

The Difference of Stroke Risk Factor between Bataknesese and Non-Bataknesese at H. Adam Malik General Hospital Medan

Laura PancaSusila Tambunan^{1,2)}, Hasan Sjahrir³⁾, Cut Aria Arina³⁾

¹⁾Department of Neurology, Faculty of Medicine, Universitas Sumatra Utara

²⁾H. Adam Malik General Hospital, Medan

³⁾Department of Neurology, Faculty of Medicine, Universitas Sumatra Utara

ABSTRACT

Background: Stroke risk factors disparities in race-ethnic. Bataknesese is the most stroke rates compared to non-Bataknesese at H. Adam Malik General Hospital Medan. This may be due to genetics and lifestyles that have a link to increase stroke risk factors in Bataknesese. Bataknesese has a characteristic lifestyle that are more eating, typical foods also contain lots of cholesterol, and have a habit of drinking traditional alcoholic beverages.

Subjects and Method: This was a cross-sectional study selected by consecutive sampling techniques, clinically proven stroke patients and computed tomography (CT) scan studied at H. Adam Malik General Hospital Medan from June to November 2018. This study aimed to know the difference of stroke risk factor between stroke patient of Bataknesese and non-Bataknesese.

Results: This study recruited 70 samples consisting of 45 Bataknesese and 25 non-Bataknesese. There were no significant differences in risk factors for hypertension, dyslipidemia, heart disease, diabetes mellitus, smoking, and obesity among stroke patients in the Bataknesese and non-Bataknesese. But the distribution of hypertension was higher in Bataknesese (50%) compared non-Bataknesese (30%) (PR=0.67, 95%CI= 0.19 to 2.40, p= 0.755). Dislipidemia was higher in Bataknesese (38.6%) compared non-Bataknesese (18.6%) (PR=1.39, 95% CI= 0.52 to 3.71, p=0.692). Heart disease was higher in Bataknesese (17.1%) compared non-Bataknesese (8.6%) (PR=1.15, 95% CI= 0.37 to 3.57, p= 1.000). Diabetes mellitus was higher in Bataknesese (17.1%) compared non-Bataknesese (10%) (PR=1.10, 95% CI= 0.31 to 2.87, p=1.000). Smoke was higher in Bataknesese (27.1%) compared non-Bataknesese (14.3%)(PR= 1.59, 95% CI= 0.38 to 6.61, p=1.000). Obesity was higher in Bataknesese (11.4%) compared non-Bataknesese (4.3%) (PR=1.59, 95% CI= 0.38 to 6.61, p=0.735). There was significant differences in risk factors for alcohol consumption between stroke patients in the Bataknesese and non-Bataknesese, where alcohol consumption was higher in the Bataknesese (15.7%) compared non-Bataknesese (1.4%) (PR=7.77, 95% CI= 0.94 to 64.22, p=0.045).

Conclusion: A significant difference in stroke risk factors between stroke patients in Bataknesese and non-Bataknesese was alcoholic consumption.

Keywords: stroke, risk factor, Bataknesese, Non-Bataknesese

Correspondence:

Laura PancaSusilaTambunan. Neurology Resident, Department of Neurology, Faculty of Medicine, Universitas Sumatra Utara/H. Adam Malik General Hospital, Medan, North Sumatra, Indonesia. Email: oyamakmur@gmail.com. Mobile: 081361525456.

BACKGROUND

Stroke is one of the highest cause of disability and death in several countries in the world (Hasirci et al., 2014). Broadly stroke risk factors are divided into two, namely: modifiable risk factors such as hypertension, heart disease, diabetes mellitus, dysli-

pidemia, smoking, obesity, and alcoholic beverages and unmodified risk factors such as age, sex, and offspring (Sjahrir, 2003).

The main causes of stroke differ according to race or ethnicity. African Americans have a two fold increased risk of stroke compared to whites and have higher mortality associated with stroke. As illustrated

recently by the regards study, the causes of racial differences are probably caused by the prevalence of higher stroke risk factors such as hypertension, obesity, and diabetes among African American (Boehme et al., 2018).

Patel et al.(2017) reported that the incidence of stroke in the Mexican Americans was 2 times greater than that of non-Hispanic whites. Comparison of relative risk of stroke with and without diabetes mellitus in the Mexican American was greater than that of non-Hispanic whites.

