Description of Stress and Cognitive Function in Patients Non-Hemorrhagic Stroke at Tugurejo Hospital in 2022

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KEYWORDS	ABSTRACT
Patient Safety Incident; underreporting; Patient Safety Culture; Perception; Nurses	Stroke is the main cause of death in Indonesia, the incidence has increased from 7% to 10%, of which 74% have ischemic strokes. Stress is common in stroke patients. According to research conducted, 58.8% of stroke survivors experienced severe stress, and 60% of stroke survivors experienced decreased or decreased cognitive function after stroke. The research objective was to describe stress and cognitive function in order to reduce stress levels and cognitive function in non-hemorrhagic patients at Tugurejo Hospital in 2022. This type of research is a quantitative descriptive analysis with a cross sectional design. The study population consisted of post-stroke patients who were diagnosed in 2022 by doctors at Tugurejo General Hospital and met the inclusion criteria, namely the Mini Mental State Exam Test Questionnaire (MMSE) and Depression Anxiety Stress Scales (DASS-21) as research instruments, then the data were analyzed using univariate analysis. The total sample consisted of 40 respondents who were analyzed by univariate. The results of the study describing stress levels in non-hemorrhagic stroke patients at Tugurejo Hospital in 2022 showed that 35% had normal stress levels and 65% had abnormal stress levels. while the picture of cognitive function in non-hemorrhagic stroke patients showed normal results in 32% and impaired cognitive function in 67.5%. Description of stress and cognitive function in non-hemorrhagic stroke patients at Tuguurejo General Hospital in 2022. Based on risk factors, gender, age, education, occupation, pre-existing conditions and stroke onset, the results showed abnormal levels of stress and disruption of cognitive function.

Introduction

Stress is an adaptive response that is individualized, so the stress response will differ from one person to another. Stress is a response to the fight or flight, which is the body's response to something. Stress is an abnormal condition of hemostasis that causes changes in physiological and emotional balance, this is due to external stimuli to the physical. Repeated and sudden emotional stress, both positive and negative, can trigger stroke and even worsen the situation in stroke patients.(Nasib Tua

Lumban Gaol, 2016)·(Putri & Herlina, 2021)·(Z.Goldfinger et al., 2014) Stress is common in stroke patients. According to a study of stroke patients, 58.8% of stroke patients experienced severe stress (Marbun et al., 2016).

Stroke is a neurological dysfunction caused by non-traumatic or traumatic cerebral circulation abnormalities. This neurological disorder causes symptoms such as paralysis of the face or limbs, aphasia, slurred speech, altered consciousness, blurred vision, and so on (Lindsay et al., 2019). Based on the number of major causes of disability, death and emergencies in neurological diseases is occupied by stroke. Reporting from WHO (world health organization), stroke is the third most deadly disease in the world. Meanwhile, according to RISKESDAS in 2018, showing that stroke is the number one cause of death in Indonesia, the incidence of stroke has increased from 7% to 10% (Kim et al., 2020).

Research conducted by Tarwoto in 2021 states that 97.5% of strokes occur at the age of over 35 years (Tarwoto, 2021). Non-hemorrhagic stroke or ischemic stroke is more common than hemorrhagic stroke. From research conducted by Hsie on stroke patients, 74% of them experienced ischemic stroke (Dudung et al., 2015). Stroke can cause dysfunction in the neurobehavioral areas of the brain, which can result in psychiatric symptoms such as post-stroke depression. Depression occurs as a result of post-stroke complications, which are then associated with impaired healing, activity or social support, and cognitive function (Boletimi et al., 2021).

Behavioral neurology explains what cognitive function means. It is the process by which sensory stimuli such as auditory and tactile stimuli are transformed, processed, stored, and used to seamlessly connect interneurons. This allows people to think about sensory stimuli. 60% of stroke survivors are affected by cognitive dysfunction or cognitive function abnormalities post-stroke.

The results of research conducted in November-December 2015 at the Neurology Polyclinic of Arifin Ahmad Riau Hospital proved that 38 out of 41 respondents experienced impaired cognitive function (Alsharif & Qurashi, 2021).

