



RELATIONSHIP BETWEEN THE ARRIVAL TIME OF POST ACUTE ISCHAEMIC STROKE ATTACK TO THE EMERGENCY DEPARTMENTS AND THE OUTCOME OF THE ACUTE ISCHAEMIC STROKE PATIENTS

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ABSTRACT

Background: The success of action and improvement of outcome on stroke depends very much to the promptness of patients being brought to the emergency installation; however most of the acute ischaemic stroke patients come late to the emergency installation. **Objective:** The research aims to find out the relationship between the arrival time of the post-acute ischaemic stroke attack patients and the outcome of the acute ischaemic stroke patients in Type C Hospital in Malang. **Methods:** Analytic observational design with cross-sectional approach was utilized. The samples were 104 Acute Ischemic Stroke Patients in the Emergency Installation selected by total sampling technique. The statistical tests used Spearman rank correlation test with significant level (α) = 0.05. The study was conducted in 4 Type C hospitals in Malang, Indonesia. **Results:** Spearman correlation test showed that there was a significant relationship between arrival time of post-acute ischaemic stroke attack in the Emergency Installation ($p=0.027$) and the outcome of acute ischaemic stroke patients with the correlation coefficient (r) = 0,217. **Conclusion:** There was a significant relationship between the arrival time of post-acute ischaemic stroke attack patients in the emergency installation and the outcome of the acute ischaemic stroke patients in Type C Hospitals in Malang.

KEYWORDS: Hospital Arrival Time, Outcome, Acute Ischemic Stroke Patients.

INTRODUCTION

Stroke is included into medical emergency condition which becomes one of the most causes of death and disability in the world.^[6,17,24] Stroke kills 1 person in the world every 6 seconds, with approximately 15 million people suffer from stroke attack each year, 5 millions of them dead and another 5 million suffer from permanent disability.^[15,25]

In Indonesia, the rate of stroke incident increases drastically, it even includes Indonesia as one of the countries with most stroke patients in the world, accounting 11.8% of total death in Indonesia.^[28] Stroke, which is not contagious disease, is also the main cause of permanent disability (Disability-Adjusted Life Years/ DALYs) with the percentage increase that reaches almost 80% from 1990-2010.^[11] The disability (DALYs) caused by stroke in 2007 alone was estimated around 2,337,718

people lost their productive time, which is predicted to increase to 32.5% in 2020.^[23]

The enormity of incident, death and disability rate caused by stroke describes that the stroke is an important health problem to be addressed. Stroke poses great consequences; not only the death, the disability will also affect the patients and the family. The disabled patients will lose their productive time, independence, identity, social life and even experience life quality degradation which eventually will be influential psychologically, as followed by stress and depression.^[2,7] The family will bear the expensive direct and indirect cost of treatment for the stroke that will increase the burden of illness, social and family economy.^[12,23,29]

One of the efforts to mitigate the impact of stroke is to improve the outcome by providing prompt action and treatment after the stroke attack.^[1,20] Several researches revealed that the initial intervention to the acute

ischaemic stroke will be very effective when given within 3 hours after the attack. The effectiveness of the intervention will gradually decrease the longer the initial action is given at the onset of the stroke.^[9,10,16] The success of action and improvement of outcome to the acute ischaemic stroke patients at the onset of the stroke will depend much on the effort to minimize the delay of arrival at the emergency installation.^[8,21,26]

At the emergency installation (IGD) of Type C Hospital in Malang, stroke ranks second in the top ten of monthly illness. In these hospitals, acute ischaemic stroke scores more than hemorrhage stroke and 80% of patients come after 3 hours therefore worsen the outcome of the patients. Rechanneling and the possibility of ischaemic/infarction development may cause the neurological increase/worsening which frequently occurs at the first hours after the attack and therefore it is the critical time to provide initial action immediately. The research was conducted to find out the relationship between arrival time of the post-acute ischaemic stroke attack patients and the outcome of the acute ischaemic stroke patients in the emergency installation of Type C Hospital in Malang.

