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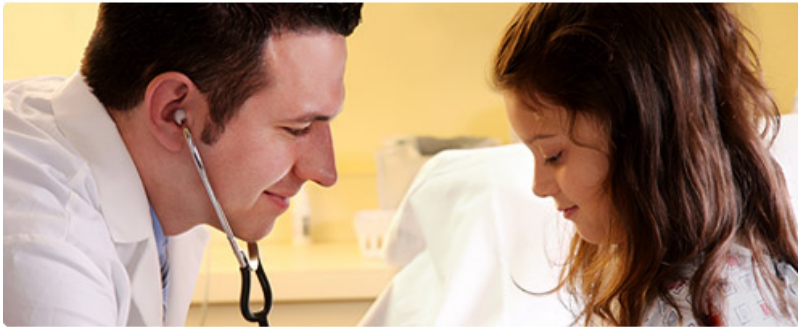
XVIII

240. The Socio-Psychological Variables in the Meaning of Self-Consciousness and Movement Satisfaction of Physical Education and Sport Sciences Students.....	1335
<i>Amer Saad Jaziri, Mustafa Jassid Mridi, Sonna Jabbar Gata, Saleh Chaudh Hilal</i>	
241. Evaluation of Efficacy and Safety of Oral Cyclosporine in the Treatment of Severe Alopecia Areata....	1342
<i>Sohar A. Majed, Amna Abdel-Jaleel Sindi, Ekhlal Sabah Hassan</i>	
242. Removing Methods of Ultracide Residues in Imported Apple Peels in Iraqi Local Markets.....	1346
<i>Sedik A.K. Al-Hiyaly; Sabi Riad Khulbati ; Jazzer, A. J. Al-Tamimi and Ahmad S.A. Al-Tar</i>	
243. Perception of Roles as Peer Educators in High Schools to Prevent Drug Abuse among Adolescents	1350
<i>Ira Nurmalia, Elisa Dwi Perlisti, Yuli Pujipta Dewi, Muhammadiyah, Rizki Diana R</i>	
244. Identification of Recurrent Laryngeal Nerve and Parathyroid Glands Intraoperatively by Methylene Blue Spraying Technique.....	1355
<i>Zaena Noor eideen Abulrahman, Waleed Qasim Rajab, Zainab Jameel Ali</i>	
245. Evaluation of the Mexiletine Effects on Normal Cats' Electrocardiogram.....	1361
<i>Ahmed Nuryntan, Nataran Rahimi, Syed Ali Shabazzari Ali</i>	
246. The Role of BRAF Mutation (V600E) in Papillary Thyroid Carcinoma (PTC).....	1369
<i>Azhar Azhar M. Al-Ansary, Karrar A. Alqerabi, Hussein W.S. Raboun</i>	
247. Forensic and Legal Victimology Education: The Actualization of Ethical Values in Law	1374
<i>Djunaedi</i>	
248. Risk Factor based on the Type of Stroke at RSUD Dr. Soetomo, Surabaya, Indonesia.....	1379
<i>Kurnia Dwi Astuti, Sunny Mariani Sri Widari, Muhammad Abinudin</i>	
249. Risk Factors for Diabetes Mellitus Occurrence in the Elderly at the Griya Antapani Public Health Center.....	1385
<i>Ade Saputra Nuratun, Fitriani Pramita Gurning, Mochi Yudi Pratama, Fauzan</i>	
250. Medical Environment of Traditional Market Quality in A Business Competition.....	1390
<i>Mohamad Tubari, Khadzafah Donyati, Amari Absari, Nurhadiswanto, Kelik Wardiana, Wafda Firda Izziyana, Ariel Budiono</i>	
251. Triability or Observability That Influences The Youth Decision Using Mobile Application "Remaja Sehat" ?.....	1395
<i>Pulang Sitawanta, Marlismainah, Rizki Diana R, Astri Meidiah S</i>	
252. Biochemical Analyses of Male Rat's Serum Administered Dexamethasone and Green Synthesis Cerium Oxide Nanoparticles Treatment.....	1402
<i>Ruan M. Ali, Nada K. Abbas, Amal K. Abbas, Laila K. Abbas</i>	
253. The Study of the Effect of Cognitive-Behavioral Therapy (CBT) on Reducing Methadone Consumption and Increasing Self-Esteem in Drug Addicts.....	1408
<i>Zakaria Zakariaet, Syed Khairi Ghazempour, Touraj Asadi, Ali Asghar Manoochebi</i>	
254. Study Effect of Clarithromycin drug on <i>Cryptosporidium Parvum</i> and Efficiency of ELISA Technique in Diagnosis Comparison with Some Traditional Methods <i>in vitro</i>	1415
<i>Hussein A. Kadhim, Shaimaa A. Shleeh</i>	