قُلْ اِنَّ صَلَا تِيْ وَنُسُكِيْ وَ مَحْيَايَ وَمَا تِيْ لِلّٰهِ رَبِّ الْعٰلَمْنَ

"Say in truth: My prayer, my worship, my life and my death are for Allah, the Lord of the Worlds". (Q.S. Al-An'am: 162).

By prioritizing Allah SWT, it is expected that the body's hormones and reactions can move normally and calmly. This will certainly respond positively to mental health, physical, cognitive function and stress for stroke patients. So it is hoped that humans will always be positive thinking (prejudiced) towards everything Allah's decree (Vogrig et al., 2021).

Previous studies, such as those conducted at the Neurology Polyclinic of Arifin Ahmad Riau Hospital, have indicated a high prevalence of cognitive impairment among stroke patients. However, most of these studies have only focused on general stroke populations or have primarily examined hemorrhagic stroke without a detailed exploration of the factors affecting non-hemorrhagic stroke patients specifically.

This study makes a significant contribution to the field by specifically focusing on non-hemorrhagic stroke patients at Tugurejo Hospital, assessing both stress levels and cognitive function in this particular population. The novelty of this research lies in its emphasis on understanding the combined impact of stress and cognitive impairment in a specific setting and population, providing a more tailored insight into the challenges faced by these patients.

Unlike previous studies, this research utilizes the Mini Mental State Exam (MMSE) and Depression Anxiety Stress Scales (DASS-21) for a comprehensive assessment of both cognitive function and stress in non-hemorrhagic stroke patients. Additionally, this study investigates factors such as gender, age, education, occupation, pre-existing conditions, and stroke onset to determine their relationship with stress and cognitive outcomes.

This unique approach allows for a more in-depth understanding of the factors contributing to cognitive and emotional health in post-stroke patients, particularly those with non-hemorrhagic conditions, thereby highlighting the need for targeted interventions to address both psychological and cognitive rehabilitation in this specific group.

Based on the description above, it has not been explained how the description of stress and cognitive function in non-hemorrhagic patients will be carried out at Tugurejo Hospital in 2021-2022. Therefore, it is necessary to carry out more in-depth research on stress and cognitive function in non-hemorrhagic patients needed in stroke patients. This study aims to provide an overview of follow-up research to reduce stress levels and cognitive function in non-hemorrhagic stroke patients at Tugurejo Hospital in 2022.

Research Methods

This study was conducted in August 2022/September 2022 at RSUD Tugurejo Semarang. This study is one of descriptive analytic research using cross sectional design. The population that will be used is post-stroke patients diagnosed in 2022 by doctors at Tugurejo Hospital. Then obtained a sample size determined using the Lemeshow formula, and the data obtained from the population in the study required a sample of 40 people.

The sampling criteria were non-hemorrhagic post-stroke patients who were being treated at Tugurejo Hospital, age >35 years, compos mentis. Exclusion criteria for research samples that were excluded from the research sample were post-ischemic stroke patients who were mentally disabled, had aphasia, and had hearing loss, such as ear infections and ear surgery.

The method in determining the sample uses purposive sampling. The variables used were stress, cognitive function and post-stroke patients. The data collection method uses medical record data consisting of age, gender, and history of disease, and stroke onset.

In this study, data analysis was performed using descriptive data analysis, namely univariate analysis to describe the distribution and percentage of data simply to find the variables studied. *Ethical clearance* was obtained from the ethical certificate of the ethics committee responsible for health research (KEPK) from RSUD Tugurejo Semarang with No. 080/ KEPK.EC/ IX/ 2022.

Results and Discussion
Stress level of non-hemorrhagic stroke patients at RSUD Tugurejo
1. Distribution of stress levels of non-hemorrhagic stroke patients at Tugurejo Hospital

Table 1. Distribution of stress levels of non-hemorrhagic stroke patients at Tugurejo Hospital

Stress Level	Frequency	Percentage (%)
Normal	14	35,0
Lightweight	6	15,0
Medium	9	22,5

Weight	7	17,5
Very Heavy	4	10,0
Total	40	100 %

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of the stress level of non-hemorrhagic stroke patients at Tugurejo Hospital is in the normal category as much as 35%.

