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Factors Related to Arrival Time at Hospital among Stroke Cases: Demographic Characteristics and Warning Signs

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In Indonesia, stroke is the leading cause of death either in urban or rural area. Stroke death and disability are related to arrival time at hospital. This study aims to describe stroke cases by demographic characteristics, warning sign and to analyze factors related to arrival time at Hospital. The survey was conducted in Surabaya, the second biggest city in Indonesia. Samples were 111 stroke cases of Surabaya inhabitants arriving in fours hospital in Surabaya which were selected randomly. Descriptive analysis of the variables and a Chi square test were used to perform association between the demographic characteristics and warning signs as independent variables, and arrival time at hospital as dependent variable. Stroke affected people aged 30 years old and older, whereas most of them (41.4%) were 50 – 59 years old. Almost half of stroke cases (45.5%) had insurance for poor people and 90% of them lived with their family. The most frequent case of risk factors (61.3%) was hypertension. Futhermore, half or less stroke cases knew that they had either diabetes mellitus or hypercholesterolemia. Most warning signs of stroke cases were weakness on one side of the body (80.2%) and sudden lack of walkingcoordination (37.8%). Less than one third(27%) of stroke cases arrived in Hospital in 3 hours or less after stroke attack and factor related to it was male. Then, the warning sign significantly associated with the arrival time at hospital was vomiting (p value < 0.05). Epidemiologic transition is faced in Surabaya. Stroke affected people not only in high level of social economy but also poor people and most of stroke cases arrived in Hospital more than 3 hours after stroke attack.

***Keywords**: stroke, arrival time, warning sign, vomiting, male*

Introduction

In Indonesia, stroke is one of many non communicable diseases that should get a priority because stroke is the leading cause of mortality either in urban or rural area (MOH, 2008). Stroke causes mortality as well as physical and cognitive disability. In USA, mortality and disability cause lost of productivity.The estimated direct and indirect cost due to stroke is US$ 51,2 billions (American Heart Association, 2003).

Stroke mortality and disability are related to arrival time at hospital when the patientswant to get treatment. One of the clinical impacts of stroke is cognitive impairment or dementia. Previous studies conducted by Martini, et al (2000) and Martini (2002) showed that stroke cases getting therapy more than 12 hours post stroke attack increased risk for cognitive impairment or post stroke dementia. This study aims to describe stroke cases by demographic characteristics, warning sign and to analyze factors related to arrival time at Hospital.

Methods

The study was conducted in Surabaya which is the capital city of East Java. Accessible population of the study was stroke cases of Surabaya inhabitants arriving at hospital in Surabaya. Fours hospitals were selected randomly: cluster random sampling based on location (middle, eastern, southern, northern part of Surabaya) and status of

hospital (public or private hospital). Furthermore, stroke cases as respondents as many as 111 patients were recruited consecutively and voluntarily.

Variables investigated in this study were demographic characteristics such as age, sex, level of education, jobs and having insurance as well as risk factors including hypertension, diabetes mellitus, and hypercholesterolemia. Furthermore, variables on stroke occurrence in community were arrival time at Hospital, living status, warning sign and type of stroke. Stroke cases in this study were *first ever stroke* diagnosed by neurologist based on WHO criteria.

The period of collecting data was for four months in 2008 using questionnaire. The questionnaire was asked by trained interviewer to patients or their families. Then the data was analyzed descriptively and X^2 test was used to get statistical significance. Statistical significance was defined as p value < 0.05.

Results

Demographic Characteristic of Stroke Cases

Most of stroke cases were people aged 50 – 59 years old (41.4%). Stroke cases affected people aged 30 years old, although stroke cases were not frequently found (1.8%). Average age of stroke cases was 57 years old and 9 months (± 9 years old 11 months) with the youngest age was 30 years old and the oldest was 79 years old. Stroke cases were found more in women than men, with 56.8% and 43.2% respectively (fig. 1).

