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Page 61-72

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RESPONSE TIME OF CODE STROKE OFFICERS IN THE MANAGEMENT OF ISCHEMIC STROKE PATIENTS: SYSTEMATIC REVIEW

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ABSTRACT
Stroke causes disability according to the American Heart Association (AHA) 87% of stroke patients experience disability and 77% experience complications. The highest prevalence of stroke is ischemic stroke where the standard therapy is to provide intravenous thrombolysis to patients with onset ≤ 4.5 hours. Response time of code stroke officers in the emergency area and fast activation will reduce disability and death rates. Researchers conducted a literature study and passive observation. This research design uses a cross study. In this systematic review, the research article uses the RCT research method and studies method with data analysis using meta-analysis. From a journal literature search using two databases, namely Science direct as many as N = 4 journal articles and Google Scholar as many as N = 3 articles, so that a total of N = 7 journal articles of literature by conducting an advanced search with keywords: response time, code stroke, with the addition of And, OR, published journals 5 years (2019 - 2024), in the form of complete journal articles, scholarly journals and journal articles in Indonesian and English. The findings of the article show that the response time of stroke code officers in the management of stroke patients in the emergency unit greatly affects the quality of life and risk of disability / disability of patients.

Keywords: Ischemic Stroke, Response Time, Code Stroke, Emergency Department.

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INTRODUCTION

Stroke is a major cause of death and disability in Indonesia and the world. The Global Burden of Disease, Injuries and Risk Factor Study 2017 reported that stroke is the second leading cause of death and the third leading cause of disability in the world (Kang et al., 2024). In Indonesia, based on a report from the Ministry of Health of the Republic of Indonesia, stroke is the leading cause of death with 15.4% of total deaths. Basic Health Research (Riskesdas) data in 2018, the prevalence of stroke was 10.9 per 1000 population (Utama & Nainggolan, 2022).Stroke causes disability according to the American Heart Association (AHA) reporting that stroke is the leading cause of long-term disability in the United States. 87% of stroke sufferers experience disability and 77% experience complications. Research in China shows that 46.7 - 63.8% of sufferers experience disability where 30.1% experience mild disability, 18% moderate disability and 15.7% severe disability. Post-stroke disability results in disruption of daily activities, thus reducing the quality of life of sufferers (Le et al., 2020).The death rate due to stroke in Indonesia is quite high, mainly due to delays in treatment. According to the

Indonesian Ministry of Health, stroke causes more than 100,000 deaths every year. Ischemic stroke has the risk of causing death if blood flow to the brain is disrupted for a long time without adequate treatment, such as administering tPA (tissue plasminogen activator) or a mechanical thrombectomy procedure. Delays in administering this therapy, often caused by low public awareness of stroke symptoms, also worsen the prognosis (Luviano & Pandya, 2023).

The highest prevalence of stroke is ischemic stroke where the standard therapy is to provide intravenous thrombolysis to patients with onset ≤ 4.5 hours. In addition, mechanical thrombectomy is a reperfusion therapy that has an effectiveness of up to 70% so that patients experience significant improvement. Data in the United States shows that thrombolysis therapy in ischemic stroke patients is only around 14-15.5%. The low rate of alteplase administration is due to the time the patient arrives at the hospital exceeding the golden time for alteplase administration (Grøan et al., 2021) .The code stroke team's response time in ischemic stroke patients is very important in improving treatment outcomes and reducing permanent brain damage. Time is a critical factor in treating ischemic stroke, because the sooner treatment is started, the greater the chances of recovery and the lower the risk of long-term complications. According to guidelines from the American Stroke Association (ASA), the ideal response time for the code stroke team is within 60 minutes after the patient arrives at the Emergency Room (ER) (Rouhani et al., 2020).

The first step is a rapid assessment of stroke symptoms using the NIHSS scale to determine severity. After that, the team must immediately perform a CT scan or MRI imaging to differentiate between ischemic and hemorrhagic strokes. If ischemic stroke is confirmed and the patient is eligible, tPA should be administered within 4.5 hours of the first symptoms appearing (Kang et al., 2024).

