THE RELATIONSHIP BETWEEN WAIST-HIP CIRCUMFERENCE RATIO (WHR) AND HYPERTENSION AMONG ELDERLY IN THE WORKING AREA OF WIRE HEALTH CENTER, TUBAN REGENCY

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ABSTRACT

Hypertension often occurs in individuals over 60 years of age, influenced by the Waist-Hip Ratio (WHR), which reflects the distribution of body fat, especially visceral fat, as well as age-related changes such as increased body fat and decreased muscle mass. This study aims to investigate the relationship between the Waist-Hip Circumference Ratio (WHR) and hypertension among the elderly in the Wire Health Center area, Tuban Regency. This study used an analytical observational method with a cross-sectional approach. The population was 276 elderly people in the working area of Wire Health Center, Tuban, with a sample of 163 elderly people over 60 years old who were randomly selected using a simple random sampling technique. The research instruments included measuring WHR with a measuring tape and blood pressure with an aneroid sphygmomanometer. Data analysis was performed using the Spearman correlation test with SPSS software version 22 for Windows. The results showed that only 1 respondent (1.6%) with a safe Waist-Hip Ratio (WHR) was classified as having prehypertension. In contrast, most respondents with a waist-hip ratio in the risk category, namely 49 people (50.5%), had grade 2 hypertension. The analysis indicated a significant association between Waist-Hip Ratio (WHR) and hypertension, with a p-value of 0.001 and a correlation coefficient (r) of 0.267. Discussion. The higher the waist-hip ratio (WHR), the greater the risk of hypertension in the elderly.

Keywords: Elderly; Hypertension; Waist-Hip Circumference Ratio (WHR).

1. INTRODUCTION

Hypertension is classified as a degenerative disease with high morbidity and mortality rates, characterized by elevated systemic arterial blood pressure, including both systolic and diastolic pressures. (Widyaningrum, 2014). As we age, arteries stiffen, causing blood pressure to increase and blood vessels to narrow. This narrowing, often caused by plaque buildup or inflammation, is known as coronary.

Artery disease occurs in the heart vessels, or atherosclerosis in other body vessels (Hermawati & Dewi, 2014). Age-related factors and cumulative damage to blood vessels contribute to the increased prevalence of high blood pressure among the elderly (Stanley & Beare, 2012; Novian 2013).

In the elderly, there is a decline in body function, including blood vessel function, which increases the risk of hypertension. The elderly

experience decreased physical function, such as muscle mass, muscle strength, heart rate, and brain function. (Carolina et al., 2019). This population, namely individuals aged 60 years and over, also experiences a decrease in the ability of tissues to repair and maintain normal function, making them more susceptible to infection and damage. (Hanum & Lubis, 2017). Aging affects the structure and function of cells and organs, impacting declining physical health and increasing the risk of disease. (Putra, 2019). An unhealthy lifestyle, lack of physical activity, poor diet, and genetic factors also exacerbate the risk of non-communicable diseases such as hypertension. (Arif & Hartinah, 2013).

Hypertension, or high blood pressure, is defined as a condition in which systolic blood pressure exceeds 140 mmHg and diastolic pressure more than 90 mmHg after two measurements with a five-minute interval in a calm condition. If high blood pressure lasts a long time (persistent) and is not immediately diagnosed and treated, it can cause damage to organs such as the kidneys (kidney failure), heart (coronary heart disease), and brain (stroke) (Dinas Kesehatan Kabupaten Tabanan, 2020).

In the last five decades, the percentage of elderly people in Indonesia has doubled from 1971 to 2019, reaching 9.6% or around 25 million people (Badan Pusat Statistik, 2019). In East Java Province, the number of elderly people reached 12.96%, with a prevalence of hypertension of 36.3% or around 11,008,334 people; 48.83% of whom were women and 51.17% were men. Of this number, 35.60% or 3,919,489 hypertension sufferers received health services (Dinas Kesehatan Provinsi Jawa Timur, 2021). In Tuban Regency, the prevalence of hypertension reached 32%, or around 295,706 people (Dinas Kesehatan Provinsi Jawa Timur, 2021). The prevalence of hypertension increased significantly in individuals aged 60 years and over (Tirtasari et al., 2019).

The cause of hypertension is often unknown, with about 90% of cases having no definite cause. Risk factors include uncontrollable aspects such as genetics, age, gender, and lifestyle, including smoking, stress, and consumption of foods high in sodium, sugar, fat, and

caffeine. (Aidha & Tarigan, 2019). Long-term hypertension can trigger damage to vital organs, such as the brain, eyes, heart, arteries, and kidneys, which reduces quality of life. (Septi Fandinata & Ernawati, 2020).