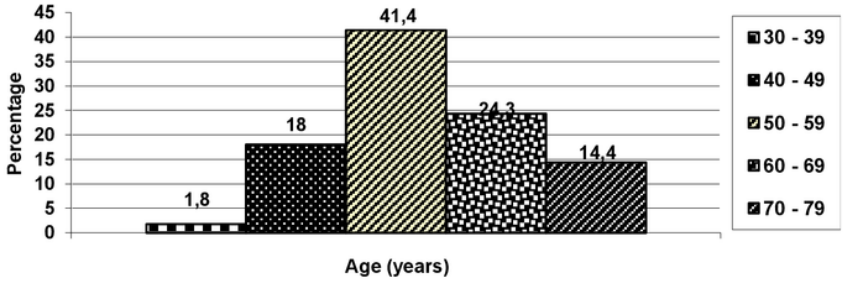

Figure 1. Distibution of stroke cases by age in Surabaya

In Surabaya, almost one third of stroke cases got education for 12 years (62 %) and only 13.51% of them got higher education (fig. 2).

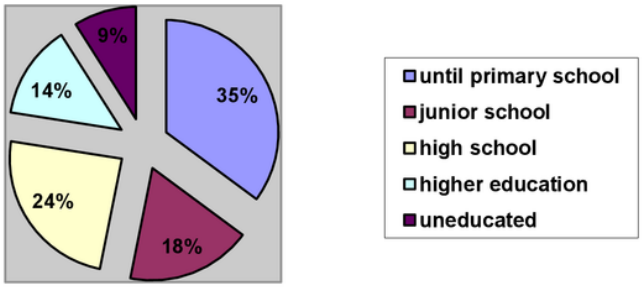

Figure 2. Distribution of stroke cases by education level in Surabaya.

In this study, more than half of stroke cases (50/94) worked in private sector and only 5 people were unemployed (fig. 3).

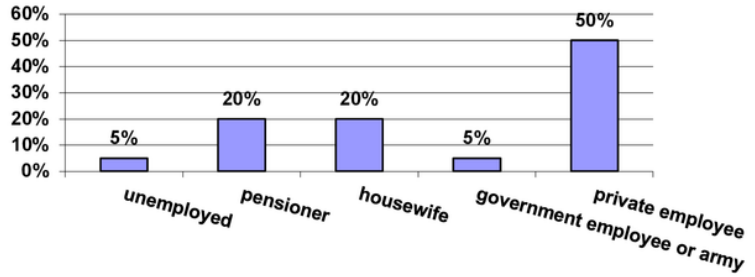

Figure 3. Distribution of stroke cases by occupation in Surabaya.

In terms of insurance coverage, almost seventy percent of stroke cases had insurance, although they only had insurance for poor people (Askeskin) (table 1).

Table 1. Type of insurance had by stroke patients in Surabaya

Type of Insurance	Frequency	Percentage
Having insurance	77	69,4
- Insurance for poor people (Askeskin)	35	45,5
- Insurance for government employee	26	33,8
- Insurance for private employee	10	12,9
- Private insurance	6	7,8
Not having insurance	34	30,6
Total	111	100,0

Risk Factor of Stroke Case

Among stroke cases, 61.3% of them previously had hypertension, 20.7% had diabetes mellitus, and 17.1% had hypercholesterolemia. However, 25.2% of them didnot know whether they had hypertension; 44.1% of them didnot know whether they had diabetes; and 62.2% of them didnot know whether they had hypercholesterolemia because they never examined it (table 2).

Tabel 2. Risk factor of stroke cases in Surabaya

Risk Factor	Frequency	Percentage
Hypertension		
Yes	68	61,3
No	15	13,5
Not known	28	25,2

Diabetes Mellitus		
Yes	23	20,7
No	39	35,1
Not known	49	44,1
Hypercholesterolemia		
Yes	19	17,1
No	23	20,7
Not known	69	62,2
Total	110	100,0

Among stroke cases having risk factors, only 30.9%, 35% and 16.7% do treatment regularly for hypertension, diabetes, and hypercholesterolemia, respectively (table 3).

Table 3. Distribution of routine therapy for each risk factor among stroke patients in Surabaya.

Routine Therapy	Frequency	Percentage
Hypertension		
Yes, regularly	21	30,9
Yes, not regularly	36	52,9
Not taking medication	11	16,2
Diabetes Mellitus		
Yes, regularly	8	34,8
Yes, not regularly	12	52,2
Not taking medication	3	13,0
Hypercholesterolemia		
Yes, regularly	3	16,7
Yes, not regularly	9	50,0
Not taking medication	6	33,3

Stroke Description in Community

Less than one third (27%) of stroke cases came to hospital in 3 hours post stroke or less (table 4). The fastest arrival time was 30 minutes and the longest time was 9 days 1 hour or 207 hours. Furthermore, the average time was 38 hours 6 minutes with median of 12 hours (fig. 4)

