Increased Levels of Uric Acid, Cholesterol and Blood Pressure with Sex and Age In Adults

Ernawati Siagian[1]* Putri Agape Ramschie[2]
[1]*Universitas Advent Indonesia*
[2]*Penang Adventist Hospital*

ernawatisiagian@unai.edu*, putri.ramschie@gmail.com

ABSTRACT

Degenerative diseases are diseases caused by a decline in organ function. This generally occurs in old age, but at a young age it can occur due to a decrease in the degree of health. Degenerative diseases include obesity, hypertension, Diabetes Mellitus and hypercholesterolemia. **Purpose:** The purpose of this study is to see whether or not there is a relationship between sex and age with uric acid, cholesterol and blood pressure levels. **Methods:** The method in this study is a descriptive correlational using purposive sampling technique, amounting 50 respondents, BMI, blood pressure, checking uric acid levels, and cholesterol. **Findings:** The results showed there was a significant relationship between sex and uric acid with a sig value of $0.029 < 0.05$. The correlation coefficient value of 0.323 shows a positive sign which means that the sex and uric acid have a relationship in the same direction with a fairly close relationship. There was a significant relationship between age and cholesterol with a sig value of $0.003 < 0.05$. A correlation coefficient value of 0.411 indicates a positive sign which means that age and cholesterol have a relationship in the same direction as a fairly close relationship. There was a significant relationship between age and blood pressure with a SIG value of $0.004 < 0.05$. The correlation coefficient value of 0.396 shows a positive sign which means that age and blood pressure have a relationship in the same direction with a fairly close relationship. **Value:** Nurses are expected to act on their role in changing and teaching healthy lifestyles to the community.

Keywords: Age, Blood Pressure, Cholesterol, Gout, Gender

INTRODUCTION

Indonesia still faces health problems, namely the high incidence of infectious and degenerative diseases. Some of the diseases that fall into the group of degenerative diseases include cancer, diabetes mellitus, stroke, coronary heart, cardiovascular, obesity, dyslipidemia, and others. Some research results show that the emergence of degenerative diseases has a strong bond with the aging process of a person. The higher or older a person gets, the higher the cholesterol level increases (Rupang et al., 2016; Yatim, 2010). Gender is also one of the factors that affect blood pressure. In women, a larger anti-inflammatory immune profile may act as a compensatory mechanism to limit the increase in blood pressure compared to men who

exhibit a more pro-inflammatory immune profile. Based on other studies, women are more likely to suffer from hypertension than men: Other studies show that sex has a relationship and is a risk factor for the incidence of hypertension (Gillis & Sullivan, 2016; Wahyuningsih & Astuti, 2016). Women under 55 years old have the hormone estrogen which functions to keep HDL levels high and LDL low, while at the age of menopause, which is more than 55 years old, estrogen levels have decreased quite drastically, resulting in an increase in cholesterol levels in women. In men who do not have the hormone estrogen, so they are more at risk of triggering an increase in cholesterol levels than women. The older you get, the higher the risk of having uric acid levels in the blood. The aging process is caused by a disturbance in the enzyme formation process so that there is a decrease in the quality of the hormone(Listiana & Purbosari, 2006; Muhajir et al., 2012). Obesity, defined as excessive accumulation of body fat, is generally determined by body mass index (BMI) (Keys et al., 2014).

Previous studies have documented the main factors of hypertension including age, gender, smoking, exercise, family history, dietary habits, and body mass index (BMI) (Han et al., 2017). The prevalence of obesity has been increasing throughout the world, it is a decisive risk factor in many chronic diseases such as hypertension, dyslipidemia, and diabetes mellitus type 2 (Min & Cho, 2018). High body weight and obesity, by means of BMI measure, are the main causes of these disorders. In fact, the World Health Organization (WHO) the importance of controlling blood pressure as millions of individuals have CVD worldwide, accounting for 31% of the world's population, of which 80% experience either heart diseases and stroke. Additionally, WHO dealt with high systolic and/or diastolic blood pressure as a severe problem and considered obesity as one of the most important risk factors to address (Yang et al., 2018). The link between obesity and hypertension is complex, considering that obesity-related hypertension is closely associated with other diseases in the course of the obesity.

