

Research Article

The Effect of Lavender Aromatherapy on Anxiety in Non-Hemorrhagic Stroke Patients

Amir^{1*}, Chandra Hadi P², Rahayu Winarti³¹⁻³ Universitas Widya Husada Semarang, Indonesia*Corresponding Author: amirtoik7@gmail.com

Abstract: Non-hemorrhagic stroke occurs due to an interruption of blood flow to the brain caused by thrombus or embolus blockage in blood vessels. Stroke patients may experience psychological problems, including emotional instability, depression, and anxiety. One non-pharmacological intