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USING SCORECARD TO ANALYSE RISK FACTORS OF STROKE IN WEST SUMATERA INDOENSIA

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ABSTRACT

Background: *Stroke is one of the most frightening diseases because it may cause major deaths in Indonesia. Recently, it has caused the death for about 21.1% of all ages. The World Health Organization (WHO) predicts that deaths caused by stroke will increase—every 45 seconds a person has a stroke, and—every 4 seconds there is a death caused by stroke. At this time, there is a shift in the phenomenon; stroke does not only suffer the elderly patients, but it has now attacked the productive age or young age also.The purpose of this study was to identify the proporsion of risk of stroke in productive age of Bukittinggi population based on Risk Scorecard.*
Method: *The study used a survey analytic study design with approach cross-sectional. This was a population – based survey of adult households in Indonesia is about 24130 individu. The sample of this study was 322 respondents where they were taken by using simple random Sampling technique. The subjects were visited at their homes for recruitment and data collection. In each household, one or more eligible subject above the age of 18. The subject were exclude if they were mentally unable to answer the questionnaire, were not a resident in Bukittinggi, or directly declined to participate.*
Result: *Individuals at high risk of stroke are 20.5%, 22.4% in case of caution, and 57.1% respondents at low risk of stroke. The results of this study represent the risk of stroke with the highest frequency of distribution was in low risk respondents. It was then followed by caution respondents. The lowest frequency was scored for high risk respondents.*
Conclusion: *The proportion of stroke of risk found in the productive age population of Bukittinggi that were based on risk scorecard.*

Keywords: *Proportion, Stroke Risk, Individuals at risk*

INTRODUCTION

Nowadays, stroke is the first cause of disability and the second cause of death in the world. This is because sudden stroke attack can result in death, physical and mental disability in both productive age and old age [1]. Globally, there are 795.00 people suffering from new or recurring stroke and every 4 minutes there will be the death caused by stroke [2]. Meanwhile, Indonesia is considered as the largest number of stroke patients in Asia [3]. The prevalence of stroke in Indonesia increased from 8.3% to 12.1% in 2013. One of the highest incidence of stroke happened in West Sumatra with the number of stroke patients diagnosed as many as 33,249 people (9.7%) and based on stroke symptoms estimated as many as 50,045 people (14.6%) [4].

At this time, there is a shift in the phenomenon; stroke does not only suffer the elderly patients, but it has now attacked the productive age and/or young age also. Some opinions have proven that stroke attacks young or productive age. "There are more than 1,000 sufferers of stroke who are less than 30 years old in age", this was mentioned at a conference conducted by international neurologists in the UK. Moreover, a research conducted by Usri also mentions that stroke is now found among adolescents and young adults [5]. The number of stroke patiens worldwide those under the age of 45 continue to increase that there are more than 1000 sufferers stroke less than 30 years old [6]. Smajlovic also reported that stroke in young adults is uncommon and this is become a major public health problem [7]. In a large-scale survey study conducted by the ASNA (Asean Neurologic Association) done at 28 hospitals in Indonesia, acute stroke patients admitted to hospitals showed that there were quite a lot of stroke patients under 45 years of age with its percentage 11.8% [5].

Stroke at the young age is relatively unusual because it usually occurs in adulthood and old age [6]. If an individual has been attacked by the stroke at a young age, it will give negative impacts in many aspects such as quality of patient's life, mortality and economy. Individuals who are attacked are unlikely to be able to carry out activities as fair as when they are in good conditions. In other words, stroke will leave residual symptoms such as communication disorders, disruption to activities, self-care disorders [8]. These conditions will make the attacked young individuals become unproductive. Automatically, this situation will create a burden within a certain family. Yet, this will add a burden to the government in a broader scope. Younger stroke patients have more quality of life and long survival than older patients, so the development of new strategies and improvements in treatment and lifestyle changes must be prioritized [9].

In the light of previous lines, this study was conducted with the aim to identify the proportion of risk of stroke in productive age of Bukittinggi pupolation based on risk scorecard. Besides, in the long term, it can reduce the adverse effects of stroke and keep young people becoming productive. This study was conducted in order to emerge the role of nurses as providers of nursing care and as educators whom they can provide preventive interventions through health promotion and early detection of individuals who are at risk of stroke.

