THE RELATIONSHIP BETWEEN CENTRAL OBESITY AND THE INCIDENCE OF HYPERTENSION IN WOMEN OF PRODUCTIVE AGE IN TURIREJO HAMLET, LAWANG, MALANG, INDONESIA

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ABSTRACT

Inactivity and sedentary lifestyles, particularly among women who primarily fulfill the role of housewives, are associated with a higher risk of obesity. The 2018 Indonesian Basic Health Research identified a significant prevalence of hypertension among adults aged 55-64, with a disproportionate burden on women. This study aimed to investigate the correlation between obesity and hypertension in women of productive age. This research used descriptive analytics with a cross-sectional design. Data were collected by interviews, blood pressure measurements, and central obesity measurements. The data were collected from Public Health Training Center Murnajati Lawang, Malang, Indonesia. The majority of participants belonged to the 46-55 age group and were non-working individuals. Among the total sample of 50 respondents, 19 (38%) experienced hypertension, with only 3 (6%) exhibiting central obesity. Dietary habits among respondents with central obesity included light to moderate consumption of items such as butter (52%), offal (34%), egg yolks (54%), shrimp (36%), cream milk (54%), mayonnaise (40%), and fatty meats (52%). However, the Fisher test results did not indicate a significant relationship (p= 0.279) between central obesity and hypertension. In conclusion, this study found no evidence of a direct association between central obesity and the incidence of hypertension in women of reproductive age.

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INTRODUCTION

Hypertension is a condition characterized by excessive blood pressure and normal limits. According to the World Health Organization[1], there has been a drastic increase in hypertension sufferers, from 650,000 sufferers to 1.28 billion in just the last 30 years.

Hypertension is still a big problem in Indonesia, 25.8% of the population aged

≥18 years suffer from hypertension. The 2018 Indonesian Basic Health Research showed the prevalence of hypertension in the population aged over 18 years as follows: hypertension in the age group 31-44 years was 31.6%, age 45-54 years was 45.3%, and age 55-64 years was 55.2%. The prevalence of hypertension in women was 36.85% higher than in men 31.34%[2]. One of the factors causing hypertension is obesity. The World Health Organization defines central obesity as "abnormal or excessive accumulation of fat in the abdominal cavity which can affect health if the abdominal circumference for women is more than 80 cm". Abdominal circumference is an indicator for measuring central obesity. Hypertension increases the risk of cardiovascular disease and can cause problems with the brain, kidneys, and multiple other organs. Obesity is associated with various diseases such as hypertension, hyperlipidemia and hyperglycemia, type 2 diabetes, dyslipidemia, and cardiovascular disease[1]. Sedentary lifestyles and inactivity are linked to an increased risk of obesity, especially in women who primarily take on the role of housewife.

This study aimed to find the relationship between obesity and hypertension in productive-age women in Turirejo Village, Lawang, Malang, Indonesia.

MATERIALS AND METHODS

This research used descriptive analytics with a cross-sectional design. Data collection was carried out through interviews. The independent variables in this study were the incidence of central obesity, physical activity, and eating patterns, and the dependent variable in this study was the incidence of hypertension in women of reproductive age.

The sample size was calculated by using the test formula[3]. Data were collected on November 2, 2022, by young medical students of Universitas Airlangga, Surabaya, Indonesia who were stationed at Health Training Center Murnajati Lawang, Malang, Indonesia with guidance from Universitas Airlangga academic supervisors and “Latkemas” field supervisor who had received official permission. By using the Lemesow formula, the sample size required was 50 samples. Sampling was carried out using the proportional random sampling method.

Blood pressure measurements were carried out using sphygmomanometers, and the respondents diagnosed hypertension if the systolic and diastolic pressure was >140/90. Obesity was measured by abdominal circumference. According to WHO criteria recommendations, women are said to be obese if their abdominal circumference is ≥ 80 cm, and not obese if their abdominal circumference is < 80 cm.

The physical activity variables in this study were divided into light (MET <600), moderate (≤600-3000), and severe (≥3000). The Global Physical Activity Questionnaire (GPAQ) WHO 2012 measured physical activity according to WHO criteria.

The tool for collecting dietary pattern data was a questionnaire, asking about the consumption of salt, MSG, butter, salted fish, instant food, offal, egg yolks, shrimp, milk cream, mayonnaise, and fatty meat.

Statistical analysis was using the Fisher exact test. The collected data were coded, followed by cleaning and entering data using statistical data processing

software (SPSS). The research protocol had been approved by the Health Research Ethics Committee, Faculty of Medicine, Universitas Airlangga (Approval number: 51/EC/KEPK /FKUA/2023).

