



STROKE RISK FACTOR ANALYSIS USING STROKE RISK SCORECARD AT RSUD DR. HARJONO S. PONOROGO

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INFORMASI

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ABSTRACT

Objective: Stroke is a condition that occurs when the blood supply to a part of the brain is suddenly interrupted, because some brain cells die due to disruption of blood flow due to blockage or rupture of brain blood vessels. Death of brain tissue can lead to loss of functions controlled by that tissue. Stroke is the main cause of functional disorders, where 20% of patients who survive still require treatment at a health institution after 3 months and 15-30% of sufferers experience permanent disability. The introduction of risk factors for stroke is very important, because many patients have more than one risk factor and are sometimes ignored, so that the incidence of stroke cannot be avoided. Practical strategies in dealing with the burden of stroke should focus on prevention and treatment based on risk factors. This study is an observational analytic study with a cross-sectional design to determine the relationship between risk factors and the level of risk of stroke patients hospitalized at RSUD dr. Harjono S Ponorogo. This type of research is non-experimental research. This study was conducted in the stroke patient inpatient room.

Methods: The research design used (crosssectional), this sampling technique used consecutive sampling and tabulated data. The sample is 60 respondents. The research instrument uses medical records to view the respondents basic data and medical diagnosis, and the stroke risk scorecard to obtain the results of the assessment of stroke risk factors and the risk level of stroke patients.

Results: The results of the study from 60 medical records of stroke patients, risk factors that were proven to have a significant relationship with the level of stroke risk were blood pressure, smoking history, cholesterol levels, history of diabetes. Meanwhile, based on the stroke risk scorecard, the risk level for stroke is mostly high risk.

Conclusion: The risk factors that were shown to have a significant relationship with the level of stroke risk based on the results of the distribution table were blood pressure, smoking history, cholesterol levels, history of diabetes. Meanwhile, based on the Stroke Risk Scorecard, the level of stroke risk in stroke patients at Dr. Harjono S Ponorogo Hospital is mostly high risk.

INTRODUCTION

Stroke is a condition that occurs when the blood supply to a part of the brain is suddenly interrupted because some brain cells die due to disruption of blood flow due to blockage or rupture of brain blood vessels. WHO defines stroke as a clinical manifestation of impaired brain function, both focal and global (comprehensive), that occurs suddenly, lasts more than 24 hours or causes death, without causes other than vascular disorders (World Health Organization, 2010).

The results of the 2017 Indonesian National and Sub-National Disease Burden Analysis research conducted by the Health Research and Development Agency in collaboration with the Institute For Health Metrics and Evaluation (IHME) noted that there had been an epidemiological transition from PM to NCD from 1990 to 2017 (Rachmawaty, 2019). In 1990, the biggest diseases were infectious diseases/Kia/nutrition by 51.30%, followed by non-communicable diseases (39.8%) and injuries (8.9%). However, in 2017 the largest diseases were non-communicable diseases at 69.9% followed by infectious diseases/Kia/nutrition (23.6%) and injuries (6.5%). In addition, there was a change in the ranking of the burden of disease from 1990 to 2017. In 2017, almost all non-communicable diseases experienced an increase in ranking compared to 1990. What needs to be watched out for, of course, is the existence of DALY Lost (DALYs) or disability-adjusted life year. DALYs are the number of years lost to a healthy life due to premature death, illness, or disability. This vigilance is needed so that there is hope for an increase in healthy life expectancy (HALE) for the Indonesian population, namely the hope of a person to live in a fully healthy condition. The results of this research also noted that the main causes of years lost due to disease burden in 1990 were neonatal disorders, lower respiratory infections, diarrheal disease, tuberculosis, and stroke..

METHOD

Research design This research is an observational analytic study with a cross-sectional design to determine the relationship between risk factors and the level of risk of stroke patients hospitalized in RSUD dr. Harjono S Ponorogo. This type of research is non-experimental. The study was conducted in the Stroke Patient Inpatient Room. The study was conducted in the Stroke Inpatient Room. The research used to study the dynamics of the relationship

between the independent variable (risk factor/exposure) and the dependent variable (effect) whose measurements were carried out only once at a time (no follow-up) (Murti, 2003).

Study Participants The population in this study were all stroke patients who were treated in the Stroke Inpatient Room, RSUD Dr. Harjono S Ponorogo. Samples from this study were taken for 2 months according to the criteria of 60 respondents. The inclusion criteria used were: Medical records of patients diagnosed with Hemorrhagic Stroke or Ischemic Stroke in the Stroke Inpatient Room, RSUD Dr. Harjono S Ponorogo. Medical records of patients diagnosed with stroke include age, gender, blood pressure, cholesterol levels, smoking habits, body mass index (BMI), physical activity, history of diabetes, history of atrial fibrillation, and family history of stroke.