Stroke risk factors reported in Mexican Americans and non-Hispanic whites are hypertension, heart disease, or hypercholesterolemia. But Mexican Americans are 3 times more likely to have diabetes and non-Hispanic whites are twice as likely to have atrial fibrillation. For risk factors for hypertension, hypercholesterolemia, and heart disease there were no significant differences in proportions. For stroke behavior risk factors, it was reported that there was no difference in the proportion of the two races in tobacco use or excessive alcohol consumption (above 21 drinks per week) (Smith et al., 2003).

The prevalence of stroke based on data from the National Health and Nutrition Examination Survey (NHANES) in the United States population consists of 79% of non-Hispanic whites, 12% of non-Hispanic blacks, and 9% of Mexican Americans. Non-Hispanic black had a significantly higher prevalence of inactive physical activity, obesity, smoking, hypertension and diabetes mellitus than non-Hispanic whites. In Mexican Americans, inactive physical activity and diabetes mellitus have a higher prevalence than non-Hispanic whites, while hypertension, smoking, and hypercholesterolemia are lower (Gutierrez et al., 2016).

Study in the Mexican American and non-Hispanic whites community found Mexican American stroke patients to have a higher prevalence of diabetes mellitus than non-Hispanic whites. But both have the same prevalence of hypertension, high cholesterol, and tobacco use (Morgenstern et al., 2001).

The study compared stroke risk factors between whites, blacks, and Caribbean Hispanics in northern Manhattan. Hypertension is an independent risk factor for whites, blacks and Hispanics. The prevalence of diabetes is greater in black and Caribbean Hispanics compared to whites. Whereas atrial fibrillation has a greater prevalence for whites compared to black and Caribbean Hispanics. The most important coronary artery disease for whites is followed by Hispanic and blacks (Sacco et al., 2011)

The results of 100 stroke patients at the H. Adam Malik Hospital Medan found that the most tribes suffered stroke were Bataknese 63 (63%), followed by Javanese 22 (22%), Acehnese 8 (8%), Malaynese 5 (5%), and Chinese 2 (2%) (El-Harizahet al, 2016).

The cause of the high incidence of stroke in Bataknese compared to non-Bataknese may be due to modifiable risk factors, namely genetically and modifiable risk factors for stroke (Sjahrir, 2003) found in Bataknese. Bataknese have more eating characteristics than other tribes (Nainggolan et al., 2015), and food typical of Bataknese also contains a lot of cholesterol (Manurung et al., 2015) and salt.

Bataknese are more temperamental and emotional than other tribes obese (Nainggolan et al., 2015), so that they can lead to increased blood pressure and heart disease (Williams et al., 2001). Bataknese also have a habit of gathering while drinking traditional alcoholictuak, drinking

coffee and smoking (Siringo-ringo et al., 2018; Sihombing, 2013; Ikegami, 1997)

SUBJECTS AND METHOD

1. Study Design

This was a cross sectional study conducted in neurology clinic and the inpatient room at H. Adam Malik Hospital Medan, North Sumatra. This study conducted from June 21 to November 11, 2018.

2. Population and Samples

Population in this study were selected by consecutive non-random sampling. The inclusion criteria were all stroke patients who have been diagnosed with anamnesis, neurological examination and have been confirmed by head CT scan and gave approval to participate in the study and proved by informed consent.

Exclusion criteria were patients who did not have risk factors for hypertension stroke, dyslipidemia, heart disease, diabetes mellitus, smoking, obesity and alcoholic drinks.

3. Study Variables

Independent variables were stroke risk factors (hypertension, dyslipidemia, heart disease, diabetes mellitus, smoking, obesity and alcoholic drinks). The dependent variable was the incidence of stroke in Batakese and non-Batakese.

4. Analysis Data

The analysis data in this study were using Chi-square test and the Fisher's exact test.

RESULTS

1. Sample Characteristics

The study subjects amounted to 70 people with stroke consisting of men 44 (62.9%) and women 26 (37.1%). The most ethnic groups in the patients of this study were Batakese 45 (64.3%) and non-Batakese 25 (35.7%). The characteristics of the study subjects are presented in table 1.