Table 4. Distribution of stroke patients brought to hospital by arrival time at hospital

Arrival time at hospital	Action to hospital directly				Frequency	Percentage
	Yes		No			
	n	%	n	%		
< = 3 hours	29	52,7	1	1,8	30	27
> 3 hours	26	47,3	55	98,2	81	73
Total	55	49,5	56	50,5	111	100

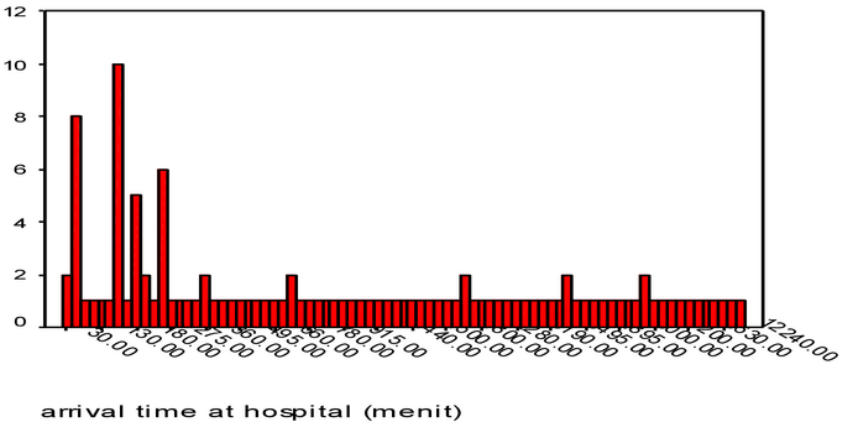

Figure 4. Distribution of stroke patients by arrival time at hospital in Surabaya.

Most of them (91%) lived with their family and only 3.6% lived alone. Among stroke patients living with family, 72.1% of them lived with their spouses (wife or husband) and the rest of them (18.9%) lived with their sons or daughters (table 5). Among many signs of stroke, the most frequent warning sign when coming to hospital was paralysis or sudden numbness of the extremities (80.2%), and walking disturbance or loss coordination (37.8%) (table 6).

Tabel 5. Living status of stroke cases in Surabaya

Living with	Frequency	Percentage
Spouse (wife/husband)	80	72,1
Children	21	18,9
Other family	6	5,4
Alone	4	3,6
Total	111	100,0

Table 6. *Warning sign* causing stroke patient to come to hospital

Warning Sign	Frequency	Percentage
Paralysis or sudden numbness	89	80,2
Walking disturbance or loss of coordination	42	37,8
Speech disturbance	41	36,9
Sudden headache	37	33,3
Slurred speech or difficulties to understand speech	33	29,7
Polineuropathy	25	22,5
Sensible disturbance	14	12,6
Coma	16	14,4
Vision disturbance	9	8,1
Sudden confused	5	4,5
Vomiting	2	1,8

Among stroke cases, most of them (76%) were infract stroke and the rest of them (24%) was hemorrhagic stroke (fig. 5)

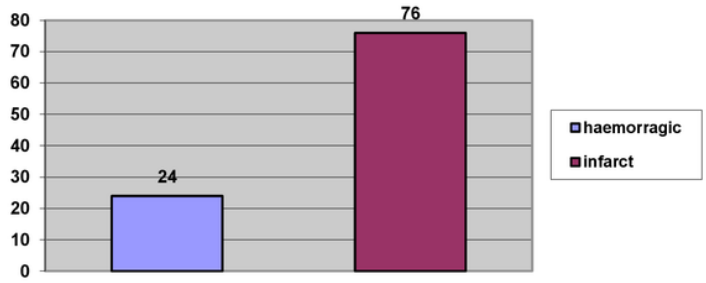

Figure 5. Percentage of stroke type in Surabaya

Factors associated to arrival time at hospital in three-hour time or less

Arrival time at hospital in 3 hours or less was associated significantly with sex (pearson correlation = -0,24). Male stroke patients came to hospital sooner than female stroke patients (table 7). Stroke patients with vomiting as warning sign came earlier to hospital than others. Arrival time of them was 38 hours 30 minutes. The warning sign was significantly associated with arrival time at hospital (p value < 0.05).

