Review Article

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Risk Factors and Stroke Symptoms Knowledge among Diabetes Mellitus, Hypertension and Heart Disease Patients: Literature Review

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ABSTRACT

Stroke is the leading cause of disability and the second leading cause of death in the world and the biggest cause of death in Indonesia. Knowledge of stroke risk factors and symptoms can improve stroke prevention measures so as to reduce the risk of disability and death. This study aims to analyze the description of knowledge about risk factors and symptoms of stroke in patients with diabetes mellitus, hypertension, and heart disease. The research was carried out using google scholar search engine and electronic databases, such as Pubmed and Science Direct. The English keywords used are knowledge AND "risk factors" AND "stroke symptoms". Meanwhile, the Indonesian keywords are: pengetahuan DAN "faktor risiko" DAN "gejala stroke". The inclusion criteria of the articles collected were articles in English and Indonesian, full text, the Cross-Sectional Study method or descriptive, and publication year between 2012-2022. This research obtained 8 articles which would then be analyzed. All articles analyzed were overseas research reports (two african continent countries and three asia continent countries) and in English. It is shown that knowledge about the risk factors and symptoms of stroke in patients with diabetes mellitus, hypertension, and heart disease is still lacking. There are 2 studies that report 56 and 77% of respondents do not know the risk factors for stroke. Knowledge of stroke symptoms in the form of decreased consciousness was found to be very poor (7.6% of respondents).

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Introduction

Stroke is an emergency condition that requires immediate help. World Health Organization mentions that stroke is one of the non-communicable diseases (PTM) which causes 71% of deaths in the world [1]. Stroke is the second leading cause of death in the world after ischemic heart disease. Data obtained from the WHO in 2016, there are as many as 15.2 million people in the world who die each year due to stroke. In addition to causing death, stroke is also a major cause of disability in the world [2].

In 2013, the prevalence of stroke in Indonesia was 12.1% and in 2018 it was 10.9% [3, 4]. The number of stroke patients has increased every year so that the cost of health services is also increasing. According to the Health Social Security Administration Agency (BPJS), the increase in the cost of stroke services in a row from 2013 to 2018 was 0.74 trillion, 1.15 trillion, 1.27 trillion, 1.43 trillion, 2.18 trillion, and 2.56 trillion [3,5]. In addition, the number of deaths in Indonesia caused by stroke continues to increase every year. In 2015 there were 332.6 thousand deaths due to stroke. This figure increased compared to 2010 which was as much as 282.8 thousand. Stroke became the highest cause of death in Indonesia in 2014 which amounted to 21.1% [3].

Stroke occurs by many risk factors. Stroke risk factors are things that can increase an individual's tendency to have a stroke. Risk factors for stroke are divided into two, namely controllable risk factors and uncontrollable risk factors. Controllable risk factors include having a stroke, hypertension, heart disease, diabetes mellitus, smoking, cholesterol, obesity, clotting problems, and an unhealthy lifestyle. While the risk factors that cannot be controlled are age, gender, race, and genetics. Stroke risk factors are important to know and understand because by knowing and understanding stroke risk factors, controllable risk factors can be sought to be controlled or even avoided [6, 7].

There are controllable risk factors that can cause stroke such as hypertension (four times more likely to have a stroke), diabetes mellitus (almost three times more likely to have a stroke), and heart disease (twice as likely to have a stroke) [8]. Hypertension is the main cause of stroke. During hypertension, the blood vessels experience considerable pressure and if the pressure lasts for a long time it can cause weakness in the blood vessel walls so that the blood vessels become fragile and break easily. In addition, hypertension can also cause narrowing of the diameter of blood vessels so that blood flow to the brain becomes disturbed [9].

In addition to hypertension, diabetes mellitus is also a risk factor for stroke. Diabetes mellitus occurs because the body cannot produce enough insulin or cannot use insulin properly or both. Diabetes mellitus causes sugar to accumulate in the blood and prevents

nutrients from entering the body, including the brain. Diabetes mellitus also causes microangiopathy and macroangiopathy which can then increase the risk of stroke [9].

