talenta PUBLISHER

SUMEJ
Sumatera Medical Journal

The Relationship between Smoking and The Incidence of Stroke at Haji Adam Malik General Hospital in 2018

Tazzya Shailla Elfazi[1], Cut Aria Arina[2]

[1]Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia
[2]Department of Neurology, Universitas Sumatera Utara, Medan, Indonesia

Abstract. Stroke is a clinical sign that develops rapidly due to a disturbance of Focal (or global) brain function, with symptoms lasting for 24 hours or more, can lead to death, without any other cause than vascular. In Indonesia it is estimated that every year there are 500,000 inhabitants affected by stroke. One of the risk factors of stroke is the unhealthy lifestyle, such as smoking. The harmful content contained in cigarettes can become oxidizing substances in the blood so that there is damage to the artery walls and will be the location of fat-saving, platelet cells, cholesterol, and the thickening of the smooth muscle layers of the artery walls resulting in an aterotrombotic. This is what can cause a stroke. **Goal.** To know the relationship between smoking and the incidence of stroke in RSUP Haji Adam Malik Medan in 2018. **Method.** This type of research is analytic research with cross-sectional design. The data used in this research is secondary data that is data of the medical record of ischemic stroke patients and hemorrhagic stroke patients years 2018 obtained from RSUP Haji Adam Malik Medan medical record installation. The research method used is non-randomized consecutive sampling, with a side-total technique. The Data obtained is subsequently processed by computerization. **Results.** The hypothesis testing was conducted using a Chi-square test at a signification level of $p < 0.05$ and obtained a P value of 0.000 and also prevelence ratio > 1 with a value of 1.7418. **Conclusion.** There is a significant relationship between smoking and the incidence of stroke, especially in the event of ischemic stroke in RSUP Haji Adam Malik Medan in 2018.

Keyword: occurrence of stroke, ischemic stroke,hemorrhagic stroke, smoking.

Received date month year | Revised date month year | Accepted date month year

*Corresponding author at: Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia

E-mail address: tazzyashaillaelfazi98@gmail.com

Journal Homepage: http://talenta.usu.ac.id/smj/, DOI: https://doi.org/10.32734/sumej.v4i3.6416

1. Introduction

Stroke is an acute neurological deficit disease caused by sudden brain vascular disorders that can lead to disability or death. The definition of stroke according to the World Health Organization (WHO) is the rapidly developing clinical signs of focal (or global) brain function disorders, with symptoms lasting 24 hours or more, can lead to death, with no other cause other than vascular [1].

Most strokes occur due to sudden blockage of the arteries (ischemic stroke). Other strokes occur due to bleeding in brain tissue when blood vessels rupture (hemorrhagic stroke). (Ringer and Jimenez, 2018) [2].

Ischemic stroke is divided into two, namely thrombosis stroke and embolism stroke. Stroke thrombosis is a stroke caused by a blockage that occurs due to the formation of thrombus in the blood vessels of the brain, while stroke embolism is a type of ischemic stroke caused by a blood clot caused by the process of embolism, while hemorrhagic stroke is divided in two, namely subaraknoid hemorrhage stroke and intra cerebral bleeding stroke [1].

The world's stroke rate is about 200 per 100,000 inhabitants a year. In Indonesia it is estimated that every year there are 500,000 people affected by stroke and about 25% or 125,000 people die while the rest have mild disabilities can even become severely disabled [3].

The results of Riskesdas Kemenkes RI 2018, there was an increase in the prevalence of stroke based on diagnosis at the age of 2013 to 2018 in Indonesia, namely 7 per mile to 10.9 per mile. The highest prevalence occurs in East Kalimantan (14,7 per mile) [4].

In a survey at a Vermont hospital, stroke at a young age constituted 8.5% of all patients treated; Intraserebral bleeding stroke was obtained by 41% of patients, with the most common causes being aneurysm, AVM (Arteriovenous Malformation), hypertension, and tumors. Subaracnoid bleeding stroke was obtained in 17% of patients, and ischemic stroke occurred in 42% of patients. The incidence of ischemic stroke at the age of under 45 years is only about 5% of the entire incidence of ischemic stroke [5].

Non-modifiable stroke risk factors are age, gender, race, and genetics, while modifiable stroke risk factors are hypertension, DM, dyslipidemia, alcohol, lack of exercise, smoking [1]. Smoking can increase the chance of stroke by up to 3-fold for men and 4.7-fold for women [6].

Various clinical and epidemiological studies prove a strong association that smoking will interact with stroke. This can occur because the increase in blood pressure is supported by blood density and narrowing of peripheral blood vessels due to the content of chemicals, especially monoxide and nicotine gases and other chemicals contained in cigarettes [7].

The result of Riskesdas Kemenkes RI 2018, there was an increase in the proportion of tobacco consumption in Indonesia (suction and chewing) in the population aged 15 years and above from 2016 to 2018 in Indonesia, namely 32.8% to 33.8% [4]. By 2020 it is estimated that

tobacco will be the leading cause of death and weakness of the body, killing more than 10 million people a year [7].

Based on the background description above, the author is interested in conducting a study titled The Relationship between Smoking and Stroke Incidence at RSUP Haji Adam Malik Medan in 2018.

2. Materials and Methods

2.1. Place and Year Work

This research was conducted from May to November 2019 at the Medical Record Installation of Haji Adam Malik General Hospital Medan.

2.2. Ethics Statement

The research was approved by The Health Research Ethical Committee of Faculty of Medicine Universitas Sumatera Utara. Written informed consent was obtained prior to the investigation.

2.3. Subjects

The population in this study is the medical record of ischemic stroke patients and hemorrhagic stroke patients at the Haji Adam Malik General Hospital Medical Record Installation in 2018. This study uses a non-randomized consecutive sampling method, where all samples meet the inclusion criteria included in the study until the number of samples is met. The size of the sample in this study was determined by the total sampling method. The criteria for inclusion of medical records of ischemic and hemorrhagic stroke patients are the medical records of patients who are diagnosed with ischemic storke and hemorrhagic stroke.

2.4. Statistical Analysis

Univariate analysis is done to know the distribution, frequency and percentage, of characteristic variables of respondents include free and bound variables to be researched i.e. smoking behavior and ischemic stroke. This bivariate analysis is done to assess the relationship between free variables and bound variables. This analysis was conducted through a statistical test of Chi-Square which will be obtained a value of p , where in this study used a level of meaning of 0.05.

3. Results

From **Table 1**, it can be seen that the largest stroke incidence in RSUP HAM Medan in 2018 is the incidence of ischemic stroke which is as many as 68 people, while the incidence of hemorrhagic stroke as many as 49 people.

From **Table 1**, it can be seen that the largest gender group is the male group of 60 people with ischemic stroke incidence as many as 31 people and with the incidence of hemorrhagic stroke as many as 29 people, while the group of women as many as 57 people with ischemic stroke

incidence as many as 37 people and with the incidence of hemorrhagic stroke as many as 20 people.

From **Table 1**, it can be seen that the largest group in middle adulthood (41-60 years) is as many as 52 patients with ischemic stroke incidence as many as 34 people and with the incidence of hemorrhagic stroke as many as 18 people, the group in geriatri (>60 years) as many as 45 patients with ischemic stroke incidence as many as 27 people and with the incidence of hemorrhagic stroke as many as 18 people, group at young adulthood (20-40 years) as many as 11 patients with ischemic stroke as many as 6 people and with the incidence of hemorrhagic stroke as many as 5 people, and the group at a young age (<20 years) as many as 9 patients with ischemic stroke as many as 1 person and with the incidence of hemorrhagic stroke as many as 8 people.

From **Table 1**, it can be seen that patients who do not have more smoking habits are as many as 79 people with ischemic stroke incidence of 37 people and with the incidence of hemotagic stroke as many as 42 people, while patients who have smoking habits as many as 38 people with ischemic stroke incidence as many as 31 people and with the incidence of hemorrhagic stroke as many as 7 people.

From **Table 1**, it can be seen that patients who have a long history of smoking (0 years) more as many as 79 people with ischemic stroke incidence as many as 37 people and with the incidence of hemorrhagic stroke as many as 42 people, patients who have a long history of smoking <10 tahun sebanyak 21 orang dengan kejadian stroke iskemik sebanyak 15 orang dan dengan kejadian stroke hemoragik sebanyak 6 orang, dan pasien yang memiliki riwayat lama merokok >10 years as many as 21 people with ischemic stroke incidence as many as 15 people and with the incidence of hemorrhagic stroke as many as 6 people, and patients who have a history of smoking >10 years as many as 17 people with ischemic stroke incidence as many as 16 people and with hemorrhagic stroke incidence as many as 1 person.

Table 1 Characteristic frequency of respondents research

Characteristic	IS	HS	Total
Stroke Incidence	68	49	117
Gender			
Male	31	29	60
Female	37	20	57
Age			
Young (<20 tahun)	1	8	9
Young Adulthood (20–40 tahun)	6	5	11
Mid Adulthood (41-60 tahun)	34	18	52
Geriatri (>60 tahun)	27	18	45
Smoking Habits			
Smoke	31	7	38
Non Smoke	37	42	79
History of Smoking			
0 year	37	42	79
<10 years	15	6	21
>10 years	16	1	17

From **Table 2**, it can be seen that 38 patients who have smoking habits. Among them, with patients who suffered ischemic stroke as many as 31 people and with patients who suffered hemorrhagic stroke as many as 7 people. It can be concluded that patients who have a habit of smoking are more at risk of developing ischemic stroke.

From **Table 2** can also be seen patients who do not have smoking habit as many as 79 people. Among them, with patients who suffered ischemic stroke as many as 37 people and with patients who suffered hemorrhagic stroke as many as 42 people.

Table 2 Relationship of Smoking Habits with Stroke Incidence

		Stroke Incidence			P *Value*	*PR*
		IS	HS	Total		
Smoking Habits	Smoke	31	7	38	0,000	1, 741
	Non Smoke	37	42	79		
	Total	68	49	117		

From **Table 3**, it can be seen that patients who do not have a long history of smoking (0 years) as many as 79 people. Among them, with patients who suffered ischemic stroke as many as 37 people and with patients who suffered hemorrhagic stroke as many as 42 people.

From table 4.3, it can be seen that patients who have a long history of smoking for <10 years as many as 21 people. Among them, with patients who suffered ischemic stroke as many as 15 people and with patients who suffered hemorrhagic stroke as many as 6 people.

From table 4.3, it can be seen that patients who have a long history of smoking for >10 years as many as 17 people. Among them, with patients suffering from ischemic stroke as much as 16 people and with patients who suffered hemorrhagic stroke as many as 1 person. It can be concluded that patients with ischemic stroke incidence who have a long history of smoking <10 years and >10 years more than patients with hemorrhagic stroke incidence.

Table 3 Relationship History of Smoking with Stroke Incidence

		Stroke Incidence			P *Value*	*PR*
		Ischemic Stroke	Hemorragic Stroke	Total		
History of Smoking	0 year	37	42	79	0,001	1,317
	<10 years	15	6	21		
	>10 years	16	1	17		
	Total	68	49	117		

4. Discussion

In table 1, it can be seen that the patients with the most stroke incidence are patients with ischemic stroke. This is in accordance with the research of Ovina et al (2013) on the relationship of diet, exercise, and smoking to the prevalence of non-hemorrhagic stroke disease in The Nerve Poly of Raden Mattaher Jambi Regional General Hospital Period May – June 2013 which shows that stroke patients at Poli Saraf Radaen Mattaher Jambi Regional General Hospital period May – June 2913 are the most patients with ischemic stroke as many as 81 people. While the patients with hemorrhagic stroke is 19 people. However, this study is not in accordance with Pradipta's research (2010) on the relationship between smoking habits and hemorrhagic stroke based on the assessment of Ct- Head scans that showed patients with hemorrhagic stroke incidence as many as 23 people, while patients with ischemic stroke incidence as many as 22 people.

Stroke is a cerebrovascular disease that is a non-communicable disease with treatment that takes a long time and requires a large cost [4]. Stroke is a heterogeneous disease. The two main subtypes, ischemic and hemorrhagic. Hemorrhagic stroke refers to subarachnoid hemorrhage (SAH) and intracerebral hemorrhage (ICH) [8]. Ischemic stroke, cerebrovascular accident (CVA), or brain attack is a sudden loss of function due to impaired blood supply to a part of the brain [9]. Blood that comes out and spreads to the parenchyma tissue of the brain, cerebrospinal space, or a combination of both is the result of rupture of the blood vessels of the brain known as hemorrhagic stroke [10].

In table 1 it can be seen that patients who do not have more smoking habits than patients who have smoking habits. This is in accordance with Marisa's research (2012) on the relationship of smoking behavior with the incidence of stroke in the nervous part of Rsu Dokter Soedarso Pontianak period June-July 2012 which showed patients who do not have smoking habits as many as 58 people, while patients who have smoking habits 32 people. But this study is not in accordance with Ovina et al (2013) on the relationship of diet, exercise, and smoking to the prevalnesi of non-hemorrhagic stroke disease in the Neurosurgery of Raden Mattaher Jambi Regional General Hospital period May – June 2013 which shows patients who have more smoking habits that is as many as 53 people than patients who do not have smoking habit as many as 28 people.

Smoking is a strong risk factor for myocardial infarction and sudden death. Smoking will increase blood pressure temporarily causing subarachnoid bleeding due to the rupture of cerebral aneurysms. Smoking increases coaguibility, blood viscosity, increases fibrinogen levels, encourages platelet aggregation, raises blood pressure, raises hematocrit, and lowers HDL [11]. Cigarettes have a very dangerous content. A cigarette contains 4000 types of chemicals, of which 60 substances are carcinogenic and addictive [12]. This risk increases with age and the number of cigarettes smoked. CO gas can cause desaturation of hemoglobin, decreasing oxygen circulation for tissues throughout the body including myocardial. Carbon

monoxide replaces the place of oxygen in hemoglobin, disrupts the release of oxygen and accelerates atherosclerosis [13].

From table 2, the chi-square test obtained a P value of 0.000 and a PR (prevelence ratio) of 1,741. The value of P value < 0.05 and PR > 1 means that the hypothesis of the work of the study is accepted, namely there is a significant relationship between smoking habits and stroke events, especially in the incidence of ischemic stroke at RSUP Haji Adam Malik Medan in 2018. This is in accordance with the research of Ovina et al (2013) on dietary relationships, sports, and smoking against prevalnesi non-hemorrhagic stroke disease in The Nerve Poly of Raden Mattaher Jambi Regional General Hospital Period May – June 2013 obtained a significant relationship between the relationship of smoking and stroke incidence in patients at the Poli Saraf Raden Mattaher Jambi Regional General Hospital Period May - June 2013, with a p value of 0.015 (p<0.05). In a study conducted by Watila et al (2012) on the profile of risk factors for stroke patients in Nigeria that showed a significant association between smoking habits and stroke incidence, with a p value of 0.018 (p<0.05).

But this study is not in accordance with Wayunah research (2016) on the analysis of factors related to stroke incidence in Indramayu Hospital obtained an insignificant relationship between smoking and stroke incidence in stroke patients in Indramayu Hospital, with a p value of 1,000 (p> 0.05).

Smoking can result in a doubling of the risk of ischemic stroke and up to a fourfold increase in the risk of hemorrhagic stroke. It is associated with the buildup of fatty substances (atherosclorosis) in the carotid arteries, the main arteries in the neck that supply blood to the brain. This is due to increased coagulability, blood viscosity, fibrinogen levels, platelet aggregation, and increased blood pressure [15].

From table 3, the chi-square test obtained a P value of 0.001 and a PR (Prevelence Ratio) of 1,317. The value of P value < 0.05 and PR > 1 means that the hypothesis of research work is accepted, namely there is a significant relationship between smoking and stroke incidence, especially the incidence of ischemic stroke at RSUP Haji Adam Malik Medan in 2018. This is in accordance with marisa research (2012) on the relationship of smoking behavior with the incidence of stroke in the nerve part of RSU Doctor Soedarso Pontianak period June-July 2012 obtained a significant relationship between the length of smoking and the incidence of stroke in the nerve section of RSU Doctor Soedarso Pontianak period June-July 2012, with a p value of 0.017 (p< 0.05).