Table 7. Association between sex and arrival time at hospital among stroke cases in Surabaya

Sex	Arrival Time at Hospital			
	> 3 hours		≤ 3 hours	
	n	%	n	%
Male	41	65,1	22	34,9
Female	40	83,3	8	16,7

P value = 0,032, correlation value (r) = -0,24

Discussion

This study showed that in Surabaya stroke cases have affected people ages 30 years old and the average age was about 58 years old and standard deviation was 10 years old. Furthermore, the peak age was 50 up to 59 years old. Data showed that in Surabaya stroke cases were younger than stroke cases in other cities. In Berlin, the average age of stroke cases was almost 67 years old (± 14 years old) (Jungehulsing *et al.*, 2006). The same situation happened in the UK and Dublin, where median age of stroke patient was 75 years old and the high proportion were between 65 and 85 years old (Harraf *et al.*, 2002). Other studies conducted in USA in 1993 reported that the average age of stroke patient were 71,3 (Feldmann *et al.*, 1993) and 58 years old (Maze *et al.*, 2004).

Younger age among stroke cases in Surabaya associated with life style has been changing in community in Surabaya. Furthermore, controlling measures on risk factors of stroke have not yet been done well. It is proven in this study that a quarter of stroke patient never examined their blood pressure; almost 45% of them never examined their blood glucose; and almost two third of them never examined blood cholesterol. If the risk factors

can be detected earlier, the controlling efforts can be done soon. Therefore, stroke occurrence can be prevented. Lack of knowledge about stroke symptoms and signs may inhibit earlier controlling measures on risk factors, which can be done better. This evidence showed that providing appropriate information about stroke is a need for community in Surabaya city.

More than half of stroke cases were male and almost one third of them had lower than junior school education. Stroke cases affected low social economic status, which can be seen from the fact that almost half of stroke cases had insurance for poor people (table 1). This data showed that stroke affected people not only in high social economic status but also people in low social economic status.

Stroke case is an emergency condition having to get treatment immediately. Stroke patientsneeds to be brought to hospital as soon as possible. In Surabaya, only 27% of stroke cases arrived in hospital in 3 hours or less. Others seek treatment to General Practioners (GPs), clinic, primary health care (Puskesmas), and hospital without stroke care unit, as well as traditional healers. Going to alternative health providerswithout stroke care unit was an obstacle to get treatment earlier. This condition revealed that many people in Surabaya do not understand that stroke is an emergency condition that needs treatment immediately and quickly in order to get a good recovery outcome. Based on the result of this study, only 27% arrived at hospital less than 3 hours. This situation influenced stroke outcome and it is apparently the reason why stroke becomes a leading mortality cause in urban area.

The result was different from other studies conducted by Feldmann, *et al.* (1993), Kothari, *et al.* (1999), Clifton, *et al.* (2001) reporting that almost half of stroke patient arrived at emergency department in 3 hours. The three research and Maestroni's research (2008) stated that ambulance or emergency medical services accelerated arrival time at emergency department. Most patients came to hospital by car, either private or public transportation. Only a few of stroke patients used ambulance. The studies proved that arrival time at hospital earlier was associated to using ambulance or emergency medical service. It proves that provision ambulance is an important thing in handling emergency case like stroke. The most frequent type of stroke in Surabaya was ischemic or infarct stroke, as also found in other studies. So, if ischemic or infarct stroke get a proper and fast handling – since pre, during, and post hospital – the outcome will be good and disability occurrence will be minimal.

Most of respondents came to hospital with warning sign of paralysis or sudden numbness. However, recognition of the signs was not followed with action to bring the patient to hospital directly. It was only 27% of stroke cases with paralysis or sudden numbness were brought to hospital in three hours or less. If severe sign happened such as vomiting or coma, respondents will bring a patient immediately to hospital although respondents didnot really know the disease.

It showed that knowledge about stroke signs in community was still minimal. Lack of knowledge about stroke due to availability of information about stroke was very limited. Therefore, provision of information about stroke sign and what actions have to be done if get stroke attack have to be provided and disseminated.

Conclusion/Recommendation

In Surabaya, the peak age of stroke cases was younger than others and most of them had insurance for poor people and hypertension as a risk factor. However, less than half of them knew that they had diabetes mellitus & hypercholesterolemia. Half of stroke cases lived with their family and most them had ischemic or infarct stroke.

Most of stroke cases went to hospital because of extremity paralysis, gait disturbance or loss of balance or coordination, difficulty speaking, sudden headache, difficulty understanding speech. In addition, sex (male), older age and vomiting were related to arrival time at hospitals 3 hours or less post stroke attack.

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