RESULTS

Table 1 Tabel Distribution Characteristics of Respondent Research

Characteristics	Number	Percentage (%)
Age		
17 – 25 years	2	4
26 – 35 years	6	12
36 – 45 years	13	26
46 – 55 years	20	40
56 – 65 years	9	18
Education		
Elementary School	9	18
Junior High School	4	8
Senior High School	24	48
Vocational School	9	18
Bachelor degree graduate	4	8
Work Status		
Does not Work	34	68
Work	16	32
Total	50	100

Table 1 shows distribution of age group among the respondents. Those aged 46-55 years has the highest proportion with 15.7% and the distribution of respondents' education levels is mostly Senior High School (SMA) with a percentage of 48.0%. According to the characteristics of respondents' employment status, the majority of the respondents were not working (68.0%). Table 2 shows the frequency distribution of hypertension found in 50 total samples of research respondents. Most of the research respondents were classified as hypertensive with central obesity.

Table 2 Distribution of Hypertension and Central Obesity of Research Respondents

	Number	Percentage (%)
Hypertension		
Positive	19	38
Negative	31	62
Central Obesity		
Positive	3	6
Negative	47	94

Table 3 presents data indicating prevalent consumption patterns among respondents with hypertension and central obesity. It can be seen that, 52% of respondents with hypertension reported consuming high-sodium foods like salt and instant meals, while 36% reported consuming high-fat foods, including egg yolks. Similarly, 82% of respondents with central obesity reported consuming high-sodium foods, while 54% of those suffering from obesity reported consuming high-fat foods like egg yolks.

Table 4 shows that light activity was found in respondents with central obesity (58%) and in respondents with hypertension (40%). Table 5 shows that Fisher's test results obtained p= 0.279, which shows that the incidence of hypertension and central obesity has no significant correlation.

Table 3 Distribution of Dietary Patterns of Respondents Research

Consumption	Hypertension		Central Obesity	
	Positive	Negative	Positive	Negative
Salt				
Light consumption	26(52%)	18(36%)	41(82%)	3 (6%)
Moderate consumption	1(2%)	1 (2%)	2 (4%)	0 (0%)
No consumption	4(8%)	0 (0%)	4 (8%)	0 (0%)
MSG Flavoring				
Light consumption	17(34%)	12(24%)	27(54%)	2 (4%)
Rare consumption	3 (6%)	2 (4%)	4 (8%)	1 (2%)
No consumption	11 (22%)	5 (10%)	16(32%)	0 (0%)
Butter				
Light consumption	14(28%)	11(22%)	23(46%)	2 (4%)
Rare consumption	2 (4%)	1 (2%)	3 (6%)	0 (0%)
No consumption	15(30%)	7 (14%)	21(42%)	1 (2%)
Salted Fish				
Light consumption	13(26%)	7 (14%)	19(38%)	1 (2%)
Rare consumption	3 (6%)	2 (4%)	5 (10%)	0 (0%)
No consumption	15(30%)	10(20%)	23(46%)	2 (4%)
Internal organs of animal consumption (Innards)				
Light consumption	11(22%)	10(20%)	20(40%)	1 (2%)
Rare consumption	2 (4%)	2 (4%)	4 (8%)	0 (0%)
No consumption	18(36%)	7 (14%)	23(46%)	2 (4%)
Egg yolk				
Light consumption	18(36%)	11(22%)	27(54%)	2 (4%)
Rare consumption	6 (12%)	1 (2%)	7 (14%)	0 (0%)
No consumption	7 (14%)	7 (14%)	13(26%)	1 (2%)
Shrimp				
Light consumption	10 (20%)	9 (18%)	18(36%)	1 (2%)
Rare consumption	8 (16%)	4 (8%)	11(22%)	1 (2%)
No consumption	13 (26%)	6 (12%)	18(36%)	1 (2%)
Cream Milk				
Light consumption	10 (20%)	7 (14%)	16(32%)	1 (2%)
Rare consumption	6 (12%)	5 (10%)	11(22%)	0 (0%)
No consumption	15 (30%)	7 (14%)	20(40%)	2 (4%)
Mayonnaise				
Light consumption	2 (4%)	9 (18%)	11(22%)	0 (0%)
Rare consumption	10 (20%)	1 (2%)	9 (18%)	2 (4%)
No consumption	19 (38%)	9 (18%)	27(54%)	1 (2%)
Fatty meat				
Light consumption	9 (18%)	6 (12%)	14(28%)	1 (1%)
Rare consumption	6 (12%)	6 (12%)	12(24%)	0 (0%)
No consumption	16 (32%)	7 (14%)	21(42%)	2 (4%)

Table 4. Distribution of Physical Activity, Hypertension, and Central Obesity of Research Respondents

Physical activity	Hypertension				Central Obesity			
	Positive		Negative		Positive		Negative	
Light	20	40 %	11	22%	29	58%	2	4%
Moderate	8	16 %	6	12%	14	28%	0	0
Severe	3	6 %	2	4%	4	8 %	1	2%

Table 5. Cross Tabulation Analysis between Central Obesity and Hypertension.

