

ASSOCIATION OF BODY MASS INDEX WITH MORTALITY AMONG STROKE HAEMORRAGIC PATIENTS

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ABSTRACT

Abnormal body mass index (BMI) that leads to obesity and overweight is a problem that must be considered. It was one of the major health problems in the worldwide. Obesity and overweight contribute to risk factor for stroke and contribute to rapid death than those in normal BMI. The aim of this study was to analyse the association of Body Mass Index (BMI) with mortality among haemorrhagic stroke patients in the Unit Stroke, RSUD Banyumas. Non-experimental with retrospective approach has been used on this study. Total of 111 respondents using total sampling technique was taken from the medical record data of the Banyumas hospital from November 2018 to November 2019. Chi-square analyses has been performed to analyse this data. The statistical analysis showed that hemorrhagic stroke patients who died within ≤ 48 hours were 55 respondents (49,5%) and those who died within ≥ 48 were 56 respondents (50,5%). Abnormal BMI (≥ 25 kg/m²) were 46 patients (41,4%) and normal BMI (< 25 kg/m²) were 65 respondents (58,6%). The chi square result obtained p value = 0,045 with OR 2,2189. Which means that there was a relationship between BMI and mortality among hemoragic stroke.

Keywords : Body Mass Index, Hemorrhagic Stroke, Mortality.

ABSTRAK

Indeks massa tubuh (IMT) yang tidak normal yang mengarah pada obesitas dan overweight merupakan masalah yang harus diperhatikan. Hal tersebut adalah salah satu masalah kesehatan utama di dunia. Obesitas dan kelebihan berat badan berkontribusi terhadap faktor risiko stroke dan berkontribusi terhadap kematian yang lebih cepat dibandingkan dengan IMT yang normal. Penelitian ini bertujuan untuk menganalisis hubungan Indeks Massa Tubuh (IMT) dengan mortalitas pada pasien stroke hemoragik di Unit Stroke, RSUD Banyumas. Pengambilan sampel sebanyak 111 responden dengan teknik total sampling telah di ambil dari medical record RSUD Banyumas dari data bulan November 2018 sampai dengan November 2019. Analisis bivariat dilakukan dengan menggunakan analisis chi-square. Hasil uji statistik menunjukkan bahwa pasien stroke hemoragik yang meninggal dalam waktu ≤ 48 jam sebanyak 55 responden (49,5%) dan yang meninggal dalam waktu ≥ 48 sebanyak 56 responden (50,5%). IMT (≥ 25 kg/m²) sebanyak 46 responden (41,4%). Hasil analisis Chi Square diperoleh nilai $p = 0,045$ dengan OR 2,2189. Artinya ada hubungan antara IMT dengan mortalitas pada pasien stroke hemoragik. terdapat hubungan antara indeks masa tubuh dan kematian pada pasien stroke hemoragik.

Kata Kunci : Indeks Massa Tubuh, Kematian, Stroke Hemoragik,

INTRODUCTION

Stroke is typically characterized by neurological deficits due to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intracerebral haemorrhage (ICH) and subarachnoid haemorrhage (SAH) (Sacco et al., 2017). Data from

American Heart Association (AHA) reported that stroke is ranked fourth among all causes of death, after heart disease, cancer, and chronic lower respiratory disease in the world and the second leading cause of death in developed country (Go et al., 2014). In Indonesia, stroke was the leading cause of death in all age group, with 15.4% of the

total death i.e., one of seven people died due to stroke. One of four (25%) people who suffered stroke died and the other (75%) had mild or severe disability (Ministry of Health Republic of Indonesia, 2013). The prevalence of stroke continuously increased in Indonesia (Riskesdas, 2012).

Asian countries in general have higher rates of stroke mortality—especially death from haemorrhagic stroke—than Western countries, although these rates have decreased in Japan and urban areas in China. The high prevalence of stroke in Indonesia was influenced by several risk factors such as obesity, lack of physical activity, unhealthy diet, smoking, high blood pressure, increased blood sugar and increased blood lipids (Kemenkes RI, 2019).

Many cases of haemorrhagic stroke need long term care. Only 20% of sufferers who could live independently, while 40% of cases die within 30 days and about half will die within 48 hours. Total 80% cases of spontaneous haemorrhagic stroke, where damage was due to rupture of an artery caused by chronic hypertension or amyloid angiopathy (Haynes, et al., 2013). Brainstem haemorrhage and intracventricular haemorrhage were independent predictors of short- and long-term mortality (Yan et al., 2018). Overweight and obesity were risk factors for increased risk of stroke, diabetes mellitus (DM), and hypertension, particularly among women. Alcoholic beverages usually contain a lot of calories as well, which can contribute to weight gain (Towfighi et al., 2012). Among East Asian population, high BMI was considered a risk factor ischemic and haemorrhagic stroke (Chen et al., 2013)

For haemorrhagic stroke, the risk of death was higher at body mass index values of 27.5 and above. Elevated risk of death from cardiovascular disease was also observed at lower categories of body mass index (hazard ratio 1.19 (95% confidence interval 1.02 to 1.39) and 2.16 (1.37 to

3.40) for body mass index ranges 15.0-17.4 and <15.0, respectively), compared with the reference range (Chen et al., 2013).