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Risk Factor based on the Type of Stroke at RSUD Dr. Soetomo, Surabaya, Indonesia

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Abstract

Introduction: Stroke defined as a disease due to the trouble in the blood circulation which affected by several risk factors. It consists of fixed factors and unfixed factors. The fixed factor such as age, and gender, while unfixed factors including hypertension, blood glucose level, dyslipidemia, and job. **Aims:** This research aims to identify the distribution type of stroke, and risk factor which affecting the stroke patients in the RSUD Dr. Soetomo, Surabaya. **Method:** Research was designed as descriptive research to the stroke patient in the RSUD Dr. Soetomo, Surabaya. Various data was collected including age, gender, job, blood pressure, blood glucose level, and lipid profile when patient involved in the hospital at the first time, history of smoking, history of stroke in family. All of stroke patients in the RSUD Dr. Soetomo, Surabaya within October-December 2018 was addressed as subject in this research. **Result:** Result showed that ischemic stroke had the highest incidence rate in the hospital (72,6%), most of patient of stroke are male (56,2%) with age in less 65 years old (72,6%). Both hypertension 37(50,7%) respondent and smoking 29 (39,73%) respondent are the highest modified risk factor in this research. In the ischemic stroke, hypertension (62,3 %) is the highest modified risk factor. Whilst, in the hemorrhagic stroke, smoking (35 %) is the highest modified risk factor. Moreover, the highest risk factor in all type of stroke is in age less than 65 years old (72,6%). **Conclusion:** Number of ischemic stroke case is higher than hemorrhagic stroke. Hypertension is defined as the highest risk factor in hemorrhagic stroke, while smoking is the highest risk factor of ischemic stroke.

Keywords: Hemorrhagic stroke, ischemic stroke, smoking, risk factor

Introduction

Non-communicable diseases (NCDs) such as heart disease, stroke, cancer, diabetes mellitus, chronic injury, and obstructive pulmonary constitute 68% (38 million) of deaths worldwide by killing 56 million people per year⁽¹⁾. According to the WHO, deaths of NCDs are expected to continue to increase throughout the world which the biggest increase will occur in middle and poor countries. More than two thirds or 70% of the global population will die from NCDs such as cancer, heart disease, stroke and diabetes⁽²⁾ The prevalence of NCDs in Indonesia,

such as strokes increased from 2007 to 2013 which was 8.3 per mile to 12.1 per mile. It increases by age. The highest stroke cases diagnosed with health workers are age 75 years and above (43.1%) and the lowest in the age group 15-24 years that is equal to (0.2%). The prevalence of stroke based on sex is more male (7.1%) compared to women (6.8%). The prevalence of stroke in cities is higher than in the villages, both based on the diagnosis of health workers (8.2 ‰) and based on the diagnosis of health care or symptoms (12.7 ‰). Prevalence is higher in people who are not working either diagnosed with health (11.4 ‰) or diagnosed with health or symptoms (18%). East Java is a province that ranks fourth and has increased from 2007 to 2013 after South Sulawesi, DI Yogyakarta and Central Sulawesi in stroke. The prevalence of stroke at the age of ≥ 15 years by province, East Java ranks sixth (9.1 ‰) based on health diagnosis and fourth (16.0 ‰) based on the

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diagnosis of professionals or students⁽³⁾. The prevalence of stroke patients in Surabaya has increased during 2007-2013. It started from 0.7% in 2007 to 16.2% in 2013⁽²⁾.

Stroke is caused by an ischemic or hemorrhagic process that is often preceded by lesions or injuries to the arteries. Of all stroke events, two-thirds are ischemic and one third are hemorrhagic. It is called ischemic stroke because of thromboembolic blood vessel blockage which results in an ischemic area under the blockage. This is different from the hemorrhagic stroke that occurs due to ruptured microaneurysm^(4,5). Several factors that can cause strokes are distinguished into risk factors that cannot be changed and risk factors that can be changed. Risk factors that cannot be changed including age and male sex. Risk factors that can be changed including hypertension, diabetes mellitus, and dyslipidemia. Hypertension is defined as a condition where a person's blood pressure exceeds the normal blood pressure limit. Hypertension is a potential risk factor for the incidence of stroke because hypertension can cause rupture of the blood vessels of the brain or cause narrowing of the blood vessels of the brain. Rupture of cerebral blood vessels will result in cerebral hemorrhage, whereas if there is a narrowing of the blood vessels of the brain it will interfere with blood flow to the brain which ultimately causes the death of brain cells. This research aims to identify the distribution type of stroke, and risk factor which affecting the stroke patients in the RSUD Dr. Soetomo, Surabaya.

