



THE CORRELATION BETWEEN OBESITY WITH STROKE INCIDENCE AMONG ELDERLY

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ABSTRACT

Obesity can increase the risk of hemorrhagic stroke through increased blood pressure, tendency to blood clots, and systemic inflammation. The purpose of the study was to determine the relationship between the incidence of obesity and the increased risk of stroke in Karanganyar, Central Java. This was a cross-sectional study by applying non-probability sampling techniques by means of Consecutive Sampling. The instruments and study materials used in this study came from primary and secondary data, namely body scales and manual height measurements, Medical Records. The results showed that there was a relationship between obesity and the incidence of stroke in Karanganyar, Central Java ($p=0.001$). This study conclude that obesity have a close relationship with stroke. The policy about prevent obesity by healthy lifestyle need to be increases so it can help minimize the risk of stroke.

Keywords: BMI; elderly; obesity; stroke

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INTRODUCTION

Obesity rates have seen a marked rise globally in recent decades, including in developing countries. In Indonesia, obesity rates tend to increase from year to year (Susantiningih, 2015). Being overweight is an important risk factor for a number of diseases, including stroke. There is a correlation with vascular disorders and general metabolic function, such as coronary heart disease and stroke (Fuming et al., 2022). Obesity is considered a metabolic condition that not only reduces quality of life and life expectancy, but can also lead to various related complications, such as cardiovascular disease and stroke (Tappia, 2021; MICHA, 2017; Widiyanto et al., 2022). A statistically significant correlation was seen between the spread of fat in the midsection and the presence of additional diseases in obese individuals, especially in the elderly group and people with complex comorbidities such as cardiovascular, cerebrovascular, and metabolic diseases (Liu et al., 2023).

Obesity is closely linked to the risk of cardiovascular disease, including stroke. Stroke, causing 10% of global deaths, ranks third after coronary heart disease (13%) and cancer (12%) in developed countries. In Indonesia, stroke causes 7.9% of total deaths (Amelia K. Boehme, Charles Esenwa, 2017). The link between obesity and stroke risk has been investigated in depth. Studies show that obesity increases the risk of stroke in older groups of

adults, while evidence also points to an increase in hospitalizations due to ischemic stroke in young adults along with increased obesity rates (Mitchell et al., 2015).

It is reported that obesity can increase the risk of death by almost 40% in ischemic stroke patients (Yawoot et al., 2021). It should be noted that obesity is independently associated with mortality events after ischemic stroke, and the impact of a combination of the two on the final outcome has never been explored before (Bauza et al., 2018). Further, it should be emphasized that obesity increases the risk of ischemic stroke because it is associated with the development of several chronic complications such as hyperglycemia, hypertriglyceridemia, dyslipidemia, and hypertension, all of which are risk factors for ischemic stroke (Huang et al., 2022). What's more, it should be noted that there is an association between obesity and diabetes and ischemic post-stroke outcomes, and the combined impact of these outcomes has never been investigated before (Bauza et al., 2018). The purpose of this study was to determine the relationship between obesity and the incidence of stroke among elderly in Karanganyar, Central Java.

METHOD

This study used an analytical observational study with a cross-sectional study design. This study conducted in Karanganyar Regency, Central Java, Indonesia in 2023. The sample of the study was 415 elderly selected using consecutive sampling. The instruments and study materials used in this study came from primary and secondary data, namely body scales and manual height measurements and Medical Records. This study data is in the form of body mass index figures obtained from the patient's height and weight. So that the data obtained is ratio data.

RESULTS

An overview of sample characteristics in the study can be seen in table 1.

Table 1.
Sample characteristics

Criterion	f	%
Age (Years)		
45-60	195	47
61-75	220	53
Gender		
Man	276	66.5
Woman	139	33.5

Table 1 above, it can be described that from the total sample, there were 195 people who fell into the middle age category with a presentation of 47% and as many as 220 were in the category *elderly* or elderly with higher presentation at 53% (WHO., 2013).