2. Distribution of stress levels of non-hemorrhagic stroke patients based on gender

Table 2. Distribution of stress levels of non-hemorrhagic stroke patients based on gender

Gender	Stress Level										Total	
	Normal		Lightweight		Medium		Weight		Very Heavy			
	n	%	n	%	n	%	n	%	n	%	n	%
Male	8	20	3	7,5	3	7,5	4	10	2	5	20	50
Female	6	15	3	7,5	6	15	3	7,5	2	5	20	50
Total	14	35	6	15	9	22,5	7	17,5	4	10	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The stress level of non-hemorrhagic stroke patients at Tugurejo Hospital is mostly male with a normal range of 20%.

3. Distribution of stress levels of non-hemorrhagic stroke patients based on age

Table 3. Distribution of stress levels of non-hemorrhagic stroke patients based on age

Gender	Stress Level										Total	
	Normal		Lightweight		Medium		Weight		Very Heavy			
	n	%	n	%	n	%	n	%	n	%	n	%
40-49	1	2,5	0	0	0	0	1	2,5	0	0	2	5
50-59	3	7,5	3	7,5	7	17,5	3	7,5	3	7,5	19	47,5
60-69	7	17,5	3	7,5	1	2,5	3	7,5	1	2,5	15	37,5
> 69	3	7,5	0	0	1	2,5	0	0	0	0	4	10
40-49	14	35	6	15	9	22,5	7	17,5	4	10	40	100
Total	1	2,5	0	0	0	0	1	2,5	0	0	2	5

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of the stress level of non-hemorrhagic stroke patients at Tugurejo Hospital based on age is age 50-59 years with moderate category and age 60-69 years with normal category as much as 17.5% each.

4. Distribution of stress levels of non-hemorrhagic stroke patients based on education level

Table 4. Distribution of stress levels of non-hemorrhagic stroke patients based on education level

Education Level	Stress Level										Total	
	Normal		Lightweight		Medium		Weight		Very Heavy			
	n	%	n	%	n	%	n	%	n	%	n	%
Not in school did not finish elementary school	2	5	0	0	1	2,5	1	2,5	0	0	4	10

Elementary School	4	10	1	2,5	4	10	1	2,5	2	5	12	30
Junior High School	3	7,5	1	2,5	0	0	1	2,5	0	0	5	12,5
High School	4	10	2	5	3	7,5	4	10	2	5	15	37,5
College Graduate/Bachelor's Degree	1	2,5	2	5	1	2,5	0	0	0	0	4	10
Total	14	35	6	15	9	22,5	7	17,5	4	10	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of non-hemorrhagic stroke patients at Tugurejo Hospital according to education level are elementary school graduates with normal and moderate categories and high school graduates with normal and severe categories, each with 10%.

5. Distribution of stress levels of non-hemorrhagic stroke patients based on type of work

Table 5. Distribution of stress levels of non-hemorrhagic stroke patients based on type of work

Jobs	Stress Level										Total	
	Normal		Lightweight		Medium		Weight		Very Heavy			
	n	%	n	%	n	%	n	%	n	%	n	%
IRT	6	15	1	2,5	5	12,5	2	5	2	5	16	40
Self-employed/Merchant	3	7,5	1	2,5	1	2,5	1	2,5	1	2,5	7	17,5
Employee/Laborer	4	10	2	5	2	5	4	10	1	2,5	13	32,5
Teacher	0	0	1	2,5	1	2,5	0	0	0	0	2	5
PNS	1	2,5	1	2,5	0	0	0	0	0	0	2	5
Total	14	35	6	15	9	22,5	7	17,5	4	10	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of the stress levels of non-hemorrhagic stroke patients at Tugurejo Hospital according to occupation are as housewives with a normal category as much as 15%.

6. Distribution of stress levels of non-hemorrhagic stroke patients based on past medical history

Table 6. Distribution of stress levels of non-hemorrhagic stroke patients based on past medical history

Disease History	Stress Level										Total	
	Normal		Lightweight		Medium		Weight		Very Heavy			
	n	%	n	%	n	%	n	%	n	%	n	%
Seizures	11	%	n	%	n	%	n	%	n	%	n	%
Hyper tension	0	0	0	0	1	2,5	0	0	0	0	1	2,5
Vertigo	5	12,5	2	5	4	10	2	5	1	2,5	14	35
DM	0	0	0	0	1	2,5	0	0	0	0	1	2,5
Koles terol	3	7,5	3	7,5	3	7,5	4	10	0	0	13	32,5
Trauma	5	12,5	1	2,5	0	0	0	0	3	7,5	9	22,5
Total	1	2,5	0	0	0	0	1	2,5	0	0	2	5

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of non-hemorrhagic stroke patients at Tugurejo Hospital according to their previous medical history had a history of hypertension and cholesterol with a normal category of 12.5% each.