METHODS

The present study was conducted by using a survey analytic study with approach cross-sectional. This was a population – based survey of adult households in Indonesia is about 24130 individu . The sample size was calculated considering the urban area population, which included individuals over the age of 18 – 45 years, individu who have not been diagnosed with stroke, individu who have stay in Bukittinggi. Respondent in this research is about 322 and based on a significant level (α error) of 0.05%. The subjects were visited at their homes for recruitment and data collection. In each household, one or more eligible subject above the age of 18 was simple random sampling selected. The subject were exclude if they were mentally unable to answer the questionnaire, were not a resident in Bukittinggi, or directly declined to participate. The instrument used to assess the risk of stroke is the "Stroke Risk Scorecard" taken from the National Stroke Association. This questionnaire used just to earlier detection the risk of stroke. This questionnaire will detect the individu become high risk, caution and low risk for stroke. Stroke risk scorecard consist of 8 item are blood pressure, atrial fibrillation, smoking, cholesterol, diabetes, exercise, diet and stroke in family. Blood pressure, cholesterol and diet have detected directly to respondent whereas atrial fibrillation, smoking, and stroke in family have anamnesa to respondent. The respondent will become high risk of stroke if the value of point in high risk is $\geq$ 3 and caution if the value of point in caution is 4 – 6, and th evalue of low risk is 6 – 8 point. Each box that applies to respondent equals 1 point. The categorical variable were presented as percentages.

Table 1. The Questionnaire of Stroke Risk Scorecard

RISK FACTOR	HIGH RISK	CAUTION	LOW RISK
Blood Pressure	140/90 or unknown	120 – 139/80 - 89	<120/80
Atrial Fibrilation	Irregular Heartbeat	I don't Know	Regular Heartbeat
Smoking	Smoker	Trying To Quit	Non Smoker
Cholesterol	>240 or Unknown	200 - 239	< 200
Diabetes	Yes	Borderline	No
Exercise	Couch Potato	Some Exercise	Regular Exercise
Diet	Overweight	Slightly	Healthy Weight
Stroke In Family	Yes	Not Sure	No
Total Score	High Risk	Caution	Low Risk

RESULT

There were 322 respondents involved in this study consisting of 60.9% women and 39.1% men. The representation of risk of stroke among those respondents were high risk, caution, and low risk.

The assessment of respondent with high risk are blood pressure around 140/90 mmHg, has an irregular heartbeat, smoker, cholesterol around > 240, diabetes, less exercise, overweight and has a family with a stroke. If the respondent has 3 signs above then it is categorized into a high risk of stroke. Whereas the assessment of respondent with caution are blood pressure around 120 – 139/80 – 89 mmHg, not knowing suffering from atrial fibrillation, trying to quit smoking, cholesterol around 200 - 239, borderline blood glucose at the limit, some exercise, slightly overweight and not sure has a family with a stroke. If the respondent has 4 – 6 3 signs above then it is categorized into a caution risk of stroke. Last assessment for the low risk stroke are blood pressure around 120 /80 mmHg, regular heartbeat , non smoker, cholesterol around < 200, not diabetes, regular exercise, healthy weight and do not has a family with a stroke. If the respondent has 6 – 8 signs above then it is categorized into a low risk of stroke

Table 2. Description of Risk Factors for Stroke

Factor of Risk Stroke	Categories		
Blood Pressure	140/90 or unknown	120-139 / 80-89	<120/80
	22.4%	30.4%	47.2%
Atrial Fibrilation	Irreguler heartbeat	I dont know	Regular heartbeat
	8.1%	16.5%	75.5%
Smoking	Smoker	Trying to quit	Non smoker
	10.2%	14.3%	75.5%
Cholesterol	>240 or unknown	200-239	<200
	3.7%	22.7%	73.6
Diabetes	Yes	Borderline	No
	18.6%	7.8%	73.6%
Exercise	Couch potato	Some exercise	Regular exercise
	6.5%	51.2%	42.2%
Diet	Over weight	Slightly	Healthy weight
	19.6%	19.9%	60.6%

Factor of Risk Stroke	Categories		
Stroke in Family	Yes	Not Sure	No
	49.1%	12.4%	38.5%