In addition to diabetes mellitus, heart disease is also a risk factor for stroke, including coronary artery disease, heart valve defects, irregular heartbeat (atrial fibrillation), and enlarged heart chambers. Coronary artery disease is a risk factor for stroke because plaque builds up in the arteries and blocks the flow of oxygen-rich blood to the brain. While heart valve defects, atrial fibrillation, and enlarged heart chambers are risk factors for stroke because they can cause blood clots that can then rupture [9].

In addition to risk factors, stroke symptoms are important for patients to know in preventing complications due to stroke. Symptoms of a stroke are signs of a stroke. In general, the symptoms of a stroke are severe headache, dizziness, confusion, blurred or decreased vision, difficulty speaking, characterized by the mouth being pulled to one side, loss of balance, numbness, and weakness of the muscles on one side of the body [6]. Individuals often come to the hospital more than three hours after a stroke with an average delay of 23 hours 12 minutes due to lack of knowledge about stroke symptoms so they cannot recognize the existing symptoms and do not immediately go to the hospital which results in slow stroke treatment [10].

It is important for individuals to know and understand the symptoms of a stroke because by knowing and understanding the symptoms of a stroke, when an individual experiences symptoms of a stroke, they can make a decision to immediately go to the hospital to get help. The sooner the individual is diagnosed and treated, the better the results because the success of the action is related to efforts to minimize delays when stroke symptoms occur. Therefore, stroke prevention can be done if individuals know the risk factors and symptoms of stroke so that the risk factors and symptoms of stroke are important to know and understand. If individuals know and understand the risk factors and symptoms of stroke, disability and death from stroke can be reduced [8, 10].

There are previous studies that examine the effect of knowledge about risk factors and warning signs of stroke on delays in patient arrival at the emergency department. The study was conducted on 58 family members of stroke patients who were treated in the Emergency Room (IGD) RSUD Ngudi Waluyo Wlingi, East Java. The study reported that the most and the least known knowledge about stroke risk factors were hypertension (74.1%) and alcohol consumption (24.1%). While the most and the least known knowledge about stroke symptoms are weakness on one side of the body (63.8%) and visual disturbances (20%) [10]. The stroke

rate should be suppressed. Therefore, it is necessary to conduct a literature review on knowledge of risk factors and symptoms of stroke in patients with diabetes mellitus, hypertension, and heart disease as an effort to prevent stroke in order to reduce disability and death from stroke.

Research Methodology
The literature review was compiled by searching for articles using search engines, namely Google Scholar and electronic databases, namely PubMed and Science Direct. The English keywords used are knowledge AND "risk factors" AND "stroke symptoms". While the Indonesian keywords are pengetahuan DAN "faktor risiko" DAN "gejala stroke". The inclusion criteria of the articles collected were articles in English and Indonesian, full text, Cross-Sectional Study or descriptive methods, and publications in 2012-2022. A total of 944,615 articles were found based on keywords. Next, the articles were sorted based on the inclusion criteria and 15 articles were obtained. The last step is to analyze the components of the objectives, methods, samples, criteria, and results. So as to produce 8 articles which will then be analyzed (Diagram 1).
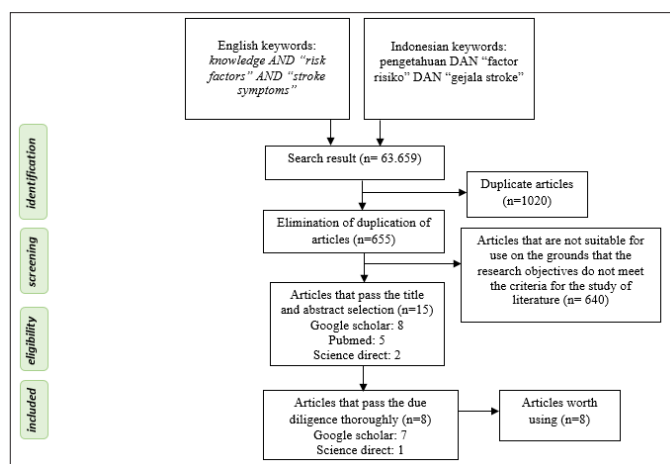