7. Distribution of stress levels of non-hemorrhagic stroke patients based on stroke onset

Table 7. Distribution of stress levels of non-hemorrhagic stroke patients based on stroke onset

| Onset Stoke | Stress Level | | | | | | | | | | Total | |
| | Normal | | Lightweight | | Medium | | Weight | | Very Heavy | | | |
	n	%	n	%	n	%	n	%	n	%	n	%
1-12 Months	10	25	3	7,5	2	5	5	12,5	4	10	24	60
13-24 Months	1	2,5	0	0	2	5	0	0	0	0	3	7,5
25-36 Months	0	0	0	0	2	5	1	2,5	0	0	3	7,5
>36 Months	3	7,5	3	7,5	3	7,5	1	2,5	0	0	10	25
Total	14	35	6	15	9	22,5	7	17,5	4	10	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of the stress level of non-hemorrhagic stroke patients at Tugurejo Hospital according to stroke onset was 1-12 months with a normal category as much as 25%.

Cognitive function in non-hemorrhagic stroke patients at RSUD Tugurejo

1. Distribution of cognitive function in non-hemorrhagic stroke patients at Tugurejo Hospital

Table 8. Distribution of cognitive function in non-hemorrhagic stroke patients at Tugurejo Hospital

Level of Cognitive Function	Frequency	Percentage (%)
Normal	13	32,5
Mild impairment of cognitive function	11	27,5
Moderate impairment of cognitive function	10	25,0
Severe cognitive function impairment	6	15,0
Total	40	100 %

Source: Research conducted at RSUD Tugurejo Semarang (2022)

Most of the cognitive function of non-hemorrhagic stroke patients was 32.5% in the normal category at Tugurejo Hospital.

2. Distribution of cognitive function of non-hemorrhagic stroke patients based on gender

Table 9. Distribution of cognitive function of non-hemorrhagic stroke patients based on gender

Gender	Cognitive Function								Total	
	Normal		Lightweight		Medium		Weight			
	n	%	n	%	n	%	n	%	n	%
Male	6	15	9	22,5	3	7,5	2	5	20	50
Perem puan	7	17,5	2	5	7	17,5	4	10	20	50
Total	13	32,5	11	27,5	10	25	6	15	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

Based on gender, most of the cognitive functions of non-hemorrhagic stroke patients at Tugurejo Hospital were male, with a category of mild cognitive impairment of 22.5%.

3. Distribution of cognitive function of non-hemorrhagic stroke patients based on age

Table 10. Distribution of cognitive function of non-hemorrhagic stroke patients based on age

Age	Cognitive Function								Total	
	Normal		Lightweight		Medium		Weight			
	n	%	n	%	n	%	n	%	n	%
40-49 Years	0	0	1	2,5	1	2,5	0	0	2	5
50-59 Years	6	15	6	15	3	7,5	4	10	19	47,5
60-69 Years	5	12,5	4	10	4	10	2	5	15	37,5
> 69 Years	2	5	0	0	2	5	0	0	4	10
Total	13	32,5	11	27,5	10	25	6	15	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of cognitive function in non-hemorrhagic stroke patients at Tugurejo Hospital based on age is 50-59 years with normal and mild cognitive impairment as much as 15% each.

4. Distribution of cognitive function in non-hemorrhagic stroke patients according to education level

Table 11. Distribution of cognitive function in non-hemorrhagic stroke patients according to education level

Education Level	Stress Level								Total	
	Normal		Lightweight		Medium		Weight			
	n	%	n	%	n	%	n	%	n	%
Not in school did not finish elementary school	0	0	0	0	2	5	2	5	4	10
Elementary School	1	2,5	3	7,5	5	12,5	3	7,5	12	30
Junior High School	1	2,5	2	5	2	5	0	0	5	12,5
High School	7	17,5	6	15	1	2,5	1	2,5	15	37,5
College Graduate/Bachelor's Degree	4	10	0	0	0	0	0	0	4	10

| Total | 13 | 32,5 | 11 | 27,5 | 10 | 25 | 6 | 15 | 40 | 100 |

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of cognitive function in non-hemorrhagic stroke patients at Tugurejo Hospital based on education level is high school graduates with a normal category as much as 17.5%.