In general, obesity, which is usually determined by BMI, is one the principal risk factors for hypertension. Emerging studies support association of high UA levels with onset and increase progression of CKD, cardiovascular risk, hypertension, diabetes mellitus, metabolic syndrome, and cognitive decline (Aktas et al., 2022; de Oliveira Franco et al., 2019; Gaubert et al., 2020; Heda et al., 2021; Kuwabara et al., 2018). Hypercholesterolemia, which is often associated with many diseases such as hypertension, coronary heart disease and stroke, is something that needs to be watched out for and anticipated. Other factors that cause and worsen the condition of hypercholesterolemia are unhealthy lifestyles, such as smoking, consuming high-fat foods, obesity and lack of physical activity and stress(L et al., 2020). Therefore, this study was conducted to provide a clearer picture of the linear relationship between uric acid, cholesterol and blood pressure against gender and age.

METHODS

In this study, a correlational description design was used to 50 adults. Sampling was carried out using the purposive sampling technique. The respondent population is a community of adult men and women who live around the GMAHK Bandarjaya neighborhood on Jl. S. Parman Bandarjaya Lampung. The research was carried out on June 18, 2024 at the GMAHK Bandarjaya hall. This research has obtained approval and has passed the ethical review issued No. 400/KEPK-FIK. UNAI/EC/VIII/24. Univariate analysis was carried out to determine the frequency and percentage of each vairable. Bivariate analysis was carried out using the

correlation formula, namely Spearman rho. The data collection carried out was to measure weight, height to get BMI results and blood pressure. To get the value of uric acid, and total cholesterol levels, respondents were asked to fast for 10 hours starting at night, where the next morning blood was drawn with a uric acid, blood glucose and cholesterol measuring device (Accu Check).

RESULTS AND DISCUSSION

Table 1
Distribution of Respondent Characteristics (n=50)

Variable	Category	Frequency	**Percent**
Gender	Man	22	44
	Woman	28	56
Age	21 – 30 years old	3	6
	31 – 40 years old	6	12
	41 – 50 years old	10	20
	> 51 years old	31	62

Source: Calculated by Authors

The result showed that most of the respondents were female (56%), and most of the respondents were > 51 years old (62%)

Table 2
Distribution of Respondent (n=50)

Variable	Category	Frequency	Percent
Uric Acid	Normal	12	24
	High	38	76
Cholesterol	Normal	20	40
	Upper Limit	13	26
	High	17	34
Blood Pressure	Normal	21	42
	High	8	16
	Hypertension I	8	16
	Hypertension II	13	26

Source: Calculated by Authors

Table 2 shows that Uric Acid is a high category (76%). Cholesterol in the upper limit category (26%), high category (34%). Meanwhile, blood pressure is in the high category (16%), hypertension I (16%) and hypertension II (26%).

Table 3
Correlation between Gender and Uric Acid (n=50)

Variable	Mean	Std. Deviation	Sig Correlation	Coefficient
Gender	1.56	2.013	0.029	0.309
Uric Acid	7.418	2.001		

Table 3 shows that there is a significant relationship between sex and uric acid with a sig value of 0.029 < 0.05. The correlation coefficient value of 0.323 shows a positive sign which means that the sex and uric acid have a relationship in the same direction with a fairly close relationship.

Table 4
Correlation between Gender and Uric Acid (n=50)

Variable	Mean	Std. Deviation	Sig Correlation	Coefficient
Age	55.48	16.006	0.003	0.411
Cholesterol	218.84	56.248		

Source: Calculated by Authors

Table 4 shows that there is a significant relationship between age and cholesterol with a sig value of 0.003 < 0.05. A correlation coefficient value of 0.411 indicates a positive sign which means that age and cholesterol have a relationship in the same direction as a fairly close relationship.