Diagram 1: Article Search Process Using PRISMA Reporting Guidelines

Results
Search results found 944,615 articles. Then 15 articles were selected based on titles that matched the literature review and based on inclusion criteria. Furthermore, an analysis is carried out to see the objectives, methods, samples, criteria, and results. This resulted in 8 articles being analyzed. All articles analyzed are research reports abroad (two African countries and three Asian countries) and in English (Table 1).

Table 1: Research Results

No.	Title and Year	Writer	Country	Destination	Design	Sample	Instrument	Results
1	Hypertensive Patient's Knowledge of Risk Factors and Warning Signs of Stroke at Felege Hiwot Referral Hospital Northwest Ethiopia: A Cross-Sectional Study [11]	Addisu Taye Abate, Netsanet Bayu, Tesmichael G. Mariam	Ethiopia	Assessing knowledge of hypertensive patients about risk factors and warning signs of stroke	Cross-sectional study	278 hypertensive patients at Felege Hiwot Referral Hospital	Stroke Recognition Questionnaire (SRQ)	A total of 214 (77%) did not know the risk factors for stroke, 39 (14%) knew 5 risk factors, 10 (3.6%) knew 4 risk factors, 5 (1.8%) knew 3 risk factors. The most widely known risk factor is lack of physical activity (21.6%). While the least known is hypertension (3.6%). A total of 217 (77.3%) did not know the warning signs of stroke, 40 (14.4%) knew 5 warning signs, 15 (5.4%) knew 4 warning signs, 2 (0.7%) knew 3 warning signs. The most widely known warning sign was paralysis on one side of the body (35.9%). In general, only 18.3% have good knowledge about stroke.
2	Determination of Nursing Activities For Prevention of Heart Attack and Stroke in Hypertension Patients [12]	Damla Bayrak, Nuran Tosun	Turkey	Determine appropriate treatment activities by identifying the level of knowledge related to heart attack and stroke prevention	Descriptive	234 hypertensive patients in the inpatient and outpatient clinics of the medical training hospital	Questionnaire developed by the author through literature study	The most widely known risk factors are stress and a depressed life (97.9%). While the least known is high blood sugar (57.7%). The most common symptom of stroke is numbness on one side of the face (94%) and the least is the individual feels that he has had a stroke (65.8%).
3	Stroke Awareness among Elderly Hypertensives in a Rural Area of Bangalore District, India[13]	Vivek Bhat, Thanmayi GS, Kasthuri	India	Assessing awareness about cerebrovascular disease in the elderly with hypertension in rural areas	Cross-sectional study	144 elderly people with hypertension	Questionnaire developed by the author	As many as 56% could not mention a single stroke risk factor. The most mentioned risk factor was hypertension (31%) As many as 49% could not mention a single stroke symptom. The most mentioned symptom was paralysis on one side of the body (36%). Overall, 35 (24.3%) had good stroke awareness and 109 (75.7%) had poor stroke awareness.
4	Assess the Prevalence of Hypertension and Knowledge Regarding the Prevention of Stroke [14]	Sahbanathul Missriya, Johnce John	India	Identify the prevalence of hypertension and knowledge of stroke prevention	Cross-sectional study	60 people with hypertension	Spigmomano-meter and stroke prevention questionnaire	A total of 42 (70%) had inadequate knowledge about stroke prevention, 18 (30% had moderate knowledge, and none had adequate knowledge