5. Distribution of cognitive function of non-hemorrhagic stroke patients based on occupation

Tabel 12. Distribution of cognitive function of non-hemorrhagic stroke patients based on occupation

Jobs	Cognitive Function								Total	
	Normal		Lightweight		Medium		Weight			
	n	%	n	%	n	%	n	%	n	%
IRT	4	10	2	5	7	17,5	3	7,5	16	40
Self-employed/Merchant	4	10	1	2,5	0	0	2	5	7	17,5
Employee/Laborer	1	2,5	8	20	3	7,5	1	2,5	13	32,5
Teacher	2	5	0	0	0	0	0	0	2	5
PNS	2	5	0	0	0	0	0	0	2	5
Total	13	32,5	11	27,5	10	25	6	15	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of non-hemorrhagic stroke patients at Tugurejo Hospital based on occupation are as housewives with a moderate category as much as 17.5%.

6. Distribution of cognitive function in non-hemorrhagic stroke patients based on history of previous disease

Table 13. Distribution of cognitive function in non-hemorrhagic stroke patients based on history of previous disease

Past Medical History	Cognitive Function								Total	
	Normal		Lightweight		Medium		Weight			
	n	%	n	%	n	%	n	%	n	%
Seizures	1	2,5	0	0	0	0	0	0	1	2,5
Hypertension	5	12,5	3	7,5	4	10	2	5	14	35
Vertigo	0	0	0	0	1	2,5	0	0	1	2,5
DM	4	10	4	10	2	5	3	7,5	13	32,5
Cholesterol	3	7,5	3	7,5	2	5	1	2,5	9	22,5
Trauma	0	0	1	2,5	1	2,5	0	0	2	5
Total	13	32,5	11	27,5	10	25	6	15	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of non-hemorrhagic stroke patients at Tugurejo Hospital based on a history of previous illnesses had a history of hypertension with a normal category as much as 12.5%.

7. Distribution of cognitive function in non-hemorrhagic stroke patients based on stroke onset

Table 14. Distribution of cognitive function in non-hemorrhagic stroke patients based on stroke onset

Stroke Onset	Cognitive Function								Total	
	Normal		Lightweight		Medium		Weight			
	n	%	n	%	n	%	n	%	n	%
1-12 Months	9	22,5	7	17,5	4	10	4	10	24	60
13-24 Months	1	2,5	0	0	2	5	0	0	3	7,5
25-36 Months	0	0	2	5	1	2,5	0	0	3	7,5
>36 Months	3	7,5	2	5	3	7,5	2	5	10	25
Total	13	32,5	11	27,5	10	25	6	15	40	100

Source: Research conducted at RSUD Tugurejo Semarang (2022)

The majority of cognitive function in non-hemorrhagic stroke patients at Tugurejo Hospital based on stroke onset is 1-12 months with a normal category as much as 22.5%.

Discussion
Description of the stress level of patients with non-hemorrhagic stroke at Tugurejo Hospital in 2022
The results of the study revealed that the prevalence of non-hemorrhagic stroke was highlighted at Tugurejo Semarang Hospital on 40 respondents conducted in August to September 2022 showed that the majority of respondents as much as 35% experienced normal stress. 15% had mild stress, 22.5% had moderate stress, 17.5% had severe stress and 10% had severe stress. This shows that 65% of patients at Tugurejo Hospital have abnormal stress levels. The results of this study agree and are in line with previous research conducted by Magdalena at Dr. Doris Sylvanus Palangka Raya Hospital in relation to non-hemorrhagic stroke stress, which showed that 33 subjects (86.0%) experienced stress (Purba, 2019).