Instrument and Data Collection The instruments used are medical records to view the basic data of respondents and their medical diagnoses, as well as the Stroke Risk Scorecard which is an instrument to obtain the results of the assessment of stroke risk factors and the risk level of stroke patients.

Data Analysis Data analysis has been started by processing all primary data obtained from the respondent's medical record data. All data collected is processed first by going through several stages, namely editing, coding, and code entry. Then the results of the data processing were further analyzed to answer the research objectives. This study was analyzed by univariate analysis. Univariate analysis is in the form of an overview of the frequency distribution which is then presented in the form of a percentage table and an image that is described in the form of a narrative. Descriptive statistics are statistics that serve to describe or provide an overview of the object under study through sample or population data as is (Sugiyono, 2009). So descriptive analysis is a description of the respondent's data and research data, which is shown by a single table, the aim is to simplify the data into a form that is easy to read and interpret.

RESULTS

Description of data

Table 1 Frequency Distribution of Respondents' General Data Based on Gender Characteristics in RSUD Dr. Harjono S Ponorogo in April 2021 – June 2021

Sex	Frequency	%
Male	32	53
Female	28	47
Total	60	100

Source : primary data

Based on Table 1 above, it shows that according to the sex of the 60 respondents, 32 respondents were male and 28 female respondents. which means that the sex distribution of stroke patients who are hospitalized in RSUD Dr. Harjono S Ponorogo is dominated by men. The ratio of the incidence of stroke between men and women from a total of 60 patients is 8:7

Table 2 Frequency Distribution of Respondents' General Data Based on Age Characteristics

Age (year)	frequency	%
40 - 50	13	21,7
51 - 60	14	23,3
61 - 70	16	26,7
> 70	17	28,3
total	60	100

Source : primary data

Based on Table 2, the age distribution of stroke patients who are hospitalized at RSUD Dr. Harjono S Ponorogo is dominated by the elderly with the highest age group in the range of > 70 years as much as 28.3%.

Specific Data

Table 3 Distribution of Risk Factors based on Stroke Risk Scorecard

Variabel	Frek	%
Blood Pressure	54	91
> 140/90 mmHg	1	1,7
120-130/80-89 mmHg	5	8,3
< 120/80 mmHg		
Atrial Fibrillation		
There is	24	40
Do not know	0	0
There isn't any	36	60
Smoking History		
Smoking	29	48,4
Trying Stop	2	3,2
Do not smoke	29	48,4

Tingkat Kolesterol	240 mg/dl	22	36,7
	200-239 mg/dl	18	30
	< 200 mg/dl	20	33,3
Riwayat Diabetes	Diabetes	30	50
	Pre-diabetes	10	16,7
	No history of diabetes	20	33,3
Aktivitas fisik	Not at all	6	10
	1-2 times per week	20	33,3
	3-7 times per week	34	56,7
Berat Badan	Obesity	0	0
	Overweight	15	25
	Normal	45	75
Riwayat Stoke	There is Don't know/ doubt There isn't any	24	40
		31	51,7
		5	8,3

Source : primary data

Based on Table 3, the distribution of risk factors based on the Stroke Risk Scorecard of stroke patients hospitalized at RSUD Dr. Harjono S Ponorogo is dominated by blood pressure factors > 140/9 MmHg, with 54 respondents (91%).

Table 3 Distribution of Risk Factors based on risk factor level

Risk Factor Level	Frequency	%
High risk	42	70
Medium risk	10	17
Low risk	8	13

Source : primary data

Based on Table 4.4 above, it shows that according to the level of risk factors from 60 respondents, data obtained, most (70%) or 42 respondents are at high risk.

DISCUSSION

The results of the Risk Factor distribution table based on the Stroke Risk Scorecard show data on blood pressure, almost all respondents (91%) or 54 respondents have blood pressure of 140/90 mmHg. In Atrial Fibrillation, almost half of the respondents (40%) or 24 respondents had atrial fibrillation. Based on the history of smoking, it was found that most of the respondents (52.6%) or 31 respondents smoked and tried to quit smoking. Almost half of

the respondents (36.7%) or 22 respondents had cholesterol levels of 240 mg/dL. Most of the respondents (66.7%) or 40 respondents had a history of diabetes and pre-diabetes. As for physical activity, most (56.7%) activity 3-7 times/week. In the weight data of the respondents, it was found that most (75%) or 45 respondents had normal weight. Meanwhile, in the family history of stroke, most (51.7%) or 31 people did not know or had doubts. Our study showed that high-risk stroke was followed by signs of high blood pressure, irregular heartbeat (atrial fibrillation), smoking, high cholesterol and a history of diabetes.