Method

Research design. This research was cross-sectional design. The sample was collected by systematic random sampling method. The sample had to attain selected inclusion and exclusion criteria. The inclusion criteria were patient with Stroke diseases, willing to participate in this research, and have a complete medical history. Whilst, exclusion criteria were Stroke patients with uncompleted medical history, patients with complicated condition.

Study population and study periode. The subject in this research was inpatient and outpatient Stroke disease

at RSUD Dr. Soetomo during Januari–Oktober 2018. The research sample was calculated by the formula of the cross-sectional research which included 73 respondents.

Data source and data variable. The data source in this research is primary data obtained by distributed questionnaire to Stroke patients. Whilst, secondary data obtained from medical history. Research variable in this research including dependent variable and independent variable. Dependent variable was selected as a medical history with complete information, such as age, gender, blood pressure, blood glucose level, lipid profile, Smoking history and job description. Data on age, gender and job description were obtained from primary data, whereas blood pressure, glucose level, and lipid profile were collected from secondary data. While variable of hypertension was collected from the blood test. Respondent was included into hypertension group if they have blood pressure $\geq 140/90$ mmHg in Stroke patients without another chronic diseases and blood pressure $\geq 130/80$ mmHg in Stroke patients with another chronic diseases. Then, variable of hypercholesterolemia was also obtained from blood test. Respondents were determined into hypercholesterolemia group if they have high density of lipoprotein ≥ 100 mg/dl. Meanwhile, respondents were addressed into diabetes mellitus group if they have blood glucose level of fasting about ≥ 110 mg/dl. Then, variable of physical activity was obtained from interview. Respondent was acquired into bad physical activity group if they did not have physical activity in 30 minutes for 5 times in a week.

Data analysis. Data were analyzed by univariate method. We describe all varibel independent and ranked it.

Ethical Clearance. Before collecting data, This Study approved Ethical Clearance by Ethic Commission of Government Hospital Dr. Soetomo, Surabaya (Number: 0727/KEPK/X/2018). All participants were provided with written informed consent approved by the Ethics Commission of Government Hospital Dr. Soetomo, Surabaya.

Table 1 : Distribution type of stroke respondent

Type of stroke	Number	Porsentase (%)
Ischemic	53	72,60
Hemorrhagic	20	27,39

Table 2: Distribution patient stroke base on modified risk factor

	Ischemic stroke	Hemorrhagic stroke	Number
Age			
< 65 years	35 (66.0)	17 (85.0)	52 (72.6)
≥ 65 years	18 (34.0)	3 (15.0)	21 (27.4)
Sex			
Male	29 (54.7)	12 (60.0)	41 (56.2)
Female	24 (45.3)	8 (40.0)	32 (43.8)

Tabel 3 : Distribution patient stroke base on modified risk factor

	Ischemic stroke	Hemorrhagic stroke	Number
Smoking			
Yes	22 (41.5)	7 (35.0)	29 (39.7)
No	31 (58.5)	13 (65.0)	44 (60.3)
History of family			
Yes	11 (20.8)	6 (30.0)	17 (56.2)
No	42 (79.2)	14 (70.0)	56 (43.8)
History of hypertension			
Yes	33 (62.3)	4 (20.0)	37 (50.7)
No	20 (37.7)	16 (80.0)	36 (49.3)
History of diabetes mellitus			
Yes	12 (22.6)	5 (25.0)	17 (56.2)
No	41 (77.4)	15 (75.0)	56 (43.8)

Table 4 : Rank of Distribution risk factor by type of Stroke

	Ischemic stroke		Hemorrhagic stroke	
	Porsentase	Rank	Porsentase	Rank
age < 65 year	35 (66.0)	1	17 (85.0)	1
History of hipertension	33 (62.3)	2	4 (20.0)	6
Sex (man)	29 (54.7)	3	12 (60.0)	2
Smoker	22 (41.5)	4	7 (35.0)	3
History of diabetes mellitus	12 (22.6)	5	5 (25.5)	5
History of Family	11 (20.8)	6	6 (30.0)	4