Table 2.
Association of obesity with stroke incidence

		Obesity	Incidence of stroke
Obesity	Person correlation	1	0.377
	P Value		0.001
	N	415	415
Incidence of stroke	Person correlation	0.377	1
	P Value	0.001	
	N	415	415

Table 2 there are 415 total samples. Referring to the basis of decision making shows that the significance value of $0.001 < 0.05$ which means there is a correlation. The results also showed

that the value of person correlation was 0.377 so that it can be concluded that it has a weak correlation. In determining the relationship in this study, it can be seen in the value of the value of the person correlation $> r$ table, which is $0.377 > 0.098$ so that it can be stated that there is a relationship between obesity and the incidence of stroke in Karanganyar, Central Java.

DISCUSSION

The study was conducted in Karanganyar Regency, Central Java with a total number of subjects as many as 415 people who were obese. The age range of study subjects was 50 to 75 years with the male sex being more dominant. complaining of the emergence of various diseases such as stroke, low back pain, and osteoarthritis which begins with obesity. Obesity is indeed one of the risk factors for the onset of stroke. Overweight individuals tend to have higher levels of Low Density Lipoprotein (LDL). LDL levels that exceed normal limits can result in narrowing of blood vessels, and in the long run, can cause the formation of atherosclerosis plaques that can trigger ischemic stroke. The probability of stroke was higher in patients who were obese by 1.3 times and central obesity by 1.53 times compared to patients who were not obese (Ghani et al., 2016). Ischemic stroke can arise due to reduced blood flow in the brain region due to blockage that blocks blood flow (Caplan LR, 2016).

This blockage can cause disturbances in circulation resulting in decreased oxygen levels and increased levels carbon dioxide and lactic acid in the brain (Affandi et al., 2016). Decreased ATP levels will inhibit the process of pumping Na and K ions, resulting in excess Na⁺ ions in the cell. As a result, there is an increase in H₂O levels in cells, causing cytotoxic edema and accelerating the occurrence of ischemia in the brain. (Mardiani et al., 2022). This can cause damage to nerve cells, and the large number of damaged and dead nerve cells can cause disruption in the neurological function of stroke survivors (Sherwood., 2019). Obesity is a risk factor for stroke, and evidence suggests that obesity may increase the risk of ischemic stroke in adults (Mitchell et al., 2015). The relationship between obesity and stroke is complex, involving many factors. Study shows that obesity is linked to an increased risk of hypertension, diabetes, and its complications, all of which play an important role in stroke epidemiology (Strazzullo et al., 2010). In addition, obesity is associated with strong cytokine activity, affecting the sympathetic nervous system, renin-angiotensin axis, endothelial function, and microcirculation, all of which are relevant to the pathophysiology of stroke (Strazzullo et al., 2010). Inflammation also plays an important role in the link between obesity and stroke because obesity is characterized by an increase in inflammatory mediators, and chronic inflammation has been linked to a worse risk and outcome of stroke (Haley & Lawrence, 2016).

Furthermore, type 2 diabetes triggered by obesity has been shown to inhibit the neurological recovery process after stroke, associated with decreased neurogenesis and persistent atrophy of specific interneurons, suggesting impaired neuroplasticity (Pintana et al., 2019). The impact of obesity on stroke outcomes after intravenous thrombolysis for acute ischemic stroke is still not fully understood, indicating the need for further study in this area (Sarikaya et al., 2011). Obesity has also been linked to atherosclerotic stroke of the great arteries, highlighting the multifaceted link between obesity and stroke (Song et al., 2016). Overall, the association between obesity and stroke involves a variety of mechanisms, including the indirect impact of obesity on hypertension and diabetes, the influence of obesity on inflammatory mediators, and its association with impaired neurogenesis and specific interneuronal atrophy. More study is needed to fully understand the correlation between obesity and stroke, especially in the context of stroke outcomes and specific types of stroke.

CONCLUSION

The higher incidence of eating obesity will trigger an increase in the incidence of stroke because the results of the study state that there is a relationship between obesity and the incidence of stroke. Obesity contributes to the occurrence of atherosclerosis, increased blood pressure, endothelial dysfunction, systemic inflammation, and changes in lipid metabolism that all play a role in the occurrence of ischemic stroke. Present conclusions that can be drawn from the results and discussion, consistent with the objectives

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