http://mnj.ub.ac.id/
DOI: 10.21776/ub.mnj.2022.008.02.7
eISSN: 2442-5001 **pISSN:** 2407-6724
Accredited by DIKTI Decree No: 21/E/KPT/2018

MALANG NEUROLOGY JOURNAL MNJ

RESEARCH ARTICLE OPEN ACCESS

PROFILE OF CHARACTERISTIC, RISK FACTOR, AND STROKE SEVERITY ON INFARCTION STROKE PATIENTS

Aisyah Rizki Ramadhani[1], Mohammad Saiful Ardhi[2], Subur Prajitno[3]

Correspondence: *saifulardhie@fk.unair.ac.id*
[1]*Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.*
[2]*Department of Neurology, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.*
[3]*Department of Public Health and Preventive Medicine, Faculy of Medicine, Universitas Airlangga, Surabaya, Indonesia.*

Article History:
Received: December 14, 2021
Accepted: June 30, 2022
Published: July 1, 2022

Cite this as:
Ramadhani AR, Ardhi MS, Prajitno S. Profile of characteristic, risk factor, and stroke severity on infarction stroke patients. Malang Neurology Journal; 2022.8:109-112. DOI: http://dx.doi.org/10.21776/ub.mnj.2022.008.02.7

ABSTRACT

Background: Stroke is the second leading cause of death and the third leading cause of morbidity. Therefore, it is important to know which risk factor that most patients have. Stroke can be divided according to its severity using NIHSS, NIHSS itself has strong ability to predict outcomes after stroke
Objective: This study's aim to learn about profile of characteristic, risk factor, and stroke severity on infarction stroke patients in ward Seruni A RSUD Dr. Soetomo from July 2018 – June 2019.
Methods: This descriptive observational study's samples are patients with infarction stroke in ward Seruni A RSUD Dr. Soetomo from July 2018 – June 2019. The observed profile include age, sex, ethnic, family history of vascular disease, history of hypertension, diabetes, heart disease, dyslipidemia, obesity, smoking, alcohol consumption, physical inactivity, and stroke severity.
Results: From 200 patiens, 55% (110) are 56-70 years old. 61% (122) patients are male. 81 out of 96 are Javanese. 25 out of 135 have family history of vascular disease, 140 out of 194 have hypertension, 69 out of 190 have diabetes, 27 out of 183 have heart disease, 101 out of 174 have dyslipidemia, 62 out of 162 have obesity, 33 out of 82 smoke, 4 out of 63 consume alcohol, and 50 out of 55 are inactive physically. On admission, out of 60 patients, 27 have moderate stroke, 25 minor, and 8 moderate to severe. On discharge, out of 49 patients, 23 have moderate stroke, 20 minor, 3 moderate to severe, and 3 severe.
Conclusion: Infarction stroke patients were mostly male and the peak incidence occur between 56-70 years old. Most patients have histories of hypertension, dyslipidemia, and diabetes. On admission and discharge, most patients have moderate stroke, followed by mild stroke.

Keywords: infarction stroke, ischaemic stroke, risk factor, NIHSS

Introduction

Stroke happens when there is a disruption of cerebral blood flow.[1] There are two types of strokes, which are hemorrhagic and infarct. Hemorrhagic stroke is caused by the bursting of vessels. Infarction stroke is caused by occlusion of blood vessel to the brain and is responsible for 85% of all stroke incidence.[1,2] Stroke is the second leading cause of death and the third leading cause of morbidity.[3,4] In Indonesia, stroke is the first leading cause of death (15,4%) with prevalence of 8.2 per 1000 population.[5] According to Riskesdas 2018, stroke is the leading cause of disability in geriatrics.[6]

Risk factor of stroke can be divided into two categories, which are unmodifiable risk factor and modifiable risk factor. Unmodifiable risk factor consists of age, sex, race, and family history of vascular disease. Modifiable risk factor consists of history of hypertension, diabetes, heart disease, dyslipidemia, obesity, smoking, alcohol consumption, and physical inactivity. Stroke can also be divided according to its severity using NIHSS (National Institutes of Health Stroke Scale). Patients' NIHSS score on admission can be used as a predictor of the functional outcome after stroke.[7] This scale can also help clinicians with accurate information for the patient, set therapy's goals, and plan for discharge.[8] This scale divides stroke into 4 categories according to the score which are mild stroke for score <5, moderate stroke for score 6-14, moderate to severe stroke for score 15-24, and severe stroke for score ≥25.