Demographic characteristics ethnic stroke showed in Batakese with the highest age group at 61 to 80 years with mean age standard deviation of 62.7 ± 10.5 years, whereas in non-Batakese with the highest age group at 41 to 60 years with mean age standard deviation of 56.2 ± 13.3 years. The majority of sexes in the two ethnic groups were male, namely the Batakese stroke group of 31 (44.3%) and the non-Batak ethnic group as many as 13 (18.6%).

The most sub-ethnic groups in the Batakese group were Tobanese 23 (32.9%), then Karonese 12 (17.1%), Mandailingnese 4 (5.7%), Simalungunese 3 (4.3%), Angkolanese 2 (2.9%), and Pakpaknese 1 (1.4%). The majority of people in the non-Batak stroke group were Javanese, 16 (22.9%), Padangnese 3 (4.3%), Malaynese 3 (4.3%), Acehese 2 (2.9%), and Niasnese 1 (1.4%).

The highest occupation in the Batakese stroke group was 14 farmers (20.0%), in the non-Batakese stroke was entrepreneurs 8 (11.4%). The highest education in Batakese and non-Batakese stroke group were high school with 24 (34.3%) and 12 (17.1%) respectively.

The highest diagnosis in Batakese is ischemic stroke with the number of 38 (54.3%) while the hemorrhagic stroke 7 (10.0%). The most diagnoses in non-Batakese were ischemic stroke with a total of 23 (32.9%) while hemorrhagic strokes were 2 (2.9%). Data on the characteristics of Batakese and non-Batakese study subjects are presented in table 2.

2. The Difference of Stroke Risk Factor between Batakese and Non-Batakese

The results of statistical analysis using the Chi-square test showed no significant difference in hypertension risk factors for stroke incidence between Batakese and non-Batakese stroke patients (PR= 0.67,

95% CI= 0.19 to 2.40, $p= 0.755$). However the distribution of hypertension in Batakese stroke patients (50.0%) was greater than in non-Batakese stroke patients (30.0%) of the total incidence of stroke.

The results of statistical analysis using the Chi-square test showed no significant difference in dyslipidemia risk factors for stroke incidence between Batakese and non-Batakese stroke patients (PR= 1.39, 95% CI= 0.52 to 3.71, $p= 0.692$). However the distribution of dyslipidemia in Batakese stroke patients (38.6%) was greater than non-Batakese (18.6%) of the total incidence of stroke.

The results of statistical analysis using the Chi-square test showed no significant difference in heart disease risk factors for stroke incidence between Batakese and non-Batakese stroke patients (PR= 1.15, 95% CI= 0.37 to 3.57, $p= 1.000$). But the distribution of heart disease in Batakese stroke patients (17.1%) was greater than in non-Batakese (8.6%) of the total incidence of stroke.

The results of statistical analysis using the Chi-square test showed no significant difference in diabetes mellitus risk factors for stroke incidence between Batakese and non-Batakese stroke patients (PR= 0.94, 95% CI= 0.31 to 2.80, $p= 1.000$). However the distribution of diabetes mellitus in Batakese stroke patients (17.1%) was greater than in non-Batakese (10.0%) of the total incidence of stroke.

The results of statistical analysis using the Chi-square test showed no significant difference in smoking risk factors for stroke incidence between Batakese and non-Batakese stroke patients (PR= 1.10, 95% CI= 0.41 to 2.97, $p= 1.000$). However the distribution of smoking in Batakese stroke patients (27.1%) was greater than in non-Batakese (14.3%) of the total stroke incidence.

The results of statistical analysis using the Fisher's exact test showed no significant difference in hypertension risk factors for stroke incidence between Batakese and non-Batakese stroke patients (PR= 1.59, 95% CI= 0.38 to 6.61, $p= 0.735$). However the distribution of obesity in Batakese stroke patients (11.4%) was greater than in non-Batakese (4.3%) of the total incidence of stroke.

The results of statistical analysis using the Fisher's exact test showed a significant difference in risk factors for alcoholic drinks on stroke incidence among Batakese and non-Batakese stroke patients, where Batakese stroke patients had a risk factor for 7.77 times greater alcoholic drinks than non-Batakese stroke patients. (PR= 7.77, 95% CI= 0.94 to 64.22, $p= 0.045$). From the distribution of patients drinking alcoholic beverages in Batakese (15.7%) greater than non-Batakese (1.4%) from the total incidence of stroke.