Obesity increases the risk of hypertension up to five times compared to a normal weight. Weight gain, especially in the elderly, is closely related to the habit of consuming high-fat foods, which causes increased cholesterol levels and plaque formation in blood vessels, resulting in high blood pressure and cardiovascular disorders. (Enita Rizka Wahyuni et al., 2014). Increased body mass causes increased blood demand, which increases pressure on the arterial walls. (Darmawan et al., 2018).

RLPP is used to detect body fat distribution, especially abdominal fat, and helps identify the risk of hypertension. High RLPP indicates visceral fat accumulation that can produce inflammatory compounds and damage blood vessels. The threshold of RLPP is 0.9 for men and 0.8 for women. This assessment provides a better understanding of body fat distribution and cardiovascular risk than measuring waist circumference or MUAC. (Ningrum et al., 2019).

Based on the background above, the researcher is interested in conducting further research to determine whether there is a relationship between the Waist-Hip Circumference Ratio (WHR) and hypertension sufferers in the elderly in the Wire Health Center work area, Tuban Regency.

2. METHOD AND ANALYSIS

This type of research is an observational analytical study with a cross-sectional approach where the measurement of the waist-hip circumference ratio and blood pressure is measured at the same time.

This study was conducted in the Wire Health Center Working Area with a population of 276 elderly people and a sample of 163 elderly people. The sampling technique used was simple random sampling.

The instrument used in this study was a questionnaire to measure the ratio of waist-hip circumference and blood pressure. Measurement of the

Waist–Hip Ratio (WHR) using a measuring tape or metronome with an accuracy of 0.1 cm, which was repeated 2 times. Table 1.1 below is the category of WHR according to World Health Organization (2008):

Table. 1.1 The Category of Waist-Hip Ratio (WHR)

Group	Waist-Hip Ratio (WHR)	
	Male	Female
Normal	<0.90	<0.85
Risk	>0.90	>0.85

While the blood pressure of the elderly is measured using an aneroid tensiometer.

After obtaining the desired data, the respondents are then grouped into a data tabulation and presented. After the data is obtained, the observation data will be entered into the data tabulation and analyzed using the Spearman correlation test with a significance level of 0.05 or 95% confidence.

3. RESULT AND DISCUSSION

Table 2.1 shows the distribution of characteristics of the research subjects. Of the total 163 respondents, the majority were aged between 60-69 years, which was 130 people (79.7%). In addition, most of the respondents were female, which was 140 people (87.1%).

Table 2.1 Distribution of Characteristics of Research Subjects in the Wire Health Center Work Area

Category	n	Percentage (%)
Age (years)		
60–69	130	79,7
70–90	33	20,3
Gender		
Male	23	14,1
Female	140	87,1

RLPP (Waist Hip Circumference Ratio)

Based on Table 2.2, the majority of respondents have RLPP in the risk category, namely 97 people (59.5%), while respondents with RLPP in the safe category numbered 66 people (40.4%).

Table 2.2 Frequency Distribution of RLPP in the Elderly in the Wire Health Center Work Area, Tuban Regency

Category	n	Percentage (%)
Safe	66	40,4
Risk	97	59,5
Total	163	100

Blood Pressure

Based on Table 2.3, the majority of respondents have blood pressure in

the hypertension 1 category, which is 96 people (58.9%). A small number of respondents have blood pressure in the hypertension 2 category, which is 64 people (39.3%), and only a few respondents have blood pressure in the prehypertension category, which is 3 people (1.86%).

Table 2.3 Distribution of Blood Pressure Frequency in the Elderly in the Wire Health Center Work Area, Tuban Regency

Category	n	Percentage (%)
Prehypertension	3	1,86
Hypertension 1	96	58,9
Hypertension 2	64	39,3
Total	163	100

Based on Table 5.8, it can be seen that out of 163 respondents, one respondent (1.6%) with a waist-hip ratio in the safe category had prehypertension. Meanwhile, the majority of respondents with a waist-hip ratio in the risk category, namely 49 people (50.5%), suffered from grade 2 hypertension.

Table 2.3 Cross-Relationship Between Waist-Hip Circumference Ratio in the Elderly in the Wire Health Center Work Area, Tuban Regency

RLPP	Prehypertension		Hypertension 1		Hypertension 2		Total	
	n	%	n	%	n	%	n	%
Safe	1	1,6	53	80,3	12	18,1	66	100
Risk	2	2	46	47,5	49	50,5	97	100
	3	1,8	99	60,7	61	37,5	163	100

Correlation Coefficient (r): 0,267
Significant (p) : 0,001

The results of the statistical test using the Spearman correlation test with SPSS software version 22 for Windows showed a p-value = 0.001, which means p <0.05. This indicates a significant relationship between the Waist-Hip Ratio (WHR) and the incidence of hypertension, with a correlation coefficient value of 0.267, which indicates that H1 is accepted with sufficient strength of the relationship.