From table 2, it was known that 47.2% of respondents do not suffer from hypertension or in other word they have blood pressure was about < 120/80 and there was only 22.4% of respondents suffer from hypertension as a risk factor for stroke. Most of the respondents have regular heartbeat is about 75.5% and the nethermost was irregular heartbeat (8.1%). However there were also respondents who did not know their heart rate whether regular or irregular, the value ranged from 16.5%. Table 2 also shows that 75.5% of respondents were non smoker. There were only 10.2% as smoker. The research found that at respondents who had cholesterol levels higher is lower (3.7%) than levels Normal cholesterol (73.6.7%). While respondents who have moderate cholesterol values, the value is also no more than half (only 22.7%).
Diabetes is one of the risk factors for stroke. Diabetes is divided into three categories including diabetes, on the edge of diabetes and not diabetes. On the research gave information that respondents who has diabetes is only 18.6% and respondents stay on borderline was 7.8%. Most respondents was not have suffered diabetes. From the result of the study can be explained that respondents who have regular exercise and some exercise the value was not much different, there are 51.2% and 42.2%. The respondents who had less activity were the lowest. Based on table 2 the description of diet of respondents was devided into over weight, slightly and healthy weight. The highest range of diet was healthy weight and followed by slightly than overweight. There was only 19.6% of respondents was over weight. On the Table also shows that it was found the result 49.1% of the respondents have family in stroke. Besides, 12.4% of respondents not sure have a history of biological parents (sibling) and relative who also suffer from stroke. Moreover, about 38.5% of the respondents not have a history of having stroke.

DISCUSSION

Our study showed that the high risk stroke followed by signs the high blood pressure, irregular heartbeat (atrial fibrillation), smoker, high cholesterol, diabetic, non - physical activity, overweight, history stroke in family.

The increase of 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 so that it will cause cerebral ischemia. Conversely, if there is an increase in systemic blood pressure, the perfusion pressure on the capillary becomes high which results in hyperemia, edema, and the possibility of bleeding in the brain [10]. Hypertension is a cause of damage to blood vessel due to the presence of blood pressure that exceeds the normal limit and release of collagen. The exfoliated endothelium causes the positively charged basal membrane to attract a negative thrombosis which it causes platelet aggregation process. Furthermore, it can release *trombokinase* which causes a stable blood clot. If the blood vessels are not strong enough to hold high blood pressure, it will cause the worst rupture of blood vessels in the brain. This condition induces stroke.

Likewise an atrial fibrillation has the potential to cause strokes. This risk factor will cause cerebral embolism originating from the heart [11]. Atrial Fibrillation will cause a blockage of blood flow to the brain because the heart releases blood clots or dead cells into the bloodstream. Atrial Fibrillation usually occurs due to blockages in the coronary arteries caused by atherosclerotic. Arteriosclerotic are fat lesions or *atheromatous plaques* that appear on the surface of the arterial wall. Thus, such condition narrows and even blocks the supply of blood flow to the heart muscle. Finally, it results in inadequate blood supply to the cerebral tissue

Smoking can lead to stroke also, many studies have verify about this matter. Smoking was undoubtedly presumed as a risk independent factor of stroke. One explanation related to this assumption is smoking

accelerates the occurrence of arteoclerosis [12]. To stop smoking does not change immediately the risk factors for stroke, but these conditions will reduce the risk of stroke after stopping smoking for 2-5 years. Theoretically, smoking is a risk factor that is undoubtedly considered as an independent factor in stroke risk. Smoking increases fat oxidation which plays a role in the development of atherosclerosis. Shop reduces the amount of HDL / good cholesterol and decreases the ability of HDL to get rid of excessive LDL cholesterol. Smoking also increases the tendency of blood cells to clot on the arterial wall. This increases the risk of thrombus / plaque formation [13]. Another reason smoking can causes of stroke is due to chemicals contained in cigarettes where carbon monoxide will bind oxygen in the blood so that the oxygen level in the blood decreases. As a result, the metabolism does not work properly. Smoking also causes more fibrous production (blood clotting factor) so that it stimulates the onset of atherosclerosis as a cause of stroke.

