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Incidence of Stroke Cases at Blambangan General Hospital of Banyuwangi in January-December 2022: A Descriptive Study

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ABSTRACT

Introduction: Stroke is a leading cause of morbidity in Indonesia. It significantly contributes to the overall burden of disease and places a substantial impact on the health of the population in Indonesia. **Objective:** The purpose of this study was to show the incidence of stroke cases in the Blambangan General Hospital in Banyuwangi. Understanding the prevalence of strokes at this particular hospital is critical for identifying patterns, improving patient care, and taking preventive actions to deal with this important health issue. **Methods:** This study used a retrospective cross-sectional sampling method to look at all 342 inpatient stroke cases that were treated in the neurology department of Blambangan General Hospital in Banyuwangi in 2022. All of their data was collected and analyzed. **Results:** Most cases of stroke in this study were ischemic strokes, with a total of 212 cases (62.0% of all cases). The age group that experienced the most strokes was over 40 years old (96.2%) and female (56.4%). More than half of stroke patients had hypertension, and 80.1% had diabetes mellitus. **Conclusion:** This study found that ischemic stroke survivors, mostly female and aged over 40, were frequently associated with diabetes mellitus and hypertension. These findings provide insights into the frequency of these stroke types within the examined population.

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INTRODUCTION

A stroke is a type of functional brain disorder. The disorder can be focal or global and occurs acutely, lasting more than 24 hours. It is caused by problems with cerebral blood flow disorders and is not caused by other disorders.[1] According to the World Health Organization's (WHO) MONICA study, the incidence of stroke varies between 48 and 240 per 100,000 per year in the population aged 45–54 years.[2,3,4]

According to research conducted in the United States, the incidence of stroke in people under the age of 55 is 113.8 per 100,000 people each year. Some previous research showed that approximately 10% occurred at the age of under 55 years.[5,6] Stroke affects 795,000 people in the United States each year, and the prevalence of stroke increases with age.[6,7] Strokes are classified as either ischemic or hemorrhagic. Ischemic stroke accounts for 85% of all strokes and consists of 80% atherothrombotic stroke and 20% cardioembolic stroke.[7,8]

The Indonesian Ministry of Health's 2018 Basic Health Research showed that the prevalence of stroke was 10.9%. A total of 713,783 people suffer from strokes each year. East Kalimantan is the province with the highest stroke incidence rate in Indonesia, which is 9,696 or 14.7% of the total population. In addition, patients are mostly in the age group above 75 years.[9]

Ischemic stroke is caused by the focal occlusion of cerebral blood vessels, leading to a decreased supply of oxygen and glucose to the occluded part of the brain.[10] The risk of death is 10–20% in the first 7 days or 30 days after the first acute phase stroke. The risk of death in the first year for patients who have had their first stroke is higher than that for those who have never had a stroke.[7]

The mortality rate for patients with hemorrhagic stroke is higher than that of those with ischemic stroke. Major ischemic stroke patients are more likely to die because the anterior cerebral artery is completely blocked.[4,7,11]

OBJECTIVE

This study aimed to show the incidence of stroke cases in the Blambangan General Hospital in Banyuwangi.

METHODS

This was an observational study that used a cross-sectional study design. Cross-sectional studies are used to assess an event at one time. The study was conducted in the Blambangan General Hospital of Banyuwangi, Banyuwangi, East Java, Indonesia. This research location was chosen because Blambangan General Hospital of Banyuwangi is a hospital that serves as a referral center for stroke patients in Banyuwangi. The study was carried out using medical record data from January to December 2022.

The collected data consist of information about inpatient stroke patients, including both ischemic and hemorrhagic strokes, who received treatment in the neurology department. Throughout the year 2022, these data were acquired from the medical records of Blambangan General Hospital in Banyuwangi. The population under consideration involves 342 stroke patients hospitalized in the neurology department of Blambangan General Hospital in Banyuwangi from January to December 2022. The data in the sample are specifically from stroke patients who met the inclusion criteria for hospitalization in the neurology department at Blambangan General Hospital in Banyuwangi.