DISCUSSION

1. Demographic Characteristics

In this study, the highest sex were male 44 people (62.9%). The risk of stroke in male sex is higher 1.25-2.5 times than women. But this risk rate is different in old age. The incidence of stroke in female (84.9%) in America in 1999-2000 was higher than men (70.7%). This is related to estrogen which has a protective role to prevent atherosclerotic plaque of cerebral blood vessels. Productive age women have protection against the incidence of vascular disease and atherosclerosis which causes a lower incidence of stroke than men (Harris et al, 2017a).

The mean age and standard deviation of the subjects in the stroke group in the whole study was 60.3 ± 11.9 years with the highest age group at the age of 41-60 years (52.9%). The mean age and standard

deviation in the Batakese stroke group was 62.7 ± 10.5 years with the highest age at 61-80 years, whereas in the non-Batakese stroke group with mean age and standart deviation range of 56.2 ± 13.3 years with the highest age group in the 41-60 year age group. In accordance with the Framingham study, the incidence of stroke increases with age, which is 0.4% (18 to 44 years), 2.4% (65 to 74 years) and 9.7% (more than 75 years). This is related to an increase in atherosclerosis as age increases are associated with other risk factors (Harris et al, 2017a). The effect of aging has an impact on the cardiovascular system and the progressive development of stroke risk factors. The risk of stroke incidence has doubled after the age of 55 years (Goldstein et al., 2010).

Based on socioeconomic status, in this study the highest occupation in all groups of stroke patients was 18 patients (25.7%), Batakese were farmers 14 (20.0%) while those in non-Batakese were entrepreneurs 8(11, 4%).The highest education in all groups of stroke patients was high school 36 (51.4%), Batak and non-Batakese were high school with 24 (34.3%) and 12 (17.1%) respectively. Socio-economic status (education and income) has a relationship to the incidence of stroke(Liao et al., 2009; Smith et al., 2003). This is due to the low level of economic status associated with the use of health access and low health costs so that the quality of health is also low (Smith et al., 2003). This is related to stroke prevention efforts, namely controlling stroke risk factors.

In this study based on stroke diagnosis from all study subjects found ischemic stroke amounted to 61 (87.1%) and 9 hemorrhagic strokes (12.9%). The most diagnoses in Batakese and non-Batakese were ischemic stroke with the

number of each 38 (54.3%) and 23 (32.9%). In a study in the same location as this study El-Harizah et al. (2016) and Rambe et al. (2013) found that the incidence of ischemic stroke was greater than for hemorrhagic stroke.

2. Difference of Stroke Risk Factor between Batakese and Non-Batakese

a. Hypertension as a risk factor for stroke

Although in this study there was no significant difference in hypertension in the incidence of stroke between Batakese and non-Batakese but the distribution of hypertension in Batakese (50.0%) was greater than that of non-Batakese (30.0%) of total stroke incidence. The magnitude of the distribution of hypertension in Batakese stroke patients compared to non-Batakese may be due to genetic and lifestyle in Batakese which increases the risk of hypertension. Many factors can cause hypertension, namely smoking, salt consumption, coffee, and high alcoholic beverages, obesity, psychosocial stress, and family history (Mohani, 2016).

Bataknesetend to be exposed to hypertension due to eating patterns that use a lot of salt in food (Sagalaet al, 2011). Salt is closely related to the occurrence of hypertension if excessive salt intake can increase body fluid volume, thereby increasing preload and eventually increasing blood pressure (Mohani, 2016). Besides that Batakese also has the habit of drinking traditional alcoholic beverages (tuak), coffee, and smoking (Siringo-ringo et al., 2018). Consumption of excessive alcoholic beverages can increase blood pressure. The mechanism of alcohol to increase blood pressure may be caused by increased transport of calcium ions into vascular smooth muscle cells (Siyad et al., 2011). Consumption of coffee can increase blood pressure

through working caffeine which can increase the heart rate so that it increases blood pressure. Giving caffeine 150 mg or 2-3 cups of coffee will increase blood pressure 5-15 mmHg in 15 minutes (Siringo-ringo et al., 2018; Budianto et al., 2017). Smoking can cause hypertension through the work of nicotine which can increase the work of the sympathetic nerves so that there will be an increase in blood pressure (Harris et al., 2017a).