Post-stroke stress is a complication of stroke characterized by mood swings, self-blame, sadness and depression.(Purba, 2019) However, the results of this study differ from Dewi Pongantung's research on the stress of non-hemorrhagic stroke patients at the stroke hospital in the province of South Sulawesi where the research states that the research subjects who did not experience stress / normal were 34 people (56%) (Pongantung & Rosdewi, 2022).

Measured by gender, it was found that 35% of female respondents experienced more stress than male respondents. The study results are in line with Wilkinson's view that women are more likely to be exposed to environmental stressors and have a lower stress threshold than men. The female brain has negative vigilance so that if a stressor comes. The brain will stimulate the adrenal glands to form excess cortisol hormones that cause stress. Stress associated with hormonal instability in the female body increases the prevalence in women. However, this contradicts research conducted by Munir in 2016 which wrote that there was no influential relationship between gender and the prevalence of post-stroke stress (Purba, 2019).

In this study, 17.5% experienced moderate stress mostly from respondents aged 50-59. The results of this study agree with research conducted by Agnes, where the results of her research state that the majority of patients who experience severe stress in stroke victims are over 50 years old.(Marbun et al., 2016) This is because the 50+ age group tends to be more productive in their activities and the 70+ age group is more accepting of their circumstances.

A study by Ratep and Putera (2014) found that the prevalence of post-stroke stress increased with age and stated that individuals aged ≥ 55 years had a 5.8 times higher risk than those aged 15-44 years to experience stress after stroke. Stress is caused by functional decline and persistent health problems so that it cannot carry out daily activities. It can be concluded that the age group that experiences higher stress is the age group that still has dependents and is active every day.(Purba, 2019)

Contrary to a 2001 study by Bays in America, which found that older patients are more sensitive to stress due to general health conditions, aging suggests that the body's ability to adapt to environmental stress is reduced. Patients feel less able to solve problems, left out, and no longer needed (Ananda, 2017).

Based on the level of education, it is known that 27.5% of respondents who experience stress at the high school level are the majority. The results of the study agree with Dudung's research which is based on research that explains stress/depression in stroke patients at Professor Kandou Manado Hospital, where 21 people (41.2%) have a high school education (Dudung et al., 2015).

There are many reasons why education can directly affect health. By improving one's information processing skills, health awareness, or increasing the effectiveness of therapy. The higher the education, the faster help-seeking and commitment to treatment will be. Education has an influence on stress but is indirect, namely through several economic factors (work, environment, economy), family relationships and psychosocial factors (Dudung et al., 2015).

According to Dinarsari, stress and anxiety can occur in people with little knowledge. This is because patients do not understand the health problems they face because the information they receive is not understood. Knowledge affects the development of the disease suffered by the patient (Ananda, 2017).

In this study, based on occupation, it was found that 25% of the majority of respondents who experienced stress were respondents who had jobs as housewives. The results of other studies on stroke patients with daily habitual activities are at a low level, will feel more stress according to their level of activity. Because of the situation that pressures them. The ability to do daily activities is impaired and the level of dependence on others increase (Marbun et al., 2016).

Based on anamnesis, it was found that 22.5% who experienced stress were respondents with a history of hypertension. The results of the research conducted agree with Heri's research where it was found that 34 patients who experienced stress after non-hemorrhagic stroke 72.3% had a history of hypertension (Pribadhi, 2019). Stress is the most important cause of increased blood pressure which is then the main cause of stroke. One of the triggers for the rise or fall of blood pressure is emotional state, including stress. Stress can actually affect your overall physical condition and cause a sudden increase in blood pressure. Therefore, people with a history of high blood pressure are advised to stay away from or at least control their stress levels, as high blood pressure is a risk factor for non-hemorrhagic stroke (Makarim, 2021).

Based on the onset of stroke, it is known that 35% of respondents with stroke onset of 1-12 months experience more stress. The results of this study are in accordance with Ananda's research where the majority of research subjects, namely 54 people (56.3%), have suffered a stroke ≤ 2 years (Ananda, 2017). Patients who have had a stroke ≥ 6 months have a higher risk level for feeling anxiety caused by a stroke ≥ 6 months have shown anxiety, there are changes in physical conditions that are

getting worse, patients in the phase cannot accept their physical condition after a stroke and there are restrictions on physical activities after a stroke (Morris et al., 2013).