5	Assessment of Hypertensive Patients' Knowledge about Lifestyle Risk Factors and Warning Signs of Stroke [15]	Muhammad Rashid Amen	Iraq	Assessing knowledge of hypertensive patients about lifestyle risk factors and stroke warning signs	Descriptive	114 hypertensive patients attending the chronic disease center in the city of Solomon	Questionnaire according to the relevant literature and references	Patients' knowledge of lifestyle risk factors for stroke is 53.5% with low knowledge, 36% with moderate knowledge, and 10.5% with high knowledge. The most mentioned risk factor was unhealthy diet (43%) and the least mentioned was lack of physical activity (17.5%). Patients' knowledge of stroke warning signs was 75.4% with low knowledge, 20.2% with moderate knowledge, and 4.4% with high knowledge. The most mentioned warning signs were sudden weakness or numbness of the face, arms, or legs (29.8%) and the least mentioned were sudden dizziness, difficulty walking, loss of balance or coordination (20.2%).
6	Awareness of Stroke Risk Factors and Warning Symptoms amongst Htpertensive Patients in Benin City [16]	Odiage Francis Ehidiamen	Nigeria	Knowing the level of awareness of stroke in hypertensive patients	Cross-sectional study	144 outpatient hypertension patients at the hospital	Questionnaire based on literature	The most mentioned risk factor is stress (41%) and the least is hypertension (35.4%) The most mentioned stroke symptoms were weakness on one side of the body (36.1%) and the least was a decrease in consciousness (7.6%)
7	Knowledge and Practices Related to Stroke Prevention among Hypertensive and Diabetic Patients Attending Specialist Hospital, Sokoto, Nigeria[17]	Sarafadeen Adeniyi Arisigi, Kehinde Joseph Awosan, Mansur Oche Oche, Anas Ahmad Sabir, Mohammed Taofek Ibrahim	Nigeria	Knowledge and practice related to stroke prevention in hypertensive and diabetic patients	Cross-sectional study	248 hypertension and diabetes patients who visited the hypertension and diabetes clinic at a specialist hospital	Questionnaire adapted from the instrument used in previous research	The majority, as many as 208 (87%) had good knowledge about stroke symptoms. The most well-known symptoms of stroke were sudden and severe headache (86.2%) and the least known was reduced sensation throughout the body (30.5%). A total of 207 (86.6%) had good knowledge about stroke risk factors. The most widely known risk factor is hypertension (92%) and the least known is aging (42.3%)

| 8 | Knowledge of Risk Factors and Warning Signs of Stroke Among Patients with Heart Disease at Tikur Anbessa Specialized Hospital[18] | Abdata Workina, Sofia Kebede, Chala Fekadu, Andualem Wubetie Snr | Ethiopia | Identify knowledge of heart patients about risk factors and warning signs of stroke | Cross-sectional study | 227 patients with heart disease who visited the heart clinic at Tikur Anbessa Special Hospital | Questionnaire based on literature | A total of 15.4% did not know any risk factors for stroke, 11% knew 1 risk factor, 11.5% knew 2 risk factors, 15.9% knew 3 risk factors, 14.1% knew 4 risk factors, 16.3% know 5 risk factors, 16.9% know 6 risk factors. The most widely known risk factor was lack of physical activity (61.7%) and the least known was diabetes mellitus (42.7%). 45.8% have good knowledge about risk factors. A total of 20.3% did not know any stroke symptoms, 7.5% knew 1 symptom, 18.1% knew 2 symptoms, 11.5% knew 3 symptoms, 21.6% knew 4 symptoms, 21.1% knew 5 symptoms . The most well known stroke symptom was weakness on one side of the body (62.6%) and the least known was vision problems in one or both eyes (41%). 42.7% have good knowledge about stroke symptoms. |

Discussion

Knowledge is all information stored in memory as a person's mental wealth regarding certain objects including science, art, and religion [19]. Individuals who have good knowledge about risk factors and symptoms of stroke will make efforts to prevent stroke [20]. Increased knowledge about stroke risk factors in individuals can improve prevention efforts by controlling stroke risk factors. In addition, increasing knowledge about stroke symptoms in individuals makes individuals able to recognize stroke symptoms quickly and immediately to the hospital so that they can produce better care [21]. Stroke prevention efforts will depend on knowledge and awareness of risk factors and stroke symptoms in individuals who are prone to stroke [22]. Research conducted by, said that none of them had good knowledge about stroke prevention [14].