Prabowo stated that dyslipidemia, hypertension, and male sex are the most common risk factors for death outcomes, meanwhile patients without heart disease, not smoking, and normal cholesterol are associated with improved outcomes.[9] Marantika also stated that higher blood glucose level or triglyceride level will result in worse motor output.[10]

Methods

This study's aim to learn about profile of characteristic, risk factor, and stroke severity on infarction stroke patients in ward Seruni A RSUD Dr. Soetomo from July 2018 – June 2019.

This study was approved by the Health Research Ethics Committee at RSUD DR. Soetomo and in accordance with The Office of Human Research Protections (OHRP) under

the requirements of the US Department of Health and Human Services (HHS) Regulation 45 CFR part 46 for exempt review, with approval number: 030/114/XI/2020.

This study's design is descriptive observational. This study observed patients' characteristic or unmodifiable risk factor, modifiable risk factor, and stroke severity. The unmodifiable risk factor includes age, sex, ethnic, and family history of vascular disease. The modifiable risk factor consists of history of hypertension, diabetes, heart disease, dyslipidemia, obesity, smoking, alcohol consumption, and physical inactivity.

The sample of this study is infarction stroke patients in ward Seruni A RSUD Dr. Soetomo from July 2018 – June 2019. Data was collected using patients' medical records and stroke registry form. Sample collection technique was total sampling with inclusion criteria: patients diagnosed with infarction stroke in ward Seruni A RSUD Dr. Soetomo from July 2018 – June 2019 and exclusion criteria: patient who does not have all the data. The data were processed by doing inspection, computerization, coding, cleaning, and arrangement.

Results

There were 200 data that were collected that fulfilled the inclusion and exclusion criteria of this research. The research result was shown as tables.

Table 1. Frequency Distribution of Patients' Characteristic.

Variable	N	Percentage (%)
Age (years old)		
- 26-40	7	3.5
- 41-55	56	28
- 56-70	110	55
- >70	27	13.5
Total	200	100
Sex		
- Male	122	61
- Female	78	39
Total	200	100
Ethnic		
- Javanese	81	84.4
- Madurese	11	11.4
- Chinese	2	2.1
- Others	2	2.1
Total	96	100
Family history of vascular disease		
- Yes	25	16.1
- No	130	83.9
Total	155	100

Table 2. Frequency Distribution of Modifiable Risk.

Variable	Yes		No		Total	
	N	%	N	%	N	%
Hypertension	140	72.2	54	27.8	194	100
Diabetes	69	36.3	121	63.7	190	100
Heart disease	27	14.8	156	85.2	183	100
Dyslipidemia	101	58	73	42	174	100
Obesity	62	38.3	100	61.7	162	100
Smoking	33	40.2	49	59.8	82	100
Alcohol consumption	4	6.3	59	93.7	63	100
Physical inactivity	50	90.9	5	9.1	55	100

Table 3. Frequency Distribution of Stroke Severity.

Stroke Severity	Admission		Discharge	
	N	%	N	%
Mild	25	41.7	20	40.8
Moderate	27	45	23	46.9
Moderate to severe	8	13.3	3	6.15
Severe	0	0	3	6.15
Total	**60**	**100**	**49**	**100**

Discussion

Age

This study shows that most of the patients are between 56 – 70 years old with 55% percentage (110 patients). This result is in accordance with study by Rachmadiansyah that showed that most patients aged between 50-59 years old.[11] Bangen et al stated that with increasing age, there will be changes in the cerebrovascular system that will affect the neurovascular, including cerebrovascular ultrastructure changer, reduced elasticity of the blood vessel, increased atherosclerosis, reduced in cerebral blood flow, and decreased in vascular reactivity to chemical modulator.[12]

Sex

Data shows that 122 patients (61%) in this study are male. This result is in accordance with studies by Rachmadiansyah and Saunoah that shows that most of the infarction stroke patients are male with percentage of each 55.1% and 62.7%.[11,13] Katsiki et al stated that estrogen can repair endothelium dysfunction, increased vasodilatation, increased blood flow after vascular occlusion, and increased healing of brain damage and progesterone can decrease the size of the lesion and increased healing.[14]