Hypertension causes interference with blood vessels in the form of atherosclerosis and fibrinoid necrosis. Atherosclerosis can cause autoregulation disorders. If there is a sudden change in blood pressure it will cause a decrease in perfusion pressure so that there is ischemic brain tissue (ischemic stroke) or hyperemia, edema and bleeding (hemorrhagic stroke). Fibrinoid necrosis causes the formation of microaneurism so that if blood pressure rises suddenly it can cause blood vessels to rupture (hemorrhagic stroke) (Harris et al., 2017b; Harris et al., 2017c).

b. Dyslipidemia as a Stroke Risk Factor

Although in this study there was no significant difference in the incidence of dyslipidemia in stroke between Bataknese and non-Bataknese stroke patients, the distribution of dyslipidemia patients in Bataknese (38.6%) was greater than that of non-Bataknese (18.6%) of total stroke incidence. The magnitude of the distribution of dyslipidemia in Bataknese compared to non-Bataknese stroke patients may be due to a pattern of food intake, such as: saksang, roast pork, and dalinihorbo (Manurung et al., 2015; Erlangga, 2013) and in every custom event slaughtering an animal in the form of pork, beef or buffalo (Manurung et al., 2015; Abidin et al., 2014). Besides that, Batak have a habit of drinking traditional alcoholic beverages tuak (Siri-

ngo-ringo et al., 2018; Sihombing, 2013; Ikegami, 1997). Alcohol consumption is associated with the occurrence of dyslipidemia where alcohol consumption of up to 21 drinks per week can increase HDL and triglyceride concentrations (Sundell, 2010).

In dyslipidemia lipid oxidation will occur and initiate the inflammatory process, blood vessel wall plaque formation and atherosclerosis (Harris et al., 2017a; Tian et al., 2014). Atherosclerosis can cause autoregulation disorders, where if a sudden change in blood pressure will cause ischemic brain tissue (ischemic stroke) or hyperemia, edema and bleeding occur (hemorrhagic stroke) (Harris et al., 2017b; Harris et al., 2017c).

c. Heart Disease as a Stroke Risk Factor

Although in this study there was no significant differences in heart disease risk factors for stroke incidence between Bataknese and non-Bataknese stroke patients but the distribution of heart disease in Bataknese (17.1%) was greater than in non-Bataknese stroke patients (8, 6%) of the total incidence of stroke.

The magnitude of the distribution of heart disease in Bataknese compared to non-Bataknesestroke patients may be caused by high other high risk factors for stroke that are closely related to heart disease, such as hypertension associated with lifestyle which is a diet that contains a lot of salt (Sagalaet al., 2011), consumption alcoholic beverage, coffee and smoking (Siringo-ringo et al., 2018). Hypertension can cause heart damage through LV filling failure, left ventricular hypertrophy, left ventricular stiffness resulting in hypertensive heart disease (Mohani, 2016). Nicotine contained in cigarettes can increase platelet aggregation through cyclooxygenase enzymes and narrowing of blood vessels that can trigger heart disease (World Health Organization,

2016). Bataknese also have more emotional character than other tribes (Nainggolan et al., 2015). In a study by Williams et al. (2001), it was found that normotensive people who had a strong temperament had a relationship with coronary heart disease.

The relationship between heart disease and stroke is very close because there is a connection between the cerebral circulation and cardiovascular circulation. Heart disease results in valve disorders and cardiac arrhythmias so the heart pumps the embolus into the brain. Occurring brain artery occlusion and causing stroke (Sjahrir, 2003).

d. Diabetes mellitus as a risk factor for stroke

Although in this study there was no significant differences in risk factors for diabetes mellitus on stroke incidence between Bataknese and non-Bataknese stroke patients, the distribution of diabetes mellitus patients in Bataknese (17.1%) was greater than non-Bataknese (10.0%) of the total incidence of stroke.

In the Purwoningsih et al (2017) study, it was found that the majority of Bataknese who had type 2 diabetes mellitus had a family history of diabetes mellitus. Bataknese have a habit of consuming alcoholic beverage tuak (Siringo-ringo et al., 2018; Sihombing, 2013; Ikegami, 1997). Consumption of heavy alcoholic beverages can cause pancreatitis which can reduce insulin production resulting in type 2 diabetes mellitus (Stroke Association, 2012).

In the book Nainggolan et al.(2015) that Bataknese tend to prefer to eat compared to other tribes. This may lead to prolonged hyperglycemia and obesity resulting in insulin resistance (Tuttolomondo et al., 2015).