Hypertension is the most important risk factor for all types of stroke, both hemorrhagic stroke, and infarct stroke. The increased risk of stroke occurs along with an increase in blood pressure. It is estimated that the risk of stroke increases 1.6 times for every 10 mmHg increase in systolic blood pressure and about 50% of stroke events can be prevented by controlling blood pressure (Gofir, 2009). Hypertension increases the risk of stroke 2-4 times regardless of other risk factors. Chronic and uncontrolled hypertension will lead to stiffness of the walls of small blood vessels known as microangiopathy. Hypertension will also trigger the appearance of plaques in large blood vessels. The accumulated plaque will make the lumen or diameter of the blood vessels narrower. An unstable plaque will easily rupture or break and fall off. Plaque that is released will increase the risk of blockage of smaller blood vessels. When this happens, the onset of stroke symptoms (Perreu & Bogusslavsky, 2003 in Pinzon & Asanti, 2010). Hypertension remains a risk factor for stroke in the elderly and also in those over 60 years of age. In all age groups, including the elderly ≥ 80 years, the benefits of hypertension treatment in preventing stroke can reduce the incidence of stroke (AHA/ASA, 2014).

Increased systemic blood pressure will make the cerebral arteries contract. If there is a decrease in systemic blood pressure, the perfusion pressure to the brain will be inadequate, which will cause cerebral ischemia. On the other hand, if there is an increase in systemic blood pressure, the perfusion pressure in the capillaries will be high which will result in hyperemia, edema, and possibly bleeding in the brain. Hypertension is a cause of blood vessel damage due to blood pressure that exceeds normal limits and the release of collagen. The exfoliated endothelium causes the positively charged basement membrane to attract negative thrombosis which causes the platelet aggregation process. Furthermore, it can release thrombokinase which causes stable blood clotting. If the blood vessels are not strong enough to withstand high blood pressure, it will cause the most severe

rupture of the blood vessels in the brain and this condition triggers a stroke.

Cerebral circulation in the cardiovascular system means that its function depends on the effectiveness of the heart as a pump, the integrity of systemic blood vessels and blood components in supplying blood and oxygen. The brain requires 25% of the oxygen consumption throughout the body using 20% of the cardiac output per minute. The incidence of stroke is always associated with other diseases. Heart disorders that are often associated with recurrent stroke are atherosclerosis, cardiac dysrhythmias, especially atrial fibrillation, ischemic heart disease, myocardial infarction and heart failure. Patients with heart defects are at higher risk of stroke than those without heart defects. Hypertension with left ventricular hypertrophy was strongly associated with an increased risk of both ischemic and hemorrhagic stroke. Cardiac lesions can also cause emboli to be released into the arterial circulation, such as mural thrombus due to a long infarct or thrombus that occurs in atrial fibrillation (Husni & Laksmawati, 2001 in Siswanto, 2005). Siswanto (2005), in his research showed that heart defects were proven to have a significant relationship with the incidence of recurrent stroke with a risk of 2.85 times.

Atrial fibrillation also has the potential to cause a stroke. Several factors in patients with atrial fibrillation become more at risk of stroke, including age over 65 years, hypertension, rheumatic heart disease, transient ischemic attack, diabetes mellitus, congestive heart disease. These risk factors will cause cerebral embolism from the heart (Josephson and Zimetbaum, 2005). Atrial fibrillation causes blockage of blood flow to the brain as the heart releases blood clots or dead cells into the bloodstream. Atrial fibrillation usually occurs due to blockage in the coronary arteries caused by atherosclerosis. Atherosclerosis is a fatty lesion or atheromatous plaque that appears on the surface of the artery wall. this condition narrows the blood vessels and even blocks the supply of blood flow to the heart muscle, and results in inadequate blood supply to brain tissue.

Smoking is also an independent risk factor for stroke, many studies have verified this. Smoking can accelerate the occurrence of atherosclerosis (Junaidi, 2003). Smoking cessation does not necessarily change stroke risk factors, but this condition will reduce the risk of stroke after quitting smoking for 2-5 years. Smoking increases fat oxidation which affects the development of

atherosclerosis, reduces the amount of HDL and reduces the ability of HDL to get rid of excess LDL cholesterol. Smoking also increases the tendency of blood cells to clump together in artery walls. This increases the risk of thrombus/plaque formation (Burhanuddin, 2013). Another reason smoking can cause a stroke is because the chemicals contained in cigarettes where carbon monoxide will bind to oxygen in the blood so that oxygen levels in the blood decrease. As a result, the metabolism does not work properly. Smoking also causes the production of fiber (blood clotting factors) more so that it stimulates atherosclerosis as a cause of stroke.