Ethnic

In this study, data shows that 81 patients (84.8) are Javanese, 11 (11.4%) are Madurese, 2 (2.1%) are Chinese, and 2 (2.1%) come from other ethnics. This result is different with study by Pajri and Safri in Pekanbaru that showed that most patients are from Minang tribe.[15] This discrepancy is believed to be caused by the difference in the society in Surabaya and Pekanbaru where in Surabaya, 83.68% are Javanese.[16]

Family History of Vascular Disease

This study shows that 130 patients (83.9%) do not have family history of vascular disease. This result matches with studies by Alagindera and Nastiti that showed that most patients do not have family history of vascular disease either with percentage of each 99% and 76%.[17,18] This means that most patients' stroke is not caused by family history of vascular disease.

Hypertension

Hypertension is characterized by persistently high blood pressure where systolic blood pressure ≥140, diastolic blood pressure ≥90, or both. The data obtained shows that most patients have history of hypertension with percentage of

72.2% (140 patients). This data is in accordance with studies by Rachmadiansyah and Nastiti that also stated that most patients have history of hypertension with percentage of each 69.7% and 72%.[11,18] In their study, Portegies et al stated that hypertension is the most important modifiable risk factor with contribution of approximately 35%.[19] Junaidi also stated that hypertension can cause thinning of blood vessel and damage blood vessel so that atherosclerosis plaque can form.[20]

Diabetes

Diabetes is a systemic disease characterized by hyperglycemia caused by dysfunction in insulin secretion, insulin action, or both. Data shows that even though most patients do not have history of diabetes (63.7%), there are still 69 patients (36.3%) that have history of diabetes. This result is consistent with studies by Rachmadiansyah and Saunoah that showed that most patients do not have history of diabetes with percentage of each 69.7% and 73.1%.[11,13] Theoretically, diabetes is an independent risk factor of stroke that can double the risk of stroke twice more than people who do not have diabetes, and stroke is responsible for approximately 20% of death in diabetics.[21]

Heart Disease

In this study, data shows that most patients do not have history of heart disease with percentage of 85.2% (156 patients). This data matches with study by Alagindera that also showed that 74.3% patients do not have history of heart disease.[17] This means that most patients' stroke is not caused by their history of heart disease.

Dyslipidemia

Dyslipidemia is caused by disturbance in lipid metabolism. This study shows that most patients have history of dyslipidemia with percentage of 58% (101 patients). This result is different with study by Rachmadiansyah that showed that most patients do not have history of dyslipidemia (60.6%).[11] Study by Nastiti showed that 49% patients have low level of total cholesterol, 32% have LDL level close to optimal and 27% at high limit, and 54% have low level of HDL.[18] Boehme et al stated that increased in total cholesterol will increase the risk of ischemic stroke and increased in HDL will lower the risk of stroke, and Moor et al stated that LDL can cause atherosclerosis which can result as ischemic stroke.[21,22]

Obesity

Obesity is characterized by having BMI >23 for Asian. The data obtained in this study showed that most patients do not have history of obesity (61.7%) and 62 patients (38.3%) have history of obesity. This result is in accordance with study by Kesuma that states that only 30.8% patients have history of obesity.[23] Strazullo et al stated that obesity is the precursor of hypertension, diabetes, and other complications that have important role indirectly in stroke epidemiology.[24]

Smoking

Data shows that most patients are not active smokers with percentage of 59/8% (49 patients). This result is in accordance with study by Alagindera and Kesuma that also showed that most patients are not active smokers with percentage of each 76.8% and 56.9%.[17,23] Shah and Cole stated that active smokers are two to four times more likely to have a stroke than people who have never smoked or have stopped smoking for more than ten years.[25]

Alcohol Consumption

The data obtained shows that there are 4 patients (6.3%) who have history of alcohol consumption and 59 (93.7%) who do not. This result is contrary with study by Saunoah in Timor Tengah Utara that showed that most patients have history of alcohol consumption (62.7%).[13] This discrepancy is believed to be cause by the difference in beliefs in both places, where in Surabaya, 85.1% of its people are Muslim, and in Timor Tengah Utara, 98.03% of its people are Christian.[16] According to Ovbiagele and Nguyen-Huynh, heavy alcohol consumption is connected with increased blood pressure and coagulability, arrythmia, and decreased in cerebral blood flow.[26]