Hyperglycemia occurs in diabetes mellitus resulting in an inflammatory process

(Asfandiyarova et al., 2014) and impaired metabolism of sorbitol accumulation in the arterial blood vessel wall which can cause osmotic disturbances and increase in water content in blood vessels and continue to become atherosclerosis (Harris et al., 2017a).

Atherosclerosis can cause interference with autoregulation, so that if a sudden change in blood pressure will cause ischemic brain tissue (ischemic stroke) or hyperemia, edema and bleeding (hemorrhagic stroke)(Harris et al., 2017b; Haris et al. 2017c).

e. Smoking as a Risk Factor for Stroke

Although in this study there was no significant differences in smoking risk factors for the incidence of stroke between Bataknese and non-Bataknese stroke patients but the distribution of smoking patients in Bataknese (27.1%) was greater than in non-Batak (14.3%) of the total incidence of stroke. The amount of smoking distribution in Bataknese is caused by Bataknese habits to gather while smoking (Siringo-ringo et al., 2018; Sihombing, 2013). In Munirstudy (2006), 33 patients (60.0%) had nasopharyngeal carcinoma bataknese patients who had a smoking habit of more than 10 years.

Smoking has an effect on increasing the work of the sympathetic nerve, which is an increase in blood pressure (hypertension) (Harris et al, 2017a; WHO, 2016).

Smoking can cause thrombotic processes so that atherosclerosis can occur which can cause interference with autoregulation and perfusion of blood to the brain resulting in ischemic and hemorrhagic strokes. Smoking can also cause carbon dioxide bonds to bleed 200 times higher than oxygen, causing the body to increase the production of erythrocytes (secondary polistemia) (Harris et al, 2017a). Polistemia is a risk factor for stroke (Sjahrir, 2003).

Table 1. Sample characteristics

Characteristics	Total n = 70	Percentage (%)
Age		
21 to 40 years old	2	2.9
41 to 60 years old	37	52.9
61 to 80 years old	28	40.0
Above 80 years old	3	4.3
Mean \pmSD	60.3 \pm 11.9	
Gender		
Man	44	62.9
Women	26	37.1
Work		
Civil servants	11	15.7
entrepreneur	18	25.7
Retired	12	17.1
Farmer	15	21.4
Housewife	14	20.0
Education		
Elementary school	10	14.3
Junior high school	9	12.9
High school	36	51.4
Bachelor	15	21.4
Tribe		
Bataknese	45	64.3
Non-Bataknese	25	35.7
Diagnosis		
Ischemic stroke	61	87.1
Hemorrhagic stroke	9	12.9

f. Obesity as a Risk Factor for Stroke

Although in this study there was no significant difference in obesity in the incidence of stroke between Bataknese and non-Bataknese stroke patients but the obesity distribution in Bataknese (11.4%) was greater than in non-Bataknese (4.3%) of the total incidence stroke.

The large distribution of obese Batak stroke patients may be influenced by Batak habits that prefer to eat compared to other tribes (Nainggolan et al., 2015). This might also be caused by eating patterns in Bataknese, where Bataknese generally consume foods that contain high levels of fat (Manurung et al., 2015; Erlangga, 2013) consume more rice (Syahril et al., 2003) and traditional alcoholic drinks tuak (Siringo-ringo et

al., 2018; Sihombing, 2013; Ikegami, 1997). Tuak have a high calorie content ranging from 110 kcal and fat to 0.52 grams per glass (Siringo-ringo et al., 2018; Sihombing, 2013). Because alcoholic beverages contain high calories, excessive alcoholic beverages can make you overweight (Stroke Association, 2012).

Several studies have identified that obesity is a risk factor for stroke both ischemic stroke and hemorrhagic stroke. Obesity is found in increasing adipose tissue which can cause an inflammatory process (Smith and Minson, 2012) and the development of other stroke risk factors for dyslipidemia, hypertension and diabetes mellitus (Haley and Lawrence, 2016).

g. Alcoholic Beverages as a Stroke Risk Factor

In this study it was found that there was a significant difference in the risk factors for alcoholic beverages on the incidence of

stroke between Bataknesse and non-Bataknesse stroke patients, where the risk factors for alcoholic beverages in Bataknesse stroke patients were 7.77 times greater than non-Batak.