The condition of patients who enter the hospital's emergency room with an emergency category really needs fast first aid, one of which is ischemic stroke cases, almost 75% will have a good impact on patients, so a standard or reference is needed in providing emergency measures according to their competence and abilities, so that it can guarantee the success of emergency handling with a fast response time of ≥ 5 minutes and proper handling (Lia Basuni, 2022).The importance of response time is very much needed, especially for patients with emergency conditions or true emergencies. In addition to being able to increase the patient's life expectancy, quality and risk of disability, the ability of officers greatly influences the success of ischemic stroke management (Dobrocky et al., 2021).

In addition to the response time, comprehensive stroke services require a complex team involving various disciplines. Good communication and cooperation in the stroke team are needed from the moment the patient enters the emergency room. Emergency room staff must be able to triage patients properly, radiology staff must quickly determine the presence of acute stroke, and the stroke team must be able to conduct interviews appropriately to determine whether the patient meets the criteria for thrombolysis to mechanical thrombectomy (Lia Basuni, 2022). With the concept and complexity of acute stroke management, socialization, education, and training are needed for the team to be able to provide acute care according to established protocols, especially by administering thrombolysis in the Emergency Unit which is delegated to professional nurses through Code Stroke activation at the hospital. With competent facilities and nurses, it is hoped that they can provide good code stroke services and in accordance with stroke management principles (Hunaifi et al., 2023). Apart from that, controlling risk factors such as high blood pressure and blood sugar needs to be done immediately. Close monitoring of the patient's vital signs and neurological status is also essential to detect further changes or complications. Stable patients can then be referred to a stroke unit or intensive care for further management (Puri et al., 2019).

METHODS

Study Design

The compilation of the writing method in this case is a systematic review. With research questions in accordance with the PICO rules. The research question is: "Is there an influence of the response time of code officers in the management of ischemic stroke on the quality of life of patients?" The literature search was through electronic databases.

Process

In this article, the search for things related to the research question uses two electronic databases, namely Science Direct and Google Scholar. With publication results starting from 2019 to 2024 or published journal articles for five years. The search strategy uses the keywords "Ischemic Stroke", "Response Time", "Code stroke", "Emergency Department". The search uses an advanced search with a combination of OR and AND keywords, with the language of the article used being English and Indonesian, the year of publication is the last five years, full text, scholarly journal, in the form of journal articles, Journal nursing. Example Journal Neurona Vol. 37 No. 3 Juni 2020 Development Of Code Stroke System In Two Educational Hospital In Indonesia. Use the Right Keywords: For efficient searching, use a combination of keywords like: "Response time", "Stroke code team", "ischemic stroke", "Time for treatment", "Stroke Management".

To search for journals with clear inclusion and exclusion criteria in systematic review papers about *"Response Time for Stroke Code Officers in Ischemic Stroke Patients"*, here are the steps:

1. Define Inclusion Criteria :
    a. Study Type : Only includes studies with relevant randomized controlled trials (RCT), observational studies, and systematic reviews designs.
    b. Population: Patients with ischemic stroke who receive treatment through the code stroke system.
    c. Publication Time: Focus on publications within the last 5-10 years to ensure the relevance of current data.
    d. Language : Articles published in Indonesian or English.
2. Define Exclusion Criteria:
    a. Studies with Non-Stroke Populations: Removed studies that did not include ischemic stroke patients.
    b. Studies Without Response Time Data: Discard studies that do not report stroke code officer response time data.
    c. Review or Editorial Articles: Filters articles that do not present original data or are just a general overview.
3. Use Database with Filters: Use filters in databases such as PubMed, Scopus, or Google Scholar with predetermined inclusion and exclusion criteria.
    In this way, you can ensure that the journals included in the systematic review are highly relevant and match the research objectives.

RESULTS

The search results from 2 databases obtained results for Science Direct as many as 50 articles and Google Scholar as many as 33. Then screening or selection was carried out based on the title and abstract found for Science Direct as many as 25 articles and 32 articles for EBSCO. Of the 57 articles in Science Direct and Google Scholar, 5 articles were found to be exactly the same (duplicates). At the eligibility stage, 5 studies did not meet the inclusion requirements set by this review study, including not targeting stroke patients, the interventions given did not focus on stroke management, the response time of the stroke code officer so that the remaining 52 articles were manually screened on the title and abstract which had information related to the problem being discussed. Then the remaining articles (55 articles) were identified based on the inclusion and exclusion criteria. The inclusion criteria were patients who entered through

the ER, the response time was given to the stroke code officer, not a case of disaster or extraordinary event, not a crime case, ischemic stroke / Non-bleeding. Exclusion criteria were patients who did not enter through the ER, non-stroke patients, crime and disaster cases or Extraordinary Events.