Lipoprotein levels consist of three components, these are Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL), and triglycerides. Excess calories in the body are converted to triglycerides and stored in fat cells throughout the body. LDL cholesterol is deposited in the walls of arteries and can lead to atherosclerosis. In general, the lower the LDL cholesterol the better for the blood vessels. HDL cholesterol protects against vascular disease by removing LDL cholesterol from artery walls. Total blood cholesterol is measured from levels of LDL, HDL, and other fat components. High blood cholesterol increases the risk of heart disease and stroke (Go et al., 2014).

Actually, cholesterol is needed by our bodies as a source of energy for the formation of cell walls in the body and as a basic material for forming steroid hormones. However, if excessive cholesterol in the body can cause atherosclerosis, narrowing or hardening of the arteries that causes stroke. Based on the theory, an increase in cholesterol in the blood will accumulate in the walls of blood vessels and will cause hardening of the arteries which leads to atherosclerosis. This condition can trigger a stroke. In conclusion, stroke will occur if LDL in excessive amounts can damage the walls of blood vessels, rupture or become blocked. LDL can settle anywhere. If the location of the sediment itself is in the brain, it can cause a stroke. It can be concluded that every percent increase in cholesterol levels means an increased risk of stroke by two percent (Lingga, 2013). This explanation strengthens the results of this study which have similarities to the theory of excess cholesterol levels in human blood.

Diabetes has an adverse impact on body tissues, causing an increase in fatty deposits or clots on the inside of the blood vessel walls and can accelerate the occurrence of atherosclerosis in both small and large blood vessels, including the blood vessels that supply blood to the brain. The condition of the blood vessels of the brain that have experienced atherosclerosis are

very at risk of experiencing blockage or rupture of blood vessels which can lead to a stroke (Powers et al., 2019).

Diabetes Mellitus causes blood fat levels to increase due to impaired body fat conversion. For people with Diabetes Mellitus, increased blood fat levels greatly increase the risk of stroke. Diabetes can accelerate the occurrence of atherosclerosis in both small blood vessels (microangiopathy) and large blood vessels (macroangiopathy) in all blood vessels, including the blood vessels of the brain and heart. High blood glucose levels in stroke will enlarge the area of infarction (dead cells) due to the formation of lactic acid due to anaerobic glucose metabolism (low oxygen) which includes brain tissue (Junaidi, 2003). People with Diabetes Mellitus do not handle sugar properly, cannot process fat efficiently and have a high risk of developing hypertension. Diabetes also plays a role in the body's ability to prevent blood clots from clotting, increasing the risk of ischemic stroke.

Diabetes Mellitus patients have a 5.35 times higher risk of stroke than patients without Diabetes Mellitus (Junaidi, 2003). According to theory, diabetes mellitus is a risk factor for stroke. Diabetes Mellitus is able to thicken the walls of the large blood vessels of the brain. Thickening of the walls of blood vessels will constrict and interfere with blood flow to the brain which will cause brain cell infarction. Diabetes Mellitus causes blood fat levels to increase due to impaired body fat conversion. This greatly triggers the process of stroke. In addition, diabetes mellitus also triggers atherosclerosis in both small and large blood vessels. It occurs in all blood vessels including the blood vessels of the brain and heart (Burhanuddin, 2013). This is because blood sugar levels in the body pathologically play a role in increasing glycoproteins which are the trigger for several vascular diseases. In addition, it also causes an increase in fat in the walls of blood vessels. This buildup can affect blood flow, increasing the chances of slowing and hardening of the arteries, which can trigger a stroke.

CONCLUSION

The risk factors that were shown to have a significant relationship with the level of stroke risk based on the results of the distribution table were blood pressure, smoking history, cholesterol levels, history of diabetes. Meanwhile, based on the Stroke Risk Scorecard, the level of stroke risk in stroke patients at Dr. Harjono S Ponorogo Hospital

is mostly high risk

From a study using the Stroke Score Card in 60 stroke patients, it was found that 70% had a high stroke risk, 17% had a moderate risk and 13% had a low stroke risk. Health workers are expected to further improve health promotion related to stroke so as not to increase the incidence of stroke and reduce mortality due to stroke. It is recommended that health workers carry out regular counselling and procure health promotion media for early recognition, symptom recognition, risk factors and stroke prevention. Stroke sufferers and stroke risk sufferers should have regular check-ups every month to check their health so that they can be well controlled, so they don't recur or risk having a stroke.

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