This is in accordance with stress theory, that the initial stage after stroke is the *appraisal* stage, which is an assessment process to identify, assess, and respond to existing events. Then stimulate the body to *flight-or-fight* To then proceed to determine *coping*, to overcome the situation. So that the onset of stroke affects a person's stress (Nasib Tua Lumban Gaol, 2016). At the beginning of a stroke, patients feel tension because they feel that physical pain prevents them from doing what they usually do and stroke survivors find it difficult to accept their current body condition and feel hopeless.[38] after the patient goes through this, he will be able to determine the coping that suits his current situation, this stage takes a long time, which is the stage of acceptance usually in patients who have experienced stroke for many years (Nasib Tua Lumban Gaol, 2016).

According to researchers, prolonged stress can indirectly increase a person's potential for non-hemorrhagic stroke. Stressful conditions can trigger blockage of blood vessels in the brain, along with unhealthy lifestyle conditions, for example by diverting stress by eating a lot and eventually causing obesity, or having a smoking habit, whereas this unhealthy lifestyle can lead to high blood pressure, increased cholesterol and diabetes.

Non-hemorrhagic stroke patients need to be aware of the situation before the stroke and after the stroke, how this needs to be realized by patients and their families so that patients and their families can cope together. In stroke patients, one of the most grueling changes is post-stroke stress/depression. Therefore, early detection of patients with a high risk of stress is very important (Sari, 2014).

Description of cognitive function in non-hemorrhagic stroke patients at Tugurejo Hospital in 2022

Based on the results of a survey of 40 respondents at RSUD Tugurejo Semarang in August to September 2022, 67.5% of post-stroke patients experienced cognitive dysfunction, and most respondents up to 32.5% did not experience cognitive dysfunction / normal. mild cognitive dysfunction up to 27.5%, moderate cognitive dysfunction 25% and 15% suffered from severe cognitive dysfunction.

The results of the study are in line with research conducted by Mustikawati, namely cognitive dysfunction in non-hemorrhagic stroke patients at Dr. Moewardi Surakarta hospital where the results obtained respondents who had cognitive dysfunction were more than respondents who did not experience cognitive / normal dysfunction, namely 31 people (55.4%).(Mustikawati, 2016)

However, the results of this study are not the same as a study conducted by Fransiska Anita on cognitive dysfunction in non-hemorrhagic stroke patients at the hospital. Stella Maris Makassar, where based on the results of the study most patients did not experience post-stroke cognitive decline / normality, as many as 15 people (60%).(Anita & Linggi, 2020) Another different study was conducted by Feriant at Dadi Hospital, South Sulawesi in non-hemorrhagic stroke patients with cognitive dysfunction, where 25 respondents (52.1%) had normal cognitive function.(Padu et al., 2022)

The consequences of non-hemorrhagic stroke can affect the cognitive function of the patient. The role of cognitive function in everyday life is very crucial because with normal cognitive function a person can remember, take initiative, concentrate, and, solve problems and carry out various

structured plans. Cognitive function is affected by various factors such as occupation, genetics, patient age, genetics, and education level.(Pramudita & Pudjonarko, 2016)

In this study, of all respondents, it was found that the age of samples who experienced a decrease in cognitive function was mostly 50-59 years showing a percentage of 32.5%. This agrees with research conducted by Akhmad Khaerul at Dr. H. Abdul Moeloek Bandar Lampung hospital in 2021, where respondents who had mild cognitive dysfunction and severe cognitive dysfunction occurred at the age of over 50 years.(Khaerul, 2021) Aging that occurs results in a change in the structure that exists in blood vessels, namely the presence of a high level of collagen and a decrease in elasticity texture that occurs between the ages of 20 and 90 years, tunica media which thickens in blood vessels up to 3 times. And the thickened arterial wall causes a decrease in cognitive function.(Ramadhani, 2020)

Based on gender, it is known that impaired cognitive function is suffered by more men than women, showing up to 35%, this agrees with Salsa's research, which shows a study showing male patients after non-hemorrhagic stroke have more cognitive dysfunction.(Ramadhani, 2020) Dementia vascular disease affects more men than women, but many studies show that there are no gender differences that affect the risk of dementia after stroke. Related to the influence of adiponectin levels as a neuroprotective agent. Age-related serum adiponectin levels were observed to be higher in women than men.(Kalaria, Akinyemi, 2016)