Physical Inactivity

The data obtained shows that there are 50 patients (90.9%) who are physically inactive and 5 patients (9.1%) who are physically active. This result matches with study by Saunoah showed that most patients rarely exercise (62.7%).[13] In study by Ovbiagele and Nguyen-Huynh, it is stated that increased physical activity will result in decreased fibrinogen, homocysteine, and platelet activity, this will also result in increased HDL and plasma tissue plasminogen activator activity. A meta-analysis of 23 studies showed that subjects who were active had a 27% lower risk of stroke and also a lower risk of mortality compared to subjects with low activity.[26]

Stroke Severity

The data obtained in this study showed that, on admission to hospital, there are 27 patients (45%) with moderate stroke, 25 (41.7%) with mild stroke, 8 (13.3%) with moderate to severe stroke, and no patients with severe stroke. On discharge from hospital, there are 23 patients (46.9%) with moderate stroke, 20 (40.8%) with mild stroke, 3 (6.15%) with moderate to severe stroke, and 3 (6.15%) with severe stroke. This result is in accordance with study by Anwar that showed that from 45 patients, 44.7% have moderate stroke, 42.1% with mild stroke, 10.5% with moderate to severe stroke, and 2.6% with severe stroke.[27]

Conclusion

In conclusion, most of infarction stroke patients in ward Seruni A RSUD Dr. Soetomo from July 2018 – June 2019 was male, and the peak incidence occur between 56-70 years old. Most patients have history of hypertension, dyslipidemia, and diabetes. On admission to hospital and discharge from hospital, most patients have moderate stroke, followed by mild stroke.

Acknowledgement

The author thanks to Universitas Airlangga and RSUD Dr. Soetomo, Surabaya, East Java, Indonesia for facilitating this research.

Conflict of Interest

There is no conflict of interest in this study.