RESULTS

The study sample included 212 ischemic stroke patients and 130 hemorrhagic stroke patients who met the sample inclusion criteria of experiencing stroke for the first time before the age of 60, being treated for a primary diagnosis of stroke, and having complete medical record data. This study only used univariate analysis, with researchers presenting frequency and percentage for categorical data as well as mean and standard deviation for numerical data in tables.

This study involved 342 medical record data, which represented the number of patients who participated in this study. The characteristics of the respondents in this study are shown in Table 1.

Table 1. Characteristics of respondents

Characteristics	n	%
Age		
- < 40 years	13	3.8
- > 40 years	329	96.2
Gender		
- Male	149	43.6
- Female	193	56.4
Type of stroke		
- Ischemic	212	62.0
- Hemorrhagic	130	38.0
Diabetes		
- Yes	274	80.1
- No	68	19.9
Hypertension		
- Yes	203	59.4
- No	139	40.6

The table above revealed that most stroke cases in this study were ischemic stroke, with 212 cases, or

62.0% of the total cases. The age group that experienced the most strokes was more than 40 years old, with a total of 329 people (96.2%). The majority of stroke patients were female (56.4%). More than half of stroke patients had hypertension (59.4%), while 80.1% had diabetes.

The incidence rate (IR) is the frequency of new diseases or cases that occur in the community at a specific time (generally one year) in a location, region, or country in comparison to the potential number of people affected by the new disease. In this study, the IR for ischemic stroke cases was 2.12 per 100,000 population, while the IR for hemorrhagic stroke was 1.3 per 100,000 population.

The table above shows that, for patients under 40 years old, there are more cases of ischemic stroke compared to hemorrhagic stroke, and the difference is significant (p = 0.001). Ischemic stroke cases were also more dominant and significant (p = 0.001) in patients above the age of 40. Patients with ischemic stroke were more likely to be female, whereas those with hemorrhagic stroke were more likely to be male. Based on statistical tests, this difference was highly significant (p < 0.001). Diabetes cases were more common in ischemic strokes than in hemorrhagic strokes, and the difference was statistically significant (p = 0.002). Hypertension was more common in ischemic stroke patients than in hemorrhagic stroke patients; however, the difference was not statistically significant (p = 0.076).

The comparison of characteristics of patients with ischemic and hemorrhagic stroke are shown in Table 2.

Table 2. Comparison of characteristics of patients with ischemic and hemorrhagic strokes

	Ischemic stroke		Hemorrhagic stroke		P value
	n	%	n	%	
Age (years)					
- < 40	8	2.3	5	1.5	0.001
- > 40	204	59.6	125	36.5	
Gender					
- Mal	62	18.1	87	25.4	< 0.001
- Female	150	43.9	43	12.6	
Type of stroke	181	52.9	93	27.2	
- Ischemic	31	9.1	37	10.8	0.002
- Hemorrhagic					
Diabetes					
- Yes	118	34.5	85	24.9	0.076
- No	94	27.5	45	13.2	

DISCUSSION

Stroke is a leading cause of disability and death worldwide and is classically defined as a condition in which a person experiences a neurological deficit associated with acute focal injury of the central nervous system (CNS) by vascular causes such as cerebral infarction, intracerebral hemorrhage (IHD), and subarachnoid hemorrhage (SAH). A neurological deficit known as ischemic stroke is the result of arterial occlusion. The majority of stroke cases are caused by ischemic strokes.[7,11]

According to this study, the strokes that occurred in patients at the Blambangan General Hospital in Banyuwangi were ischemic strokes. In theory, ischemic strokes account for 85% of all strokes.[7,8] Ischemic stroke happens as a result of thrombotic or embolic events that reduce blood flow to the brain. Due to vessel dysfunction, thrombotic events in the blood vessels obstruct blood flow to the brain. Atherosclerotic disease, arterial dissection, fibromuscular dysplasia, or inflammatory conditions are the usual causes of this condition. An embolic event occurs when debris from elsewhere in the body impedes blood flow through the affected vessel.[12]

This study showed that the majority of stroke patients are female. The lifetime risk of stroke (from the age of 25 years) was 25.1% in women and 24.7% in men, but there was significant regional heterogeneity. There are regional variances, with Eastern Europe and Eastern Asia having the highest lifetime risk for women (36.5% and 36.3%, respectively). In the United States, women had a higher lifetime risk of stroke (20%–21%) than men (14%–17%) for age 55 years.[13–16]