After going through the final selection process, there were only 5 journal articles that met the inclusion and exclusion criteria. All stages or flows were carried out using a modified PRISMA diagram. The flow can be seen in Figure 1.

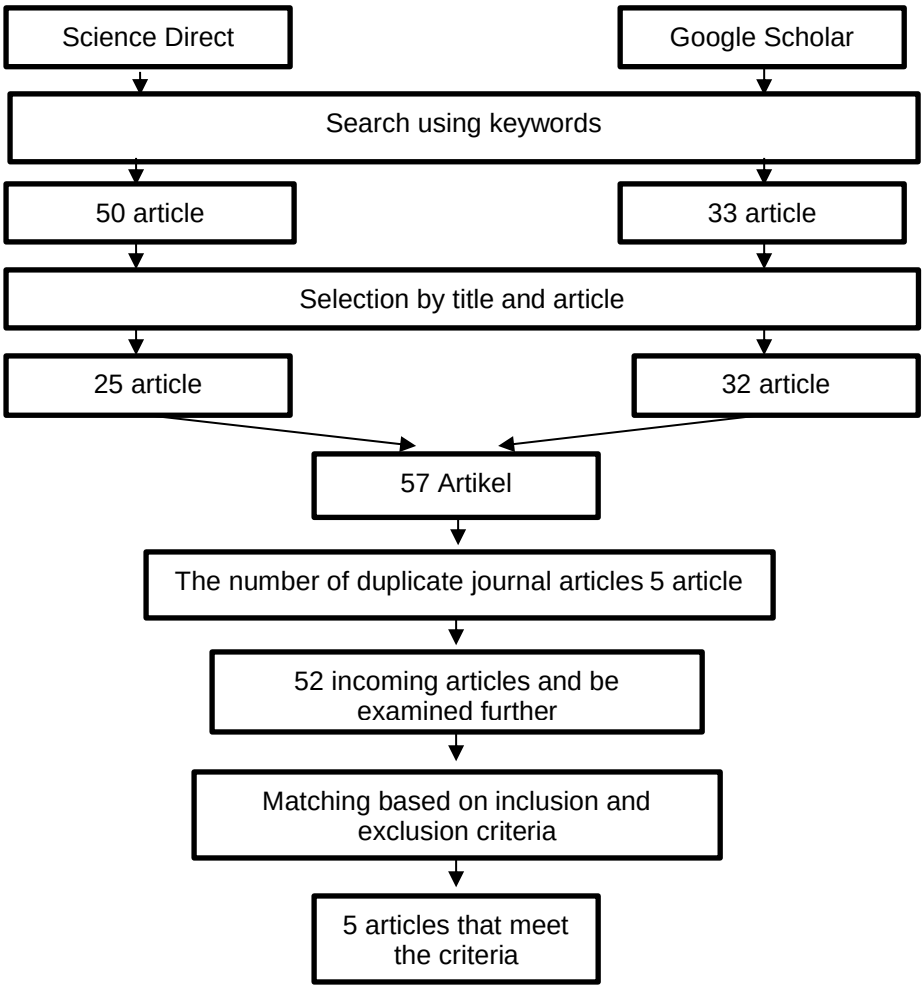

Figure 1. Modified PRISMA flowchart

Appraisal

The search results obtained as many as 5 articles were then analyzed using the Joannna Brigg Institution (JBI) journal criticism instrument checklist. Based on the appraisal or assessment, the synthesis stage was carried out and a systematic review was carried out. In conducting the synthesis of this article, it is described in table 1.

Table 1. Summary of research results on the response time of stroke code officers in ischemic stroke.