Table 5
Correlation between Age and Blood Pressure (n=50)

Variable	Mean	Std. Deviation	Sig Correlation	Coefficient
Age	55.48	16.006	0.004	0.396
Blood Pressure	133.41	22.552		

Source: Calculated by Authors

Table 5 shows that there is a significant relationship between age and blood pressure with a sig value of 0.004 < 0.05. The correlation coefficient value of 0.396 shows a positive sign which means that age and blood pressure have a relationship in the same direction with a fairly close relationship

From the results of the above study, it shows that Uric Acid is in the high category (76%). Cholesterol in the upper limit category (26%), high category (34%). Meanwhile, blood pressure is in the high category (16%), mild hypertension (16%) and moderate hypertension (26%). Respondents were female (56%), and respondents were > 51 years old (62%).

Degenerative diseases develop due to decreased physical activity, lifestyle and diet, work environment factors, exercise, and stress factors (Hanum & Syahrul, 2018). Increasing age, namely daily nutrient consumption patterns, healthy lifestyles by exercising and vitamin consumption, where each person shows different patterns (Agustiyani et al., 2017). Indonesia in the health sector is currently facing two main things, namely infectious/infectious diseases and the increasing number of people suffering from non-communicable diseases.

In this study, it was shown that there was a significant relationship between sex and uric acid with a sig value of 0.029 < 0.05. The correlation coefficient value of 0.323 shows a positive sign which means that the sex and uric acid have a relationship in the same direction with a fairly close relationship. Risk factors that affect uric acid levels are factors that cannot be controlled are age, gender and genetics. Factors that can be controlled are excessive alcohol consumption, BMI, excessive purine intake and hyperuricemia drugs caused by primary factors, secondary factors and predisposing factors(Syarifah, 2018). Primary factors are influenced by genetic factors. Secondary factors can be caused by two things, namely excessive production of uric acid and decreased uric acid excretion (Saraswati & Murdhana Putere, 2020). Gout tends to increase in men because men do not have the hormone estrogen which helps the elimination of uric acid in the urine. Meanwhile, in women, the increase in uric acid will increase when it has entered the monopouse period because women have extrogen hormones that can help extricate uric acid through urine (Firdayanti et al., 2019). Age as one of the significant risk factors in the occurrence of hyperuricemia, it was found that the prevalence of hyperuricemia increased from the age of 60 years, and the highest prevalence reached after the age of 70 years (Song et al., 2018). Women experience increased uric acid levels and hormonal changes during menopause. During menopause, women experience a decrease in estrogen levels which can help in the elimination of uric acid, triggering hyperuricemia (Hastuti et al., 2018). The gender in the elderly who experience increased uric acid in general is men, but women have a higher risk than before (Breuer et al., 2017). Men have higher serum uric acid levels than women, which increases their risk of developing gout arthritis. The development of gout arthritis before the age of 30 occurs more in men than women. However, the incidence of gout arthritis becomes the same between the two sexes after the age of 60. The prevalence of gout arthritis in men increases with age and peaks between the ages of 75 and 84 (LIZAWATI, 2014). The results of other studies showed that there was no sex relationship with the incidence of hyperuricemia, as evidenced by the value of p (0.412) < α (0.05). The limit of uric acid levels in men is 420 μmol/L, while in women it is 360 μmol/L (Ega Fadila et al., 2023). Other research shows that increased uric acid levels cause gout arthritis which is generally experienced by men over 30 years old, the aging process results in a functional decline in body organs so that hemostatic disorders occur (Sihabuddin, 2019). In this study, it was shown that there was a significant relationship between age and cholesterol with a sig value of 0.003 < 0.05. A correlation coefficient value of 0.411 indicates a positive sign which means that age and cholesterol have a relationship in the same direction as a fairly close relationship. A bad lifestyle, rarely physical activity, has an impact on health conditions, one of which is high cholesterol levels (Al Rahmad, 2018). As we age, the risk of having high cholesterol also increases (Yoeantafara & Martini, 2017). The lifestyle of patients with high cholesterol levels tends to be poor, which has the potential to trigger cardiovascular disease Chronic stress in this population is also thought to be related to a poor lifestyle (Lainsamputty

