

# Pre Elementary Study: Factors Related To Stroke in Semarang With Cohort Retrospective Approach

1<sup>st</sup> Suyanto  
Faculty of Nursing  
Sultan Agung Islamic University  
suyanto@unissula.ac.id

2<sup>nd</sup> Moh. Arifin Noor  
Faculty of Nursing  
Sultan Agung Islamic University

3<sup>rd</sup> Ahmad Ikhlasul Amal  
Faculty of Nursing  
Sultan Agung Islamic University

**Abstract—**Stroke is a disease of vascular disorders. Many factors can contribute to stroke. These factors include gender, age, history of hypertension, and history of diabetes mellitus. This is a factor that influences the incidence of stroke. **Method:** Cohort retrospective method used of this study. The sample of all stroke patients who have been treated at RSISA in the last 6 months of 2017. There were 159 respondents involved using simple random sampling technique and the secondary data used in were medical records. Chi-square tests were used in this study. **Result:** Data analysis showed that 96 respondents (60.4%) were male, 89 respondents (56%) diabetes mellitus, 147 respondents (92.5%) hypertension, age mean 58.6 years ± (SD 10.8), and 118 respondents (74, 2%) non-hemorrhagic stroke. Chi-square results obtained p-value of sex > 0.05, hypertension > 0.05 and diabetes mellitus < 0.05. Only diabetes mellitus is a factor that influences the occurrence of stroke. **Discussion:** Diabetes mellitus can accelerate the occurrence of blood vessel disorders in the brain. This will increase the risk of having stroke. Therefore, routine monitoring of sugar, physical activity, diet regulation and consumption of antihyperglycemic drugs in preventing complications of diabetes mellitus are needed.

**Keyword:** Stroke, Vascular, Diabetes mellitus

## 1. INTRODUCTION

Stroke is a diseases that can be determined with vascular disorders. This is identified as a neurological impairment related to an acute injury in central nervous system. The vascular disorders that causing stroke including the *subarachnoid hemorrhage* (SAH), *cerebral infarction*, and *intracerebral hemorrhage* (ICH). Moreover, those condition is a dominant cause of death and disability in the world (Sacco et al., 2013).

The incidence of stroke increases as we get older, and there is higher possibility of stroke for tall person (Stroke Foundation Indonesia, 2012). Besides, the number of stroke sufferers stroke under 45 years old increase in advance. WHO predicts that deaths from stroke will increase along with death from disease heart and cancer approximately 6 million in 2010 to 8 million in 2030 (Sacco et al., 2013).

Stroke is caused by many factors. These factors includes risk factors that can be changed and cannot be changed. Factor risks that can be changed such as age, type sex, race, and genetics. On the other hand, hypertension, smoking, obesity, diabetes mellitus, bad lifestyle, do not do medical check-ups regularly, and consume food which contains a lot of salt are risks factors that can be changed (Boehme, Esenwa, & Elkind, 2017).

Hypertension is the modifiable risk factor for stroke with a strong, direct, linear, and continuous relationship between blood pressure and stroke risk. Hypertension was by far the most important stroke risk factor: using a definition of hypertension that included both

a history of hypertension and a blood pressure measurement of 160/90 mmHg, the population attributable risk, or proportion of strokes in the population attributable to hypertension, was 54%.<sup>24</sup> Even among those who are not defined as hypertensive, the higher the blood pressure, the higher the risk of stroke (Stansbury, Jia, Williams, Vogel, & Duncan, 2005).

Diabetes mellitus is an independent risk factor for stroke with a 2-fold increased risk in stroke for diabetic patients, and stroke accounts for 20% of deaths in diabetics. The duration of diabetes mellitus is also associated with increased stroke risk; in the Northern Manhattan Study, duration of diabetes mellitus was associated with ischemic stroke (Banerjee et al., 2012).

Factors that influence the occurrence strokes are well known. Besides, the factors risk of this type of stroke in patients who are being treated at Sultan Agung Islamic Hospital is unknown. Therefore, analysis further is needed to identify risk factors what contributes to stroke. The purpose of this analysis is to determine the dominant factors occurring stroke.

## 2. MATERIALS AND METHOD

The retrospective cohort was used in this study. A total of 450 stroke patients have been treated in the last 6 months in 2017. The study sample was 159 respondents with inclusion criteria in the form of patients who had a hemorrhagic stroke or non-hemorrhagic stroke. The sampling technique used was simple random sampling. This study used secondary data from medical records in term of gender, history of blood pressure, history of diabetes mellitus, and medical diagnosis of stroke. Data Analysis used was the chi-square test. This research has gone through the stages of ethical testing and has passed the ethics of the ethics committee of the college of nursing.