No	Author (Year)	Journal & Indexing	Level JBI	Purpose	Method	Sample	Intervention	Data analysis	Reasearch Result
1	Rasyid, H. Salim, K..Taufik,M.Rakhmad,R,(2019) The Reasons Acute Stroke Patients Not Receiving Thrombolysis In An Indonesian Referral Hospital	Indonesian Journal of Neurology, Google Scholar	4b	The purpose of this study was to identify the reasons why acute stroke patients did not receive thrombolysis despite meeting the Code Stroke activation criteria at Cipto Mangunkusumo Hospital during November 2015 to February 2019.	*This study retrospectively collected data on adult acute stroke patients (aged>18 years) treated at Cipto Mangunkusumo General Hospital. from November 2015 to February 2019 who met the Code Stroke activation criteria but did not undergo thrombolysis. Patient data were collected from the Code Stroke Registry of Cipto Mangunkusumo Hospital.*	There were 518 acute stroke patients with activated Stroke Code at Cipto Mangunkusumo Hospital from November 2015 to February 2019. 76.3% of acute stroke patients did not receive thrombolytic therapy (n=395). Bleeding on computerized tomography (CT) scan was the most common reason for patients not receiving thrombolysis. The following most common reasons were low or improved National Institute of Health Stroke Scale (NIHSS) score, family refusal, and exceeding the time span.	Patient data collected included gender, age, National Institutes of Health Stroke Scale (NIHSS) score on arrival, time of symptom onset to hospital arrival (hospital start time), chief complaint, and the reason why thrombolytic therapy was not performed on the patient. Data were collected from the Code Stroke Registry of Cipto Mangunkusumo General Hospital. The identities and data of all patients were kept confidential.	Data were statistically analyzed using SPSS version 20. Numerical data are presented as mean and standard deviation if normally distributed (p>0.05), and as median and range if not normally distributed. Normality Numerical data were tested using the Kolmogorov-Smirnov normality test because the number of subjects was >50. Categorical data are presented as frequency and percentage.	More than three-quarters of acute stroke patients with this disease did not receive thrombolytic therapy (76.3%, n=395). Most of them were male (60.5%). The mean age of the patients was 56 years. The median door-to-door time was 175 minutes. The median National Institutes of Health Stroke Scale (NIHSS) score on arrival was 10. Loss of consciousness was the most common presenting complaint (37.5%), followed by right-sided weakness and left-sided weakness (each, 20.8%).
Disadvantages : there is no explanation of the reasons why atelaptase was not administered in ischemic stroke cases by the code stroke team. Advantages : the description of the time code stroke in ischemic stroke case services is already clearly visible.									
2	Hidayat.Rakhmad,Y, Hirari, D. Dinda. Eddy, Y. Reyhan, A. Ramlan . (2020) Development Of Code Stroke System In Two Educational	Jurnal Neurologi Indonesia, Google Scholar	4b	This article aims to provide a comparative overview of the stroke code system between hospitals with different human resources and systems so that it is expected to provide an	This study is a qualitative study with a descriptive case study approach regarding the implementation of stroke codes in two teaching hospitals, namely RSCM and RSUI.	The research data was obtained from direct observation in the two hospitals. Observations were conducted in the stroke code related units in the two hospitals.	code stroke has been running in Dr. Cipto Mangunkusumo National Hospital (RSCM) for almost 6 years. This makes it possible to design and implement the code stroke system in other hospitals, one of which is the University of Indonesia Hospital	Data analysis was conducted by comparing several aspects, namely human resources, costs and coverage of facilities, supporting examinations (radiology and laboratory), proposers of the	The successful implementation of the code stroke system at RSCM makes it possible to design and implement the same code stroke system at other hospitals. RSCM and RSUI are primary and secondary stroke centers. However, of course the background, availability of resources,