Table 2. Demographic characteristics of Batak and Non-Batak Stroke groups

Characteristics	Bataknesse group n (%)	Non-Bataknesse Groupn (%)
Number of Subjects	45 (64.3)	25 (35.7)
Sub-ethnicity	Angkolanese 2 (2.9) Karonese 12 (17.1) Mandailingnese 4 (5.7) Pakpaknese 1 (1.4) Simalungunese 3 (4.3) Tobanese 23 (32.9)	Malaynese 3 (4.3) Niasnese 1(1.4) Acehnese 2 (2.9) Padangnese 3 (4.3) Javanese 16 (22.9)
Gender		
Male	31 (44.3)	13 (18.6)
Female	14 (20.0)	12 (17.1)
Age		
21 to 40 years old	0 (0.0)	2 (2.9)
41 to 60 years old	21 (30.0)	16 (22.9)
61 to 80 years old	22 (31.4)	6 (8.6)
Above 80 years old	2 (2.9)	1 (1.4)
Mean ± SD	62.7±10.5	56.2±13.3
Education		
Elementary school	6 (8.6)	4 (5.7)
Junior high school	5 (7.1)	4 (5.7)
High school	24 (34.3)	12 (17.1)
Bachelor	10 (14.3)	5 (7.1)
Work		
Civil servants	5 (7.1)	6 (8.6)
Entrepreneur	10 (14.3)	8 (11.4)
Retired	9 (12.9)	3 (4.3)
Farmer	14 (20.0)	1 (1.4)
Housewife	7 (10.0)	7 (10.0)
Diagnosis		
Ischemic stroke	38 (54.3)	23 (32.9)
Hemorrhagic stroke	7 (10.0)	2 (2.9)

Drinking alcoholic beverages is not separated from Bataknesse customs. Tuak is a traditional alcoholic beverage that comes from leads of palm trees (bagot) which are consumed as fatigue relief drinks, traditional drinks and given to new mothers giving birth and breastfeeding (Siringo-

ringo et al., 2018; Sihombing, 2013; Ikegami, 1997). Siringo-ringong et al.(2018) were found that Bataknesse hypertension patients had a habit of drinking tuak as much as 67.5% with a moderate consumption of tuak (2.5-10 glasses/day) of 44.0%. Several studies have identified alcohol as a risk and

protective factor for stroke. This depends on the amount of alcohol content and frequency of alcoholic beverages (Department of Health UK, 2016; Razvodovsky, 2014).

Alcohol contributes to diseases that affect blood circulation such as hypertension and diabetes mellitus and can subsequently increase the risk of stroke (Stroke Association, 2012). Heavy alcohol consumption increases triglyceride concentrations (dyslipidemia) (Sundell, 2010), increasing level of homocysteine substances which can increase blood clotting and are associated in the process of atherosclerosis (Danovska et al., 2010). Atherosclerosis can cause im-

paired autoregulation and impaired perfusion when sudden changes in blood pressure can cause ischemic or hemorrhagic strokes (Harris et al., 2017a; Harris et al., 2017b; Harris et al., 2017c). The limitation of this study is the presence of other stroke risk factors besides the risk factors studied which can be a confounding factor. A significant difference in stroke risk factors for stroke incidence between Bataknese and non-Bataknese stroke patients is alcoholic beverages. Bataknese stroke patients have a risk factor of 7.77 times more alcoholic beverages than non-Bataknese.

Table 3. The differences in stroke risk factors between Batak and Non-Batak in H. Adam Malik Hospital, Medan

Risk Factors	Bataknese Stroke Group (n=45)	Non-Bataknese Stroke Group (n=35)	PR=(95% CI)	p
Hypertension	35 (50.0)	21 (30.0)	0.67 (0.19 to 2.40)	0.755
Dyslipidemia	27 (38.6)	13 (18.6)	1.39 (0.52 to 3.71)	0.692
Heart disease	12 (17.1)	6 (8.6)	1.15 (0.37 to 3.57)	1.000
Diabetes mellitus	12 (17.1)	7 (10.0)	0.94 (0.31 to 2.80)	1.000
Smoke	19 (27.1)	10 (14.3)	1.10 (0.41 to 2.97)	1.000
Obesity	8 (11.4)	3 (4.3)	1.59 (0.38 to 6.61)	0.735
Alcoholic beverages	11 (15.7)	1 (1.4)	7.77 (0.94 to 64.22)	0.045

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