& Gerungan, 2022). Daily food consumption has shifted towards styles and ways of eating with a fairly large cholesterol content such as junk food or harmful ready-to-eat foods, seafood that is too much salt, and foods with fatty acid cholesterol content in men continues to increase after the age of 45, while in women after 55 years (Ilmiah Kesehatan Sandi Husada & Lisius Marbun, 2019; Mulyanto, 2012). As we age, there are changes where the arteries become wider and stiffer. resulting in the area affected by systolic pressure will narrow so that blood pressure increases. Cholesterol is a risk factor that can be changed from hypertension, cholesterol levels in elderly women have increased, this is because at this age the levels of estrogen hormones have decreased as a result of the cessation of the menstrual process. Estrogen levels in women are a balancer of good and bad cholesterol, so that menopausal women lose the balance of cholesterol levels (Maryati, 2017; Saputri & Novitasari, 2021).

There is a relationship between cholesterol levels and all age levels, but the older the percentage of respondents with high cholesterol increases, judging from the age range, patients with hypercholesterolemia are also dominated in the age range of 41-80 years, with 38.90% of the age of 31-60 years, 37.90% of the age of 41-50 years, and 17.80% of the age of 61-70 years and 3.30% of <80 years and above 71 years (Ujiani, 2015). As a person ages, the accumulation of bad fats or LDL is also higher, as it is exacerbated by an increase in free radicals in the body. High cholesterol levels in the tubu can lead to other comorbidities such as cardiovascular disorders, heart attacks and kidney failure (Hita et al., 2022). Metabolic syndrome occurs in adult men, there is a positive correlation between age and cholesterol levels – HDL Serum The older the age, the higher the cholesterol level. and a significant negative correlation between age and serum triaciliglycerol levels. Several studies have shown a meaningful relationship between serum k-HDL levels and markers of metabolic syndrome (Refdanita et al., 2017). The results of other studies did not show a correlation between age and cholesterol levels of respondents (Lusiana et al., 2019).

In this study, it was shown that there was a significant relationship between age and blood pressure with a sig value of 0.004 < 0.05. The correlation coefficient value of 0.396 shows positive sign which means that age and blood pressure have a relationship in the same direction with fairly close relationship. Risk factors that can affect the incidence of hypertension include age, race or ethnicity, geography, gender, obesity, stress, a high-salt diet, diabetes mellitus, alcohol, smoking, coffe consumption, and use of birth control pills (Amissah, 2016). Hypertension in recent years has become one of the most common chronic disease for the elderly (Yu et al., 2018). Obesity or overweight can lead to hypertension due to disruption of blood flow and can cause hypertension. When a person getting older, blood pressure increases (Ebsaim & Wadan, 2018; Widjaya et al., 2019). Age is related to high blood pressure (hypertension). The older a person is, the grater the risk of hypertension (Hamzah et al., 2019). Physiological changes associated with aging lead to an increase in systolic blood pressure, an average increase in arterial pressure, an increase in pulse pressure and a decrease in the ability to respond to sudden hemodynamic changes. The aging process is associated with changes in the vascular system, heart and autonomic system (Zhu et al., 2016). Changes in structural components, an increase in reactive oxygen species, inflammatory changes, and endothelial dysfunction are some of the causes that cause changes in the structure and function of the arteries seen in aging (Xu et al., 2017). High HDL cholesterol levels are protective factor in

preventing the atherosclerosis process which can lead to hypertension. After menopause women tend to experience a higher increase in blood pressure than men, this is because of the hormone estrogen, which plays a role in increasing HDL, has decreased(Ahmad & Oparil, 2017). Age is one of the main factors that affect hypertension, there are natural changes in the body in the heart, blood vessels, and hormones. Age is related to endothelial dysfunction and increased arterial stiffness in hypertension, especially systolic hypertension in adulthood (Magfira Maulia et al., 2021).

CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

It can be concluded that there is a strong relationship or correlation between increased levels of uric acid, cholesterol and blood pressure in the body with the addition of age and gender. Advice is to monitor uric acid and cholesterol levels and measure blood pressure regularly. As well as implementing a healthy lifestyle.

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