In women, stroke is more likely to be the initial manifestation of cardiovascular disease, whereas men often develop coronary heart disease.[16] Women are 4 to 6 years older than men at the time of stroke onset. Women are more likely than men to be widowed, unmarried, or living alone at the time of their stroke, and they have higher levels of disability in activities of daily.[17] More than half of the patients in this study had hypertension, while diabetes alone accounted for 80.1%. Stroke has several risk factors, consisting of modifiable risk factors that can be prevented by providing interventions. Many factors, especially behavior, have an impact on these risk factors.[18]

Modifiable risk factors refer to aspects of a person's lifestyle, behavior, or environment that can be altered or modified to reduce the likelihood of developing a particular health condition or disease. Modifiable risk factors in stroke include hypertension, stress, diabetes mellitus, heart disease, smoking, and alcohol consumption. Non-modifiable factors are risk factors that cannot be changed despite interventions because they include characteristics of a person from

the beginning of their life. Non-modifiable factors include age and gender.[18–21]

In this study, the IR of ischemic stroke was 2.12, and the IR of hemorrhagic stroke was 1.3 cases per 100,000 population. Stroke (both ischemic and hemorrhagic) affects around 13.7 million people worldwide each year and is the second leading cause of death, accounting for 5.5 million deaths. One in four adults will have a stroke in their lifetime, and there are more than 80 million stroke survivors worldwide. Stroke patients are a high-risk population and the focus of secondary prevention strategies. The incidence and prevalence of ischemic stroke have grown over time.[7,22]

The global incidence of ischemic stroke was 9.5 million cases in 2016, with 2.7 million deaths from ischemic stroke in 2017. The global incidence, mortality, and disability-adjusted life years for ischemic stroke decreased between 1990 and 2013.[22] In contrast, the prevalence of ischemic stroke increased between 1990 and 2005, then decreased between 2005 and 2013. From 1990 to 2010, the epidemiologic trends of ischemic stroke varied according to a country's income level.[23] In high-income countries, incidence, mortality, disability-adjusted life years, and mortality-to-incidence ratios all decreased. During this time, however, no significant differences were observed in low- and middle-income countries. These variations may be attributed to differences in population age demographics, life expectancy, health status, and healthcare standards.[7,24]

The Indonesian Ministry of Health (MOH)'s 2018 Basic Health Research revealed that the prevalence of stroke is 10.9%. A total of 713,783 people suffer from strokes each year. East Kalimantan has the highest stroke incidence rate in Indonesia, accounting for 9,696 people or 14.7% of the total population. In addition, the majority of patients are over the age of 75.[9]

Another study conducted at Undata Hospital in Palu, Central Sulawesi, revealed that the prevalence and risk factors for stroke at Undata Hospital in Palu include: men are more susceptible to stroke than women; the elderly (46–55 years) are the age most commonly affected by stroke.[25] This shows the same trend as the research we conducted at Blambangan General Hospital of Banyuwangi.

Stroke is the second-leading cause of death in the world. The annual mortality rate reaches 5.5 million. Stroke also has high morbidity, as it can lead to chronic disability in up to 50% of patients. Stroke patients can experience a significant decrease in independence, such as difficulty performing daily activities, cognitive disabilities, and even mental disorders.[23,24]

CONCLUSION

The majority of stroke patients in this study were female and over 40 years of age. Additionally, patients with diabetes mellitus (DM) and hypertension were more likely to have an ischemic stroke. These findings suggest a higher prevalence of ischemic strokes compared to hemorrhagic strokes in the examined community. These insights into the occurrence of different stroke types contribute valuable information for healthcare planning and intervention strategies.

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Conflict of Interest
None

Ethic Consideration
This research has passed the ethical test and received a certificate from Institute of Health Science Banyuwangi with an ethic number 052/04/KEPK-STIKESBWI/XI/2023. Researchers protected the privacy of participants by ensuring that data is anonymized and confidential.

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Author Contribution
RDH and AS provided the primary writings for the manuscript. IAH helped gather crude information and reiterate it. PNK was in charge of coordinating the data collection process. AS and IAH provided independent consultation for the review and revision of the manuscript.

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