	Hospital In Indonesia			example of the formation of a stroke code system that is adapted to the environment and challenges in each hospital.			(RSUI). Both RSCM and RSUI are teaching hospitals	code stroke system, patient observation rooms, availability of catheterization rooms, and communication of the code stroke team.	facilities and infrastructure are different between RSCM and RSUI. So the code stroke at RSUI is different from the code stroke system at RSCM in many ways, even though it is carried out by a team that is not much different.
Disadvantages: only displays the advantages and disadvantages of two hospitals to run the code stroke system. Advantages: the description of the implementation of code stroke and its obstacles are clearly described.									
3	Kassardjian, Jacqueline D. Willems, Krystyna ,S. Rosane, N. Judith,B,Pawel ,K. Daniel,S. Gustavo,S. (2020) In-Patient Code Stroke A Quality Improvement Strategy to Overcome Knowledge-to-Action Gaps in Response Time	Journal of the Neurological Sciences, Science Direct	4b	The aim of this study was to develop an algorithm for inpatient stroke management, reducing delays in inpatient stroke management.	Research with retrospective observation design	During the study period, there were 218 stroke patients hospitalized (131 before the intervention and 87 after the intervention).	An inpatient stroke coding algorithm was developed, and an educational intervention was implemented at 5 months. Data were recorded and compared between 36 months before and 15 months after the intervention. Outcome measures included time from last normal to baseline assessment and time from last normal brain imaging.	Data were recorded and compared between the 36-month period before and 15 months after the intervention was implemented.	The study found that inpatient strokes were more common in cardiovascular wards (45% of cases) and occurred predominantly in the perioperative period (60% of cases). Following implementation of the inpatient stroke code intervention and educational initiative, there was a consistent reduction in all time-based outcome measures (mean time to initial assessment decreased from 600 to 160 minutes and time to computed tomography scan decreased from 925 to 348.5 minutes).
Disadvantages: This study has not shown the role of the code stroke team in the research method, it has not been mentioned what method was used and the research sample is not yet known. Advantages: as a description of ischemic stroke management including response time and implementation of code stroke.									

4	Sanjuan, E. Pancorbo, O. Santana, K. Miñarro, O. Sala, V. Muchada, M. Gonzalez, Y. Moreno, R. Rubiera, (2023) interdisciplinary approach to inhospital stroke improves stroke detection and treatment time	Journal of the Neurological Sciences, ScienceDirect	4b	The purpose of this study was to determine whether in-hospital stroke (IHS) is associated with high morbidity and mortality, possibly related to multiple time delays, associated comorbidities, and initial care by providers not trained in stroke under stroke code team guidance.	Research with retrospective analysis	Data samples taken between late 2015 and early 2016 were compared with the pre-implementation group, including diagnostic accuracy and relevant time points.	Following protocol implementation, we prospectively collected data between 2016 and 2017 for comparison with the pre-implementation cohort, including diagnostic accuracy and relevant time points (call codes for examination, examination for imaging, and imaging for intervention)	Multivariable regression analysis was performed to identify independent predictors of initial stroke symptoms and onset time.	Results There were 136 cases in the pre-implementation group and 69 cases in the post-implementation group. A decrease in stroke mimics (52% vs 33%, P=0.01) occurred after protocol initiation. The mean time to imaging after a stroke code call was 7.6 minutes shorter (P=0.026) and the mean time from imaging to acute reperfusion therapy was 45.7 vs 19.8 minutes (P=0.05) in the pre- versus post-implementation groups.
Disadvantages: The grouping of factors to be studied is still not specific and clear, the number of samples does not mention the exact number or amount, and the role of the code stroke team is not yet clear. Advantages: the identification of research results is well described.									
5	Aandarini, D. Susaldi. Bambang, S. (2024) Response time with successful handling on call patient stroke	Jurnal Kedokteran Indonesia, Google Scholar	4b	The purpose of this study was to determine the relationship between response time and the success of on-call stroke patient treatment at PSC 119 Depok in 2023.	The research method that will be used is an analytical research design with a cross-sectional correlational approach.	The number of samples is a population of 80 respondents, the number of sample techniques and sample size are 30 respondents.	In this study, the independent and dependent variables were evaluated simultaneously so that no observation was carried out. Of course, not all subjects need to be observed on the same day or time, but both the independent and dependent variables are only assessed once.	Data analysis was performed using the Chi-Square parametric test.	The results describe the characteristics of respondents, age 20 years -40 years (83.3%), D3 nursing education (83.3%), female gender (63.3%), work experience ≥ 5 years (90%). The picture of the response time is not fast enough (63.3%). The picture of the success of oncall stroke patient treatment but unsuccessful (66.7%) There is a relationship between response time and the success of oncall stroke patient treatment at PSC 119 Depok in 2023, p-value 0.023 <0.05 and OR = 9.333
Disadvantages: This study was conducted outside the hospital and the description of the relationship with the stroke code team is unclear. Advantages: There is a strategy for grouping data on influencing variables, and the identification of factors that influence response time.									