4. DISCUSSION

Identification of Waist Hip Circumference Ratio (WHR) in the Elderly in the Wire Health Center Work Area, Tuban Regency

Research in the Wire Health Center work area, Tuban Regency, provides an important picture of the health of the elderly, especially related to body fat distribution and the accompanying health risks. Most elderly people (59.5%) have a WHR (Waist-to-Hip

Ratio) in the risk category, which reflects an unhealthy distribution of body fat, especially in the abdominal area. This condition is known as central obesity, which is a major indicator of increased risk of cardiovascular disease, including hypertension.

Fat accumulation in the abdominal area is closely related to various lifestyle factors, such as low physical activity, sedentary lifestyle, and fast food consumption, as explained by Lubis et al (2020). In the elderly, decreased physical activity further worsens abdominal fat accumulation and increases WHR. This contributes significantly to the risk of hypertension, as evidenced in several studies. (Andriyani et al. 2022;Nando et al. 2021).

According to Prayogi and Kurnia (2015), lifestyle changes in the elderly, including decreased physical activity, are the main factors in increasing health risks. Therefore, efforts to prevent and control hypertension in the elderly need to focus on increasing physical activity, reducing sedentary lifestyles, and improving diet to reduce abdominal fat accumulation and reduce the risk of excess WHR.

These findings underscore the importance of public health interventions at the Puskesmas level, including education, promotion of physical activity, and routine monitoring of health indicators, such as WHR and blood pressure, to prevent further complications.

Identification of Hypertension in the Elderly in the Wire Health Center Work Area, Tuban Regency

Research shows that 58.9% of elderly people in the Wire Health Center work area, Tuban Regency, have blood pressure that is included in the category of grade 1 hypertension, with a systolic pressure range of 140–159 mmHg and a diastolic 90–99 mmHg. The main factors causing this are a diet high in salt and fat, a family history of hypertension, and lack of physical activity (Purwanto, 2012;Widianto et al. 2019).

Salt causes fluid retention, increases blood volume, and ultimately increases blood pressure,

which is more significant in the elderly due to higher sensitivity to sodium. The elderly also experience decreased aortic elasticity and thickening of the heart valves, which reduces the effectiveness of the heart pump and increases peripheral vascular resistance, so that blood pressure increases with age. (Novian 2013; Stanley & Beare, 2012).

Hypertension in the elderly can be managed with a healthy diet low in salt and saturated fat, and switching to unsaturated fat consumption that supports heart health (Widianto et al., 2018). This study noted that poor eating habits among the elderly in the region are often hereditary habits that are difficult to change.

Relationship between Waist–Hip Ratio (WHR) and Hypertension Incidence

Research in the Wire Health Center work area, Tuban Regency, found a significant relationship between the waist-hip ratio (WHR) and hypertension incidence (p = 0.001), where an increase in WHR was positively correlated with higher blood pressure (Mukiwanti and Muwakhidah, 2017). Elderly people with high WHR have a 2.4 times greater risk of hypertension compared to those with normal WHR. WHR is related to visceral fat, although its accuracy in predicting visceral fat can be reduced due to the influence of subcutaneous fat (Anak Agung Ayu Fuji Dwi Astuti, Nurmasari Widyastuti, 2017).

WHR measurement, obtained by dividing waist circumference by hip circumference, shows significant fat deposits in the body. WHR ≥ 0.85 cm in women and ≥ 0.90 cm in men increases the risk of hypertension, making it more effective than BMI in reflecting fat in the abdominal wall (Ningrum et al., 2019). Study by Isworo et al. (2019) These results indicate that individuals with normal body fat tend to have normal blood pressure, while those who are obese are more susceptible to hypertension.

A balanced and low body fat distribution around the abdomen helps control blood pressure and lowers the risk of hypertension. Conversely, high RLPP indicates a greater risk of high blood pressure and related diseases.

5.   Conclusion

Research at Wire Health Center, Tuban, showed that most respondents had a risky waist-hip ratio and blood pressure in the hypertension category. There is a significant relationship between the waist-hip ratio and hypertension in the elderly. The greater the waist-hip ratio in the elderly, the greater the risk of hypertension.

6.   Reference

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