METHODS

This research used observational analytic design with cross-sectional approach. The research locations were 4

hospitals type C in Malang, Indonesia. The research was held from March 1st to May 1st, 2018. The samples were 104 acute ischemic stroke patients in the Emergency Installation selected using total sampling technique. The exclusion criteria of this research was the patients with clinical condition and CT-Scan result that shows intracerebral hemorrhage, subarachnoid hemorrhage, TIA, malignant or neoplasm and with the previous history of stroke. The research instruments were observation sheets of acute ischaemic stroke outcome using National Institutes of Health Stroke Scale (NIHSS) and sociodemographic questionnaire. Sociodemographic questionnaire was completed when patients enter the emergency installation, and the observation was conducted while the patients undergo treatment in the emergency installation, whereas the assessment of patient's outcome was conducted when patients exit the emergency installation. This research performed three types of analysis: univariate and bivariate analysis. The univariate analysis aimed to describe the characteristic of the research respondents, the bivariate analysis used Spearman rank correlation test with significant level (α) = 0.05.

RESULTS

Table 1: Univariate Analysis Results of Characteristics of Respondents.

Characteristics of Respondents	Number (n)	Percentage (%)
Age		
<60 Years	36	34.6
≥60 Years	68	65.4
Total	104	100.0
Sex		
Female	44	42.3
Male	60	57.7
Total	104	100.0
Education		
Elementary School	54	51.9
Junior High School	21	20.2
Senior High School	20	19.2
Bachelor	9	8.7
Total	104	100.0
Occupations		
Employed	72	69.2
Unemployed	32	30.8
Total	104	100.0
Type of Transportation to IGD		
Ambulance	25	24.0
Personal/public transport	79	76.0
Total	104	100.0
Distance of onset location-to-door		
≤40 km	73	70.2
>40 km	31	29.8
Total	104	100.0

Source: Primary Data (2018)

Table 1 shows that most of the respondents of ≥ 60 years old were 68 respondents (65.4%), 60 respondents (57.7%) were male, 54 respondents (51.9%) were elementary school graduate, 72 respondents (69.2%)

were employed, 79 respondents (76.0%) used personal/public transport to IGD, and 73 respondents (70.2%) had the distance of onset location-to-door of ≤ 40 km.

Table 2: Univariate Analysis Results of Study Variables.

Variabel	Number (n)	Percentage (%)
Arrival time of post ischaemic stroke attack to IGD		
≤ 3 Hours	27	26.0
> 3 Hours	77	74.0
Total	104	100.0
Outcome of Acute Ischaemic Stroke Patients		
Good (NIHSS score ≤ 10)	32	30.8
Bad (NIHSS score > 10)	72	69.2
Total	104	100.0

Source: Primary Data (2018)

Table 2 shows that most of the respondents with the arrival time of post-acute ischaemic stroke attack to IGD

> 3 hours were 77 respondents (74.0%), and 72 respondents (69.2%) scored bad (NIHSS score > 10).

Table 3: Bivariate Analysis (Spearman rank correlation test) results between arrival time of post ischaemic stroke attack to IGD and outcome of acute ischaemic stroke patients.

Independence Variable	Outcome of Acute Ischaemic Stroke Patients				<i>p</i> -value	Correlation Coefficient (<i>r</i>)
	Good		Bad			
	n	%	n	%		
Arrival time of post ischaemic stroke attack to IGD					0,027	0,217
≤3 hours	12	42.2	15	57.8		
>3 hours	20	22.0	57	78.0		

Source: Primary Data (2018)

Table 3 shows that from 27 respondents coming to IGD within ≤ 3 hours, 12 respondents (42.2%) of them had good outcome and 15 respondents (57.8%) had bad outcome. The acute ischaemic patients coming to IGD within > 3 hours were 77 respondents where 20 respondents (22.0%) had good outcome and 57 respondents (78.0%) had bad outcome. Table 3 shows time arrival time of post ischaemic stroke attack to IGD and the outcome of acute ischaemic stroke obtained by the statistical test of Rank Spearman had $p = 0.027 < \alpha$ (0.05), which indicated a significant relationship between arrival time of post ischaemic stroke attack to IGD and the outcome of acute ischaemic stroke patients. Arrival time of post ischaemic stroke attack to IGD had a strong relationship with positive direction toward the outcome of acute ischaemic stroke patients, which was marked with the value of r of 0.217.

DISCUSSION

The research result shows that the arrival time of the post-acute ischaemic stroke attack influences the outcome of the patients in the emergency installation of Type C Hospital in Malang. As many as 74.0% had the arrival time to the emergency installation of > 3 hours post-acute ischaemic stroke attack. Most respondents

coming late to the emergency installation post stroke attack had bad outcome. It is shown by 78.0% respondents coming late to the emergency installations that scored NIHSS > 10 .