Central Obesity	Hypertension				Total		p-value
	Positive		Negative				
Positive	28	56 %	19	38 %	47	94%	0.275
Negative	3	6%	0	0%	3	6%	

DISCUSSION

Based on the research results, it can be seen that 28 of the 50 respondents were centrally obese and suffered from hypertension. From the Fisher Exact test, it was found that there was no relationship between central obesity and the incidence of hypertension (p=0.279). This was in line with two previous studies by Malinti (2019) were there is no relationship between abdominal circumference and hypertension in women[4].

Hypertension can be caused by various conditions and many risk factors[1]. The risk factors for hypertension can be divided into two, the non-modifiable and modifiable risk factors. The risk factors for hypertension that can be changed include nutritional status, smoking, physical activity, alcohol consumption, salt consumption, and consumption of high-fat foods[5].

Age, genetics, and gender are risk factors that cannot be changed[6,7]. Increasing age causes hypertension due to the process of many factors, one of which is stress oxidation. Vascular aging causes an increase in blood pressure[8].

In Pramana's study, it was found that 18 out of 50 respondents who suffered from hypertension had a history of hypertensive parents. Hypertension is inherited or genetic. Individuals with a family history of hypertension have twice the risk of suffering from the disease than people who do not have a family history[9].

Many factors cause hypertension besides central obesity. Lack of physical activity will cause an energy imbalance. If excess energy from food is greater than energy for activity, the excess energy will be stored in fat cell[10].

Based on the Physical Activity Guidelines for Americans, the recommended physical activity for women of reproductive age is 150-300 minutes/week for moderate-intensity physical activity or 75-150 minutes/week for aerobic activity. Apart from that, it is also recommended to carry out muscle-strengthening activities at least 2 days/week[11].

High sodium intake causes the body to retain water at a level and high extracellular sodium concentration, thereby attracting intracellular fluid, causing an increase in blood volume, which results in hypertension. High sodium intake causes hypertrophy of adipocyte cells due to lipogenic processes in white fat tissue. If this happens continuously, it will cause the narrowing of blood vessels due to fat accumulation, resulting increased blood pressure.[12,13,20]

Other factors that also cause hypertension besides obesity are smoking, sodium consumption, and lack of activity[14,19]. In this study, it was descriptively shown that 68% of women of productive age had light activity with hypertension, 28% of respondents who had hypertension had light activity, and only 10% of hypertension sufferers did heavy activities.

Research conducted by Tailor et al. (2018) on salt-sensitive Dahl mice given a high-fat and normal fat diet for as long as four weeks, showed that mice given high fat diet had higher blood pressure[15]. Liu's (2021) research proves that eggs, sea fish, milk, and other dairy products can be protective against increased blood pressure[16]. Associated with this research there is no significant relationship between central obesity and hypertension.

Research conducted by Istiana (2022) showed that obesity has a significant relationship with lack of physical activity[17]. The limitation of this study is that it did not examine other factors causing hypertension such as history of alcohol consumption, emotional stress, and other medical conditions that can trigger hypertension, or other pathophysiological factors of the disease[18,21].

The World Health Organization (WHO) supports countries to reduce hypertension as a public health problem. The six modules of the Hearts Technical Package (healthy-lifestyle counseling, evidence-based treatment protocols, access to essential medicines and technology, risk-based management, team-based care, and systems for monitoring) provide a strategic approach to improving cardiovascular health in countries across the world[22].

CONCLUSION

There is no relationship between central obesity and the incidence of hypertension.

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CONFLICT OF INTEREST

All Authors have no conflict of interest.

ETHICS CONSIDERATION

This research had received Ethical Approval No. 51/EC/KEPK/FKUA/2023 issued by Health Research Ethics Committee Universitas Airlangga School of Medicine Surabaya, Indonesia on 20 February 2023.

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AUTHOR CONTRIBUTION

All authors have contributed to all process in this research, including preparation, data gathering, and analysis, drafting, and approval for publication of this manuscript.

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