In previous study, Body Mass Index (OR 0.91), were found to be independent predictors of 1-year mortality among acute ischemic and haemorrhagic stroke (Liljehult et al., 2020). In another study also stated that cases of overweight and obesity were the most prominent among stroke deaths in young adults (ages 15-44 years), 97% identified were haemorrhagic strokes. There was a significant linear trend in the proportion of subarachnoid haemorrhages as BMI increased (Darke et al, 2019). Other Study also revealed that obesity is the variable most at risk of influencing stroke compared to low physical activity and smoking history (Pardede et al., 2020).

Based on reports from nurses at the Stroke Unit at Banyumas Hospital, the average patient who hospitalized and takes a long time is a patient with a type of haemorrhagic stroke and the longest period of stay and the incidence is in patients with haemorrhagic stroke. Therefore, researchers interested in conducting research related to the relationship of obesity status (BMI) with mortality in haemorrhagic stroke patients at RSUD Banyumas. Identify the association of Body Mass Index and mortality status among haemorrhagic stroke patients in the Stroke Unit was the aim of this study.

METHODS

A descriptive observational analytic study with retrospective approach was used for this study. The population in this study were all haemorrhagic stroke patients in the medical record data of RSUD Banyumas from 2018-2019. The total of 111 respondents were obtained using total sampling technique from November – Desember 2019. The instruments that we have used was a data sheet of the characteristic of the

respondents and a recording sheet from medical records related to obesity status (height and weight to measure BMI) and time of death of the patients.

Data for baseline BMI (calculated based on measured by height and weight), sex, age, blood pressure, and mortality status were collected from medical record. Descriptive analyses were conducted to describe the characteristics of patients. The researchers used chi square and 95% confidence interval to examine the association of the BMI and mortality status from all haemorrhagic stroke patients. We conducted analyses using conventional BMI in 2 categories: ≥ 25 kg/m² (abnormal body weight) and < 25 kg/m² (normal body weight). As well as mortality status in two categories that is died within ≤ 48 hours and died within > 48 hours.

This research has received permission from the research ethics committee of RSUD Banyumas with ethically proper No. 033/KEPK-RSUDBMS/XI/2019 and research permit no. 385/DIKLIT/2019.

RESULTS

Characteristic of Respondents

The research data were obtained from distributing questionnaire to 111 patients in the stroke unit at Banyumas Hospital, as follows:

Based on the data in the table 1, most hemorrhagic stroke patients were man that is 60 (54,1%). The age over 65 years old was 47 (42,3%) and the youngest age group 36 - 45 years old was 9 (8,1%). Judging from the status of patients with *Body Mass Index and Mortality Status*

abnormal blood pressure was 100 (90.1%) and normal blood pressure was 11 (9,9%). Abnormal BMI with the total number 46 (41,4%) and the normal BMI was 65 (58,6%). Mortality status within ≤ 48 hours was 55 (49,5%) and > 48 hours was 56 (50,5%)

Table 1. Characteristic of haemorrhagic stroke patients who died in stroke unit RSUD Banyumas (n= 111)

Characteristic of Respondent	Frequency	Percentage (%)
Gender		
Man	60	54,1
Woman	51	45,9
Age (years)		
36-45	9	8,1
46-55	23	20,7
56-65	32	28,8
>65	47	42,3
Total	100	100
Blood pressure status		
Abnormal blood pressure	100	90,1
Normal blood pressure	11	9,9
Obesity status		
Abnormal BMI	46	51,4
Normal BMI	65	58,6
Mortality Status		
Died within ≤ 48 jam	55	49,5
Died within > 48 jam	56	50,5
Total	111	100

Table 2. Assosiation of Body Mass Index and Mortality Status in haemorrhagic stroke patients.

Variable	Mortality Status		P value	OR	95% CI
	≤ 48 (hours) n (%)	> 48 (hours) n (%)			
Obesity Status					
Abnormal BMI	28 (50,9)	18 (32,1%)	0,045	2,189	1.013-4,732
Normal BMI	27 (49,1)	38 (67,9%)			

Table 2 shows that for the obesity status, the number of abnormal BMI among haemorrhagic stroke patients who died within ≤ 48 hours were 28 (50.9%) and who died within >48 hours with 18 (32,1 %) with p value: 0,045 ($p < 0,05$), which means that there is a relationship between obesity status and mortality status among stroke haemorrhagic patients. The result of the OR value: 2,189 (95 % CI: 1.013 – 4.732), it can be concluded that haemorrhagic stroke patients with BMI of ≥ 25 kg/ m² have a risk factor of 2,189 times for a mortality ≤ 48 hours when compared to patients with a BMI < 25 kg/m².