DISCUSSION

Reasons Acute Stroke Patients Not Receiving Thrombolysis in An Indonesian Referral Hospital.

Acute thrombolysis is an effective treatment for ischemic stroke patients, with the aim of dissolving blood clots that block blood flow to the brain. However, there are several reasons why acute stroke sufferers in Indonesian referral hospitals do not always receive optimal thrombolysis (Rasyid et al., 2019).

1. Delay in Recording Stroke Symptoms One of the main reasons is the delay in patients coming to the hospital after the onset of stroke symptoms. Stroke patients should receive thrombolysis within 4.5 hours after the first symptoms appear. The longer treatment is delayed, the less likely it is to achieve effective thrombolysis.
2. Limited Infrastructure and Resources
   Hospitals in Indonesia, even though there are referral hospitals, often lack adequate medical facilities, such as CT scans to confirm the type of stroke, or medical personnel trained in treating acute strokes.
3. Unfavorable Clinical Conditions
   Patients with other medical conditions, such as uncontrolled high blood pressure, a history of bleeding, or coagulation disorders, do not meet the criteria for thrombolysis because of the increased risk of bleeding. This is often the main reason for delaying or not administering thrombolysis.
4. Social and Economic Factors
   In some areas, limited access to quality health services, as well as socio-economic factors, such as high medical costs, also become barriers for patients to receive optimal treatment.

Development Of Code Stroke System In Two Educational Hospital In Indonesia

The development of a stroke coding system in Indonesian hospitals aims to speed up the treatment of ischemic stroke patients and improve clinical outcomes. Two teaching hospitals in Indonesia, such as Cipto Mangunkusumo Hospital (RSCM) and Dr. Sardjito, has implemented a stroke code system to ensure fast and precise handling. This system involves the activation of a trained medical team in a short time, consisting of doctors, nurses and other medical personnel who are ready to treat stroke patients (Hidayat et al., 2020).

At RSCM, stroke code development is carried out through simulations and regular training for health workers. This increases awareness and the ability to respond quickly to stroke cases. Meanwhile, at Dr. Sardjito, the stroke coding system has been integrated with the hospital information system, enabling direct notification to the medical team as soon as a patient is diagnosed with a stroke. These two hospitals also focus on evaluating the performance of the medical team in treating stroke, to ensure door-to-needle time remains within the optimal time range.The development of a stroke coding system in teaching hospitals shows Indonesia's commitment to improving the quality of stroke treatment, even though it still faces challenges in terms of resources and limited facilities (Hidayat et al., 2020).

In-Patient Code Stroke A Quality Improvement Strategy to Overcome Knowledge-to-Action Gaps in Response Time

Quality improvement strategies to address the knowledge-to-action gap in response times in in-hospital ischemic stroke patients involve several important steps. First, **continuing training and education** for medical personnel is very important so that they understand the importance of rapid response to stroke patients, including coding stroke procedures and administering thrombolytics in a timely manner. This training should involve real case simulations to ensure the medical team's readiness in emergency situations (Kassardjian et al., 2020).

Implementation of standard operating protocols (SOP) that are clear and easy to follow, with fast communication channels between doctors, nurses and other medical teams, can speed

up response times. The use of technology-based information systems that are integrated in hospitals can also help speed up the automatic activation of the stroke team. regular evaluation and feedback is essential to assess the effectiveness of actions taken and improve areas that need improvement. With these steps, knowledge gaps can be addressed, and response times in ischemic stroke patients can be shortened (Kassardjian et al., 2020).

An interdisciplinary approach to inhospital stroke improves stroke detection and treatment time

An interdisciplinary approach to stroke in the hospital involves collaboration between various medical professionals, such as doctors, nurses, neurologists, radiologists and physiotherapists. This collaboration accelerates stroke detection and treatment, with each team member contributing according to their expertise. For example, a radiologist quickly performs a brain scan for diagnosis, while the rest of the medical team immediately begins thrombolytic therapy. With this approach, stroke identification is quicker, and treatment can be initiated in a shorter time, increasing the patient's chances of recovery. Solid collaboration reduces delays in treatment and improves stroke clinical outcomes (Sanjuan et al., 2023).