Actually, cholesterol is needed by our body as a source of energy for the formation of cell walls in the body and as a basic ingredient in forming steroid hormones. However, if excessive cholesterol in the body causes atherosclerosis, narrows or hardens blood vessels that cause strokes [14]. Based on the theory, an increase in cholesterol in the blood will accumulate in the walls of blood vessels and will result in hardening of the arteries which leads to atherosclerosis [15]. This condition can trigger the stroke.

In conclusion, strokes will occur if the cholesterol in the body meets an excessive amount where bad cholesterol; known as LDL (Low Density Lipoprotein)—can damage the walls of blood vessels, break or be blocked. This bad cholesterol can be shaped like a sediment which can settle anywhere. If the location of the sediment itself is in the brain, it can cause stroke. Broadly speaking, it can be concluded that every percent increase in cholesterol levels means a two percent increase in the risk of stroke. Finally, such explanation reinforces the results of studies that have similarities with the theory of excessive cholesterol levels in human blood.

Diabetes mellitus patients had a risk of stroke attacked 5.35 times greater than patients who did not have a history of diabetes mellitus [12]. In accordance with the existing theory, diabetes mellitus is one of the risk factors for stroke. Diabetes mellitus is able to thicken the walls of large brain blood vessels. The thickening of the blood vessel walls will narrow and disrupt the smooth flow of blood to the brain which it will cause infarction of brain cells [16].

Diabetes mellitus causes blood fat levels to increase because of the conversion of the disturbance of body fat. This greatly increases the process of stroke. Moreover, diabetes mellitus also accelerates the occurrence of atherosclerosis in both small and large blood vessels. It happens in all blood vessels including the blood vessels of the brain and heart [13]. This is because of the high blood sugar levels in the body pathologically play a role in increasing the concentration of glycoprotein which is the originator of several vascular diseases. In addition, it also causes an increase in the buildup of fat in the walls of the blood vessels. This buildup can affect blood flow, increase the chance of blockage and harden of the arteries (atherosclerosis) where these conditions trigger stroke attack.

Someone who does not do physical activity / exercise has a risk of experiencing a stroke in young adulthood compared to people who do physical activity / exercise regularly ≥ 3 times a week for ≥ 30 minutes. This assumption has been proven by the majority of strokes in young adulthood occurring in someone who rarely / does not do physical activity / exercise regularly. The results of a prospective study conducted on 7735 British men whom they were 40-59 years in age showed that the benefits of moderate physical activity can significantly reduce the risk of stroke. Such physical activities can help the body control weight, reduce the risk of heart attack, and stroke. Conversely, if physical activity is low, it will be at risk for stroke. Based on the theory, lack of physical activity / exercise can be one of the risk factors for stroke. Lack of physical

activity / exercise will improve the process of atherosclerosis. Irregular physical activity will increase blood pressure and blood sugar, increase LDL cholesterol levels and cause weight gain [13].

Obesity is a risk factor for stroke. It is caused by excessive fat within the body caused difficulties in the bloodstream and increase the risk of blockages. These conditions can cause stroke [17]. Obesity can also increase the incidence of stroke if the individuals face dyslipidemia through the process of atherosclerosis. Obesity can also cause stroke through the effects of snoring and sleep apnea due to the sudden cessation of oxygen supply in the brain.

The relationship of the descent of one's family history with stroke or ischemic vascular disease comes from hereditary diseases. Sitorus said that when both parents suffer from a stroke, the chances of the children to commit stroke are greater [18]. The genetic predisposition of atherosclerosis is one of the causes of stroke that can be passed down by families of stroke patients.

CONCLUSION

Finally from this research we know that among 322 respondents with productive age individuals in Bukittinggi found 83.23% has low risk of stroke, 9.63% has caution of stroke and 7.14% has high risk of stroke. Eventhough for health workers to supposed further improve health promotion related with stroke in order to avoid increasing the incidence of stroke in productive age and reduce stroke mortality. The health workers should conducting an extension program carried out regularly and procurement of health promotion media for early recognition, symptom recognition, risk factors and stroke prevention. For stroke patients and sufferers risk of stroke should be a routine check-up every month to check their health so that it can be controlled properly, so it doesn't recurrent or risk of stroke.

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