The effects of smoking cause damage to the walls of blood vessels as a result of toxic chemicals contained in cigarettes, which will trigger the occurrence of atherosclerosis or aneurysm in blood vessels. If smoking activity is done for a long period of time, it will further aggravate the damage to blood vessels continuously that will trigger the occurrence of stroke [14].

5. Conclusion

From the results of this study can be drawn conclusions as follows:

1. The results of the chi square statistical test found a value of P value of 0.000, it can be concluded that there is a significant relationship between smoking habits and stroke incidence at RSUP Haji Adam Malik Medan in 2018.
2. The results of the chi square statistical test found a value of P value of 0.001, it can be concluded that there is a significant relationship between smoking and stroke incidence at RSUP Haji Adam Malik Medan in 2018.
3. The proportion of stroke incidence in RSUP Haji Adam Malik Medan in 2018 was 117 patients, with the largest stroke incidence being ischemic stroke as many as 68 patients, while the incidence of hemorrhagic stroke as many as 49 patients.
4. From the results of the study obtained stroke patients who have the most smoking habits are patients with ischemic stroke patients as many as 31 people, while with hemorrhagic stroke patients as many as 7 people.
5. From the results of the study, it was found that stroke patients at Haji Adam Malik Hospital Medan in 2018 had a history of smoking <10 years more than stroke patients who had a history of smoking >10 years.

6. Acknowledgement

The authors would like to express their gratitude to Department of Neurology, Universitas Sumatera Utara and TALENTA Universitas Sumatera Utara for providing the opportunity for us to conduct this experimental study.

REFERENCES

[1] Rinawati, S. B. and Munir, B. 2017, Buku Ajar Neurologi. Sagung Seto, Malang
[2] Ringer, A. and Jimenez, L. 2018, 'Stroke (Brain Attack)', vol. 4, , pp. 1–6
[3] Hanum, P., Lubis, R. and Rasmaliah 2018, 'Hubungan Karakteristik dan Dukungan Keluarga Lansia dengan Stroke pada Lansia Hipertensi di Rumah Sakit Umum Pusat Haji Adam Malik Medan', vol. 3, no. 1, pp. 72– 88.
[4] Kemenkes 2018, 'Hasil Utama Riskesdas 2018', pp. 1–88.
[5] Jatiningrum, K. S. 2018, 'Profil Faktor Resiko Stroke Pasien Usia Tua Dan Usia Muda di RSUD Jombang Tahun 2016-2017.
[6] Fong, W. C. 2016, 'Stroke', pp. 1–12.
[7] Latifah, D. and Supatmi 2015, 'Perilaku Merokok Dengan Kejadian Stroke', vol. 2(2), , pp. 61–64.
[8] Carlson, K. k 2009, *AACN Advanced Critical Care Nursing*. Canada
[9] Brunner and Suddarth 2010, *Medical-Surgical Nursing*. China
[10] Goetz, C. 2007, Neurologi Klinik. 3rd edn. Saunders, Philadelphia
[11] Misbach, J. 2011, Stroke Aspek Diagnostik, Patofisiologi, Manajemen. FK UI, Jakarta.
[12] Rahmadi, A. et al. 2013, 'Hubungan Pengetahuan dan Sikap Terhadap Rokok dengan Kebiasaan Merokok Siswa SMP di Kota Padang'.
[13] Malaeny, C. S., Katuk, M. and Onibala, F. 2017, 'Hubungan Riwayat Lama Merokok dan Kadar Kolesterol Total dengan Kejadian PJK di Poliklinik Jantung RSU Pancaran Kasih GMIM Manado', vol. 5, no. 1, pp. 1–7.
[14] Marisa 2012, 'Hubungan Perilaku Merokok dengan Kejadian Stroke di Bagian Saraf RSU Dokter Soedarso Pontianak Periode Juni-Juli 2012
[15] Misbach, J. 1999, Stroke Aspek Diagnostik, Patofisiologi, Manajemen. Jakarta.