Discussion

A. Characteristic of respondent. From these data, it is known that ischemic stroke types (72.60%) are higher than hemorrhagic strokes (27.39%). This result is similar to the research conducted by Mahdi Habibi-koolae (6), which also stated that ischemic stroke patients are higher than hemorrhagic stroke patients. However, it is different from the research conducted by Derrel V. Barahama (2) which exhibited more hemorrhagic stroke patients than ischemic stroke

sufferers. Overall, ischemic stroke patients (66%) and hemorrhagic strokes (85%) were at most age less than 65 years old. This is similar to the research conducted by Barahama (2) which showed that more patients <65 years old who come to the hospital. More stroke patients are male in ischemic stroke and hemorrhagic stroke. In subjects with hemorrhagic strokes, 60% of the subjects were male. In subjects with ischemic stroke, 54% were male. Another study conducted by Mahdi Habibi-koolae(6) showed that male sex is more in each type of

stroke. This is supported because there is no vascular protection from endogenous estrogen in men so that it will increase the risk of stroke. In addition, lifestyle such as smoking, and drinking alcohol in men can increase the risk of hemorrhagic stroke ⁽⁷⁾.

B. Risk factor that can be change.

1.Smoking. In ischemic stroke patients (58.5%),it found that they were non-smokers. In patients with hemorrhagic strokes, 65% are non-smokers.Some study stated that smoking is a factor in determining stroke(5,8). This can happen because the majority of subjects are passive smokers. Passive smoker is a person who breathes smoke from the burning of cigarette tobacco and smoke exhaled by an active smoker ⁽⁴⁾.

2.History family of stroke. In ischemic stroke patients, only 20.8% have a history of stroke in their family members. In patients with hemorrhagic stroke, 30% of patients have a history of stroke in their family members. Some study found that there are positive associations between family history of stroke and functional status at discharge ⁽⁹⁾ lacunar stroke ^(10,11) atherothrombotic stroke ^(10,11) and the severity of early neurological deficit⁽¹²⁾. Family history of stroke is a complex profile that includes the types of affected relatives (ie, paternal, maternal, or sibling), the ages of relatives at stroke onset (early onset versus late onset), and other characteristics. In addition, a family history of stroke may have different effects on the risk of stroke recurrence, depending on the patient's age of stroke onset ^(13,14).

3.Hypertension. There are about 62.3% of patients with ischemic stroke have a history of hypertension. In patients with hemorrhagic stroke, it is only 20% who have a history of hypertension. Other study found that Blood Pressure in stroke patient are higher than in control patient without a diagnosis of stroke. Systolic Blood Pressure on arrival significantly are higher in ischemic stroke than in controls (15). Other studies conducted by Laily and Imanda et al (5,16) also stated that there is a relationship between hypertension and ischemic stroke.

4.Diabetes Mellitus. About 22.6% of ischemic stroke patients have a history of diabetes mellitus. In hemorrhagic stroke patients, as many as 25% of patients have a history of diabetes mellitus. The prevalence of stroke with diabetes for more than 20 years in DM Type 2 patients is 7.9%, while DM Type 1 is 2.7%

⁽¹⁷⁾. Stroke deaths in people with DM Type 2 (13.4%) were higher than those in DM Type 2 (12.2%) ⁽¹⁷⁾. Diabetes mellitus is a risk factor for stroke that can be modified. In someone with diabetes mellitus, the risk of stroke increases two-fold compared with people without diabetes ⁽¹⁸⁾. It happens because an increase in blood sugar can increase the risk of atherosclerosis as well as other stroke risks such as hypertension, obesity, and hyperlipidemia ⁽⁶⁾. Patient with diabetes have a higher proportion of ischaemic stroke compared to haemorrhagic stroke. Microvascular disease disease dan co existence of hypertension can caused it ⁽¹⁹⁻²²⁾.

C. The Rank of Risk factor

The most risk factors that are owned by ischemic stroke patients and hemorrhagic strokes are the same to those aged less than 65 years. However, second rank in ischemic strokes is a history of hypertension while ranking second in hemorrhagic stroke is male sex.

Conclusion

Based on this research, it concluded that: 1) Ischemic stroke had the highest prevalence among patients (72,6%), 2) Most of patient were 65 years old (56,2%), 3) Age of less 65 years old patient had the highest risk of any type of ischemic stroke. Moreover, the highest controlled factors among patients with ischemic stroke is hypertension history (62,3%), while among patients with hemorrhagic stroke is smoking (35%).

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request and restricted by the ethics of Local Government Hospital Dr. Soetomo in order to protect subject privacy.

Conflicts of Interest: The authors confirm that there are no conflicts of interest.

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