Each minute of delay of action will cause the failure of ± 1.9 million neuron or brain cells function and 14 billion synapses, moreover when there is continuous brain ischemic of > 6 hours after the attack without any action, the permanent neurological damage will occur which leads to the severity of disability.^[5,18] The delay is the main cause confronted by the acute ischaemic stroke patients needing prompt actions. The promptness of patients to be brought to the emergency installation and the accuracy of treatment may lower the risk of neurological deterioration, and minimize disability and even death.

The acute phase of the ischaemic stroke patients occurs at the day 0 to 14th after the onset. Onset takes place within 3 hours.^[3] The brain tissue will stop functioning when there is lack of oxygen of more than 60 to 90 seconds and the irreversible necrosis and brain damage may happen few hours after the stroke attack.^[13] Therefore, promptness of arrival of the post-acute

ischaemic stroke patients is very important to lower the risk of disability and even death to the patients.

The research showed that the time arrival has significant relationship with the outcome of acute ischaemic stroke patients from the coefficient correlation (r) = 0.217 meaning that there is positive significant between the arrival time to the emergency installation and the outcome of acute ischaemic stroke patients. Several researches showed that the initial intervention of acute ischaemic stroke is very effective when given within ≤ 3 hours after the attack. The effectiveness of the intervention will gradually decrease the longer the initial action is given at the onset of the stroke.^[9,10,16] The success of action and improvement of outcome to the acute ischaemic stroke patients at the onset of the stroke will depend much on the effort to minimize the delay of arrival at the emergency installation. The procedure of immediate reperfusion to the ischaemic stroke may minimize the tissue damage and improve the outcome of acute ischaemic stroke.^[8,21,26]

Every minute of initial action given will be closely related to the improvement of outcome. One of the largest components in the constraints of initial action to the stroke patients is the pre-hospital delay or delay of the patients arrival to the IGD.^[27] The prompt intervention at the hyperacute stroke phase will lower the illness and disability rate of the stroke patients. Acute stroke requires immediate symptoms identification and treatment to minimize the resulting risks. On ischaemic stroke, the arrival time to the hospital after the onset is the important factor in administration of intravenous plasminogen activator.^[30]

In Indonesia, especially Yogyakarta has the largest proportion of patients coming to the hospital of more than 24 hours and only 13% come within less than 3 hours.^[22] Likewise, in China, it is found that most of the ischaemic stroke patients come to the emergency installation within >6 hours after the onset with the time median of arrival to the hospital of 15 hours.^[14]

Data from NSA (National Stroke Association) shows that only 40% stroke patients enter the emergency installation of 6 hours after the emergence of stroke symptoms and 60% after 48 hours. The delay of stroke patients coming to the hospital was caused by the ignorance of patients and the family in recognizing the signs and symptoms of stroke, therefore the introduction to stroke symptoms alert is very important because fibrinolytic therapy on ischaemic stroke must be given 3 hours at the window phase from the onset.^[4,19] The delay in receiving prompt medication may cause bad prognosis and the increase of morbidity and mortality rate as well as the factors of outcome or clinical improvement of the acute ischaemic stroke patients in IGD.^[3]

The research showed that most of the respondents coming late to the emergency installation post-acute

ischaemic stroke attack causes the delay of initial treatment to the patients after the onset, and leads to the bad prognosis and outcome of the patients. In line with this research, other factors causing the delay of patients coming to the hospital include the distance to the hospital, the belief to myth, preference to alternative medication, and the low awareness of the family and patients to the recognition of stroke symptoms.

The research showed the importance of patients and family awareness to come to the emergency installation as early as possible after the onset of stroke is experienced (post-acute ischaemic stroke onset), therefore the patients will not be late for prompt and accurate initial treatment. This will improve the good outcome for the acute ischaemic stroke patients at the hospital.

CONCLUSION

There is a significant relationship between arrival time after the onset and the outcome of acute ischaemic stroke patients in the emergency installation. Most respondents coming late of > 3 hours after the onset of acute ischaemic stroke to the emergency installation score bad outcome

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ETHICAL CONSIDERATION

Prior to data collection, ethical approval was obtained from Research Ethics Committee of Faculty of Medicine, Brawijaya University (No. 69/ EC/ KEPK-S2 /03 /2018). Informed consent and explanation of the research process were given to all respondents before data collection started.

AUTHOR'S CONTRIBUTION

All authors contributed to the study concept, design, data analysis and manuscript preparation.

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