DISCUSSION

The Characteristic of subject

The total of male in hemorrhagic stroke patient who died within ≤ 48 hours had a greater number when compared to female patients. This is the same as the results from Yulianingtias (2017) which showed that the gender of the respondents was mostly male (62,3%). Study from James et al (2016), concluded that 48,9% were female (mean age 75, for male the mean age was 67 years). This condition was also supported by study from Fortunata et al (2012) that the number of hemorrhagic stroke patients were male namely 51,35% compared to woman 48,65 %. The greater risk was due to men for the location of bleeding in hemorrhagic stroke because of deep bleeding.

Judging from the age factor, it was found that the most hemorrhagic stroke patients who died within ≤ 48 hours were aged >65 years old, 42,3%. According to Rathore et al (2012) states that hemorrhagic stroke patients with age > 60 years were the independent predictors of mortality. Setianto et al (2014) revealed that the mean age of study subjects with poor clinical outcomes during the study was 59 years. Old age was a strong predictor of the poor prognosis of hemorrhagic stroke including recurrence,

clinical deterioration, and mortality. Stroke generally occurs in the elderly and there is an increased incidence of stroke at over 55 years of age. This is due to atherosclerosis which is the most common cause of hemorrhagic stroke in the elderly (Risksdas, 2014). From the data, BMI status was not normal as much as 46 (41,4%) and normal BMI as much as 65 (58,6%). Meanwhile, according to the other studies the proportion in each category of BMI was underweight 5,6%, normal weight 37,4%, overweight 27,4% (James et al., 2016)

Association between Body Mass Index (BMI) and the Death of Haemorrhagic Stroke Patients at RSUD Banyumas.

Data obtained those 50,9 patients with a BMI ≥ 25 kg/m² who died ≤ 48 hours with p value $p = 0,045$ ($p < 0,05$). This is supported by the previous study from Darke (2019), which states that between a higher BMI and hypertension ($p < 0,001$). This is related to the presence of cardiomegaly or left ventricular hypertropia which can be categorized as causes other than hypertension, cardiomegaly, atherosclerosis, severe coronary arteries, endocarditis, or cerebral artery atherosclerosis

Study from Kim et al (2011), concluded in multivariate analysis that overall risk for all causes of death increased per kg/m² higher BMI ($p = 0,03$). But the interaction between age and BMI ($p = 0.009$) revealed that the association of BMI was higher than the risk of death most strongly in young individuals and decreased linearly with age than in the elderly, overweight and obesity had a protective effect (Kim et al, 2017). According to Zhou (2008), described that high BMI is strongly associated with high blood pressure, which predisposes to cardiovascular conditions such as ischemic heart disease.

Sarikaya et al (2011), concluded the results of his study that obese patients are at a higher risk of death than non-

obese. Logistic regression analysis showed that poor outcome in the obesity group was an independent factor of vascular risk factors associated with hypertension and diabetes mellitus.

According to previous research by Ghani et al (2016), obesity was defined by body mass index (BMI) criteria $\geq 25 \text{ kg/m}^2$, said to be central obesity if the abdominal circumference was $\geq 90 \text{ cm}$ in men and $\geq 80 \text{ cm}$ in women. People with obesity are at risk for stroke, but this risk occurs indirectly. One of the contributing factors to cardiovascular disease is obesity. Results from previous research from (2005) showed that obese patients had a relative risk of pulmonary embolism 2,21 (95% CI 2.20-2.23). Obese women had a greater relative risk of developing deep vein thrombosis than obese men, 2.75 (95% CI 2.74-2.76) versus 2.02 (95% CI 2.01-2.04). Obesity has the greatest impact on men and women aged less than 40 years, suggesting that obesity is a risk factor for pulmonary embolism and deep vein thrombosis in both men and women. According to Towfighi (2009), that a higher BMI after stroke is associated with a greater risk of all-cause and cardiovascular death in younger individuals.

CONCLUSION

From the results of this study, it can be concluded that there is association between obesity status and mortality status among stroke haemorrhagic patients. The haemorrhagic stroke patients with abnormal BMI have a risk factor of 2,189 times for a mortality within ≤ 48 hours.

ACKNOWLEDGEMENTS

Stroke Unit and medical record unit of RSUD Banyumas provided the data. This article has not been written in conjunction with the professionals of the database

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