Response time with successful handling on call patient stroke

A fast response time in treating stroke patients, especially ischemic stroke, greatly influences the success of treatment. In the on-call system, doctors and medical teams must be ready 24 hours to immediately treat stroke patients. Reducing door-to-needle time (the time from the patient arriving at the hospital to administering thrombolytics) is very important to minimize brain damage. Delayed treatment, more than 4.5 hours after symptoms appear, reduces the effectiveness of thrombolysis and increases the risk of permanent disability. Therefore, fast response time in the on-call system greatly influences the final outcome and recovery of ischemic stroke patients (Aandarini et al., 2024).

ARGUMENT

Service response time

Response time for stroke patients is recommended for 3 to 4.5 hours or what can be called the golden period for stroke, so it requires fast treatment. The more severe the stroke symptoms, the faster the patient should be taken to the hospital. Response time or the success of the response time is very dependent on the speed and quality of first aid to prevent disability or save lives. The outcome of stroke treatment is influenced by the fast response time of health workers and the family's decision to immediately take the patient to a health facility so that it can reduce the morbidity and mortality of stroke patients (Le et al., 2020).

Code Stroke Service

Code stroke is one of the concepts of acute stroke care classified as an emergency designed to facilitate rapid evaluation and immediate treatment for individuals suspected of having an early diagnosis of acute stroke with a duration of (<4.5 - 6 hours). This management protocol involves a multidisciplinary team working together to diagnose and treat stroke patients immediately. The goal of this method is to reduce the risk of brain damage caused by stroke by providing appropriate care within a very limited time window (Kassardjian et al., 2020).

Quality of Ischemic Stroke Services in Hospitals

Ischemic stroke management begins with acute management in emergency conditions. The goal is to stabilize the patient and complete the initial evaluation within 60 minutes of the patient's arrival at the health facility. The national guidelines for integrated stroke medical services issued by the Ministry of Health regarding integrated stroke services are guidelines and procedures for stroke management according to the guidelines. However, the dynamics of stroke that change over time according to the dynamics of blood flow to the brain, various risk factors, comorbidities, type of stroke (hemorrhagic or ischemic), and severity of stroke that

are individual in nature, will make integrated stroke services very varied with different results (Hidayat et al., 2020).

Outcome

Ischemic stroke is a neurological disorder of brain function that occurs for more than 24 hours and causes blockage of blood vessels. As a result of the attack incident is quite short and sudden, the stroke period occurs about 4.5 hours from the initial symptoms appear (Hunaifi et al., 2023)With the decision to immediately be taken to a health facility (hospital) and the speed of the code stroke team in the emergency service, it will reduce the extensive side effects of the symptoms caused. Although the golden period for stroke sufferers is around 4.5 hours, the patient should be taken to the hospital at least 2 hours after the attack. This is because the onset of a stroke attack that occurs for 1 minute causes 32 thousand cells to die. So in a duration of about 1 hour, 120 million cells die. The longer the procedure for handling stroke patients, the more complex the impacts. Time is the most important benchmark and indicator for stroke sufferers to reduce the severity of the risk and impact of the quality of health, both disability and even the risk of death (Venketasubramanian et al., 2022)

CONCLUSSION

Early phase management of stroke patients in addition to the speed and accuracy and precision of officers, the success of the referral system and immediately arriving at the Hospital service is one of the keys to the success of stroke management. Response time of officers to stroke patients based on the stroke chain of survival of patients in the emergency unit which is calculated from the time the patient arrives in the emergency room until the action is taken.

SUGGESTTION

a. Patients after triage are immediately given a specific rapid assessment for stroke so that supporting examinations in the form of head imaging can be carried out immediately to establish a specific diagnosis.
b. Efforts are made to speed up the referral system in health facilities because it greatly affects the success of stroke management.
c. Development of an integrated stroke code and can be used as a stroke management guideline in all hospitals in Indonesia.

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DECLARATION OF INTEREST

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AUTHOR CONTRIBUTION

Author 1: *Master of Nursing Program Students, Clinic nurse in hospital*
Author 2: *Thesis advisor, lecturer to the chancellor*
Author 3: *Thesis supervisor, lecturer, vice chancellor*

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