Ho is accepted. It can be concluded that there is no relationship between physical activity and uric acid levels in the elderly in the Padasuka Health Center working area in 2023.

Physical activity is any body movement that increases energy expenditure and energy burning. Physical activity is categorized as sufficient if someone does physical exercise for 30 minutes every day or at least 3–5 days a week. Doing physical activity is one of the pillars and guidelines of balanced nutrition.[11]

4. CONCLUSION

This study concluded: 1) According to the description of diet in the elderly, most of the respondents consumed high-purine, as many as 40 people (51.3%). 2) Physical activity in the elderly mostly had moderate physical activity; as many as 28 people had a percentage of 35.9%. 3) In the description of uric acid levels in the elderly, most of the respondents had abnormal uric acid levels, as many as 48 people, with a percentage of 61.5%. 4) The age picture of the elderly is mostly that of respondents, with ages ranging from 60 to 70 years (as many as 70 people) (89.7%). 5) The description of the gender of the elderly is mostly female, with as many as 45 people (57.7%). 6) The description of the work of the elderly is mostly housewives, with as many as 39 people (50%). 7) There is no relationship between diet and uric acid levels in the elderly in the Padasuka Health Center working area in RW 14 Padasuka (p-value 0.070). 8) There is no relationship between physical activity and uric acid levels in the elderly in the Padasuka Health Center area in RW 14 Padasuka (p-value 0.819).

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