Based on the level of education, it is known that 27.5% of respondents who graduated from elementary school suffered from cognitive impairment. The results of this study are in line with Naili's research which based on the level of education of a sample of 10 people with less than 12 years of education, it was found that all (100%) of the samples experienced cognitive impairment.(Riasari, 2022) The cognitive function of highly educated patients is much better than patients with low education. Experience and duration of training train patients to perform various functions such as effective thinking and problem solving.(Boletimi et al., 2021)

In this study, the results of work related to 30% of respondents who were manual laborers and housewives with cognitive dysfunction. This agrees with Manurung's research, which explains that if a job uses thinking ability, it has a greater effect on the neurophysiology of cognitive function than a job that uses muscle strength, such as laborers / employees and housewives. It can be said that workers who use muscles rather than thinking in carrying out their work have a higher risk of a cognitive function disorder.(Manurung et al., 2016)

Based on medical history, it is known that respondents who have cognitive dysfunction have a history of hypertension and diabetes, namely 22.5%. Hypertension is a risk factor that has a major effect on the damage to target organs such as the brain. Hypertension has complications to damage the central nervous system, namely impaired cognitive function. Reduced cognitive function can indicate the presence of a target organ damage such as the brain. The profile and variability of blood pressure within 24 hours is associated with cognitive decline, such as *silent cerebral infarction* or white matter lesions that predispose to cognitive decline and dementia (Ramadhani, 2020).(Ramadhani, 2020) This is in line with research at the hospital. Prof. Dr. Kandou Manado in 2016 which explains that there is a tendency that states that the higher the systolic blood pressure (TDS) and diastolic blood pressure (TTD), the higher the risk of impaired cognitive function. (Riasari, 2022)

Previous studies have also found that the duration of diabetes is also an important risk factor for the development of dementia. Patients with diabetes mellitus with MCI have greater lipid profile levels than those without MCI. Stroke, cardiovascular disease, and high blood sugar levels are among

the risk factors that influence MCI patients to develop dementia. It was also found that people with DM were more likely to develop vascular dementia than Alzheimer's disease.(Riasari, 2022)

Based on the stroke attack, it is known that the decline in cognitive function is more suffered by respondents who experienced a stroke for 1-12 months, namely not less than 37.5%. The results of this study are in line with Putri's research which describes cognitive impairment in patients at RSUD. Dr. Moewardi who found that 31 respondents had impaired cognitive dysfunction due to stroke, with 50-75% of stroke patients having dysfunction and the incidence of dementia arising 3 months after stroke ranging from 23.5 to 61%. Impaired cognitive function can lead to an abnormality of psychosocial function and if it does not get good and correct treatment it can cause the patient's quality of life to decrease.(Mustikawati, 2016)

Cognitive is an advanced function of the human brain, which consists of various functions such as: Language use, comprehension, memory, executive function, information processing, visual perception, arithmetic skill development, perception, executive function. and problem solving, so that if cognitive function is disrupted for a long period of time and does not get maximum proper care, then daily activities will be affected.(Manurung et al., 2016)

According to researchers, cognitive impairments in patients with nonhemorrhagic stroke often go unnoticed by patients, families or medical staff because they are no more or less noticeable than other neurological deficits, researchers said. However, cognitive impairment in nonhemorrhagic stroke patients can significantly reduce patients' quality of life.

Conclusion

Based on research conducted at RSUD Tugurejo Semarang City, it can be concluded:

The level of stress in non-hemorrhagic stroke patients at Tugurejo Hospital in 2022 for the normal stress category was 35.5%, mild stress was 15%, moderate stress was 22.5%, severe stress was 17.5% and very severe stress was 10%. This shows that 65% of patients at Tugurejo Hospital have abnormal stress levels.

Cognitive dysfunction in non-hemorrhagic stroke patients at Tugurejo Hospital in 2022 for the normal category amounted to 32.5% and 67.5% others had impaired cognitive function, with the distribution of mild cognitive function abnormalities by 27.5%, moderate cognitive function abnormalities by 25%, and severe cognitive function abnormalities by 15%.

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