Knowledge of Stroke Risk Factors

Patients who are at risk of stroke still have less knowledge about stroke risk factors. This is evidenced by as many as 77% of patients do not know any risk factors for stroke and only 14% have good knowledge about stroke risk factors [11, 13]. In addition, according to research as many as 56% of patients could not mention any risk factors and only 44% had good knowledge. Only 10.5%and 45.8% of patients who have good knowledge [15, 18]. In contrast to the research conducted by Arisigi et al which said that as many as 86.6% had good knowledge about stroke risk factors [17].

Research conducted by Arisigi et aland Bhat et al, said that the most widely known risk factor for stroke is hypertension [13, 17]. This is in contrast to research conducted by Abate et al and Ehidiamen and Ehinwenma where hypertension is the least known risk factor [11, 16]. While the research conducted by Abate et al, the most widely known risk factor was lack of physical activity [11, 18]. In contrast to research conducted by where lack of physical activity is the least known risk factor [15].

According to research Bayrak and Tosun and Ehidiamen and Ehinwenma, the most widely known risk factor is stress and according to research namely an unhealthy diet [12,15]. The least known risk factor is diabetes mellitus [12, 17, 18].

Knowledge of Stroke Symptoms

Patients who are at risk of stroke still have less knowledge about stroke symptoms. This is evidenced by as many as 77.3% of patients do not know the symptoms of stroke and only 14.4% have good knowledge about the symptoms of stroke [11]. In addition, according to research by Bhat et al, 49% of patients could not mention any symptoms and only 24.3% had good knowledge [13]. Only 4.4%and 42.7% who have good knowledge [15, 18]. In contrast to research conducted by Arisigi et al which said that as many as 87% had good knowledge about stroke symptoms [17]. The large percentage of those who have good knowledge can be caused by more respondents with formal education (71.5%) than respondents without formal education (28.5%). The study said that there is a relationship between education and knowledge where respondents with formal education have good knowledge compared to respondents without formal education.

The most common symptom of stroke is weakness on one side of the body [11, 13, 16]. numbness on one side of the face and sudden severe headache[12, 17]. While the least known symptoms of stroke are decreased consciousness and vision problems in one or both eyes [16, 18].

Factors Affecting Knowledge

There are factors that can affect individual knowledge. These factors include age and education level. Individuals with a younger age and higher education level tend to have better knowledge about risk factors and symptoms of stroke [11]. This is in line with research by Arisigi et al which says that individuals with age

under 50 years and formal education more than four times tend to have good knowledge [17]. In addition to age and education level, duration of illness also affects individual knowledge. Individuals with longer duration of hypertension will tend to have good knowledge about hypertension [15].

Research Instruments

The instrument used to determine knowledge about risk factors and symptoms of stroke is incorporated in one instrument which is divided into two separate parts between risk factors and stroke symptoms. Some use open instruments and some use closed instruments. One of the instruments used is the Stroke Recognition Questionnaire (SRQ).

Conclusion

Knowledge about risk factors and symptoms of stroke in patients with hypertension, diabetes mellitus, and heart disease is still lacking. In fact, it is very important to know the risk factors and symptoms of stroke so that individuals with these three diseases can make efforts to prevent stroke. There are several factors that can affect individual knowledge, including age, education, and the duration or duration of the illness suffered by the individual. To find out knowledge about risk factors and symptoms of stroke, you can use the Stroke Recognition Questionnaire (SRQ) instrument [23].

Recommendations for further researchers, it is hoped that the knowledge literature about risk factors and symptoms of stroke in patients with diabetes mellitus, hypertension, and heart disease patients based on Indonesian data can be improved in order to provide an overview of the problem of stroke prevention in Indonesia.

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