References

1. Silverman IE, Rymer M. An atlas of investigation and treatment: Ischemic stroke. Atlas Medical Publishing Limited; 2009
2. Khaku AS, Tadi P. Cerebrovascular Disease (Stroke) [Updated 2020 Mar 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020. Available from: https://www.ncbi.nlm.nih.gov/books/NBK430927/
3. Tran J, Mirzaei M, Anderson L, Leeder SR. The epidemiology of stroke in the Middle East and North Africa. Journal of the neurological sciences; 2010. 295(1-2), 38-40. DOI: 10.1016/j.jns.2010.05.016
4. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: A systematic analysis for the Global Burden of Disease Study 2010. The Lancet; 2012. 380(9859), 2095-2128. DOI: 10.1016/s0140-6736(12)61728-0
5. Yudiarto F, Machfoed M, Darwin A, Ong A, Karyana M. Indonesia Stroke Registry (S12. 003); 2014
6. Dasar RK. Hasil Utama Riskesdas 2018. Kemenkes Balitbangkes; 2018 7.
7. Fadil and Islamiyah, W. R., Pemanfaatan kadar granulosit sebagai prediktor risiko infeksi dan keluaran fungsional pada penderita stroke akut. AKSONA; 2016. 1(3), 55-60.
8. Kwah, L.K. and Diong, J., National Institutes Of Health Stroke Scale (NIHSS). Journal of physiotherapy; 2014. DOI: 10.1016/j.jphys.2013.12.012
9. Prabowo E. Hubungan faktor risiko terhadap luaran pasien stroke iskemik berulang di Ruang Seruni A RSUD Dr. Soetomo Surabaya periode Januari–Desember 2014 (Skripsi thesis). Surabaya: Universitas Airlangga,; 2017
10. Marantika A. Hubungan antara hipertensi, diabetes mellitus, profil lipid dengan keluaran motorik pada pasien stroke iskemik di Instalasi Rawat Inap SMF Penyakit Saraf RSUD Dr. Soetomo periode Januari 2017–Juni 2017 (Skripsi thesis). Surabaya: Universitas Airlangga; 2018.
11. Rachmadiansyah E. Gambaran keluaran klinis pasien stroke iskemik dengan faktor risiko hipertensi, diabetes mellitus dan dislipidemia di Instalasi Rawat Inap Departemen Neurologi RSUD Dr Soetomo periode Januari 2015-Desember 2015 (Skripsi thesis). Surabaya: Universitas Airlangga; 2016.
12. Bangen KJ, Restom K, Liu TT, Jak AJ, Wierenga CE, Salmon D, et al. Differential age effects on cerebral blood flow and BOLD response to encoding: Associations with cognition and stroke risk. Neurobiology of Aging; 2009. 30(8), 1276–1287. DOI: 10.1016/j.neurobiolaging.20
13. Saunoah MN. Gambaran faktor yang mempengaruhi kejadian stroke iskemik pada masyarakat Kabupaten Timor Tengah Utara pada tahun 2018 (Skripsi thesis). Kupang: Poltekkes Kemenkes Kupang; 2019.
14. Katsiki N, Ntaios G, Vemmos K. Stroke, obesity and gender: A review of the literature. Maturitas; 2011 69(3):239-243. DOI: 10.1016/j.maturitas.2011.04.010
15. Pajri RN, Safri DY. Gambaran faktor-faktor penyebab terjadinya stroke. Jurnal Online Mahasiswa; 2018. 5(1):436-43.
16. DPM&PTSP; 2021. Demografi. [online] Dpm-ptsp.surabaya.go.id. Available at: <http://dpm-ptsp.surabaya.go.id/v3/pages/demografi> [Accessed 8 August 2021].
17. Alagindera D. Gambaran faktor risiko kejadian stroke iskemik pada pasien yang dirawat inap di Rumah Sakit Umum Pusat Haji Adam Malik Medan periode Januari 2015-Desember 2015. Medan: Universitas Sumatera Utara; 2016.
18. Nastiti D. Gambaran faktor risiko kejadian stroke pada pasien stroke rawat inap di rumah sakit Krakatau Medika tahun 2011 (Skripsi thesis). Depok: Universitas Indonesia; 2012.
19. Portegies M L, Koudstaal PJ, Ikram MA. Cerebrovascular disease. Handbook of clinical neurology; 2016. 138:239–261. DOI: 10.1016/b978-0-12-802973-2.00014-8
20. Junaidi I. Panduan praktis pencegahan dan pengobatan stroke. Jakarta: PT Bhuana Ilmu Populer; 2004
21. Boehme AK, Esenwa C, Elkind MS. Stroke risk factors, genetics, and prevention. Circulation research; 2017. 120(3):472–495. DOI: 10.1161/circresaha.116.308
22. Moor VJA, Amougou SN, Ombotto S, Ntone F, Wouamba DE, Nonga BN. Dyslipidemia in patients with a cardiovascular risk and disease at the University Teaching Hospital of Yaoundé, Cameroon. International Journal of Vascular Medicine; 2017. 2017:1-5. DOI: 10.1155/2017/6061306
23. Kesuma NMTS. Gambaran faktor risiko dan tingkat risiko stroke iskemik berdasarkan stroke risk scorecard di RSUD Klungkung (Skripsi thesis). Jember: Universitas Jember; 2019.
24. Strazzullo P, D'Elia L, Cairella G, Garbagnati F, Cappuccio FP, Scalfi L. Excess body weight and incidence of stroke: Meta-analysis of prospective studies with 2 million participants. Stroke; 2010. 41(5):e418-e426. DOI: 10/1161/strokeaha.109.5769
25. Shah RS, Cole JW. Smoking and stroke: The more you smoke the more you stroke. Expert Review of Cardiovascular Therapy; 2010. 8(7), 917-932. DOI: 10.1586/erc.10.56
26. Ovbiagele B, Nguyen-Huynh MN. Stroke epidemiology: Advancing our understanding of disease mechanism and therapy. Neurotherapeutics; 2011 8(3):319-329. DOI: 10.1007/s13311-011-0053-1
27. Anwar NF. Gambaran skor NIHSS pasien stroke iskemik dan hemoragik di Rumah Sakit Sumber Waras Jakarta periode Maret-April 2019 (Skripsi thesis). Jakarta: Universitas Tarumanagara; 2019.