Variable	Frequency	Percentage
Sex		
Male	96	60,3
Female	63	39,7
Hypertension		
Yes	147	
No	12	
Diabetes mellitus		
Yes	89	
No	70	
Stroke		
Stroke hemorrhagie	41	
Stroke non hemorrhagie	118	

### 3. RESULTS AND DISCUSSION

Tabel 2. The result of chi-square among gender, hypertension, and diabetes mellitus with stroke

Variable	Variable		P-value	n
	Stroke hemoragic	Stroke non-hemoragic		
Gender				
Male	27	69	0,46	159
Female	14	49		
Hypertention				
Yes	40	107	0.18	159
No	1	11		
Diabetes mellitus				
Yes	16	73	0,01	159
No	25	45		

Tabel 2. The result of chi-square among gender, hypertension, and diabetes mellitus with stroke (n=159). Factors that can trigger to stroke such as hypertension, diabetes mellitus, cholesterol, heart rhythm disorders.

Diabetes is a disease condition in which the body is unable to produce the hormone insulin or the hormone insulin produced less according to the needs of the body. Diabetes will affect the vascular state or blood vessels, where a buildup of plaque occurs in which narrows to the blood flow. The results of related studies state that diabetes can cause a variety of serious complications if not treated appropriately. These include retinopathy, chronic kidney disease, limb amputation, heart disease, and stroke. Furthermore, diabetes has 2 forms—type I (ie, insulin dependent type) and type II (i.e., insulin-type insensitivity). In type II, diabetes is more common, accounting for the majority (around 90%) of cases. Both types of diabetes were associated with an increased risk of Cerebro Vascular Disease (CVD), but they showed a different pattern. For instance, individuals with typically type I diabetes are more likely to suffer from coronary heart disease and peripheral arterial disease. On the other hand, individuals with type II diabetes have characteristic such as obese, peripheral arterial disease, large arterial atherosclerosis, and stroke (Putala et al., 2011).

Hypertension also contributes to stroke. Through mechanisms can increased blood pressure parameters. Hypertension, the most common and modifiable risk factor for stroke, increases with age and has a lifetime probability of 90% in those who survive up to 80 years (Vasan et al., 2002). In addition, men who experience more strokes because of their lifestyles such as smoking behavior, which allows hypertension and this can cause vascular disorders in the brain.

In addition, there are other factors that cannot be modified, that is age. Related research results state that one of the risk factors that cannot be modified for stroke is age (Venkatasubramanian, Yoon, Pandian, & Navarro, 2017). As stated by Lloyd, that an individual's risk of stroke increases with age, in which the incidence multiples every decade after the age of 45 years and more than 70% of all strokes occur above the age of 65. The estimated 795,000 new or recurring strokes occur in the United States every year. In fact,

around 145,000 result in death (Lloyd-Jones et al., 2010). Moreover, another studies maintain that a treatment for any age is effective, even in those age 80 years and older, antihypertensive therapy in those with hypertension reduces the risk of stroke by 30% and mortality by 21% (Nikitin et al., 2008). Despite steps in the identification, treatment, and monitoring of hypertension, only 70% of Americans are aware that they have a condition and less than a third are controlled (Chobanian et al., 2003). For people who suffer hypertension, healthy lifestyle treatment are the best approaches to effective management to reduce the risk of stroke.

The results suggests that stroke risk is actually higher in the young population with diabetes. According to the Greater Cincinnati / Northern Kentucky Stroke Study, diabetes mellitus increases the incidence of ischemic stroke in any age, but this is most striking before the age of 55 in African America and before age 65 in white (Khoury et al., 2013). Other relevant research results suggest that people with diabetes are more likely to suffer from hypertension, myocardial infarction (MI) and high cholesterol than people without diabetes. Even prediabetes that can be defined as a disorder of glucose tolerance or a combination of disturbed fasting glucose plus impaired glucose tolerance associated with a greater risk of stroke (Lee et al., 2012).

Studies using longitudinal data have determined the effect of older age and sex on disability after stroke (Kelly-Hayes et al., 2003). Women were found to significantly experience early stroke at ages 75.1 and 71.1 years which experience depends on the daily activities and more than 4 times than men entering nursing homes after a stroke. Disability, as well as the presence of other chronic diseases along with stroke events, make strokes one of the most feared consequences of aging (Kapral et al., 2005).

The limitations that appear in this study are this study does not discuss other factors that influence the incidence of stroke. This study also does not deliberate the place of the research in one hospital and the retrospective research method. Therefore, the researcher expected that further research is needed to look at stroke risk factors related to stroke events.

## CONCLUSION

People who has a history of Diabetes Mellitus disease contributes to stroke. Thus, people who has a history of diabetes mellitus is required to control blood sugar regularly and take routine anti-hyperglycemic drugs every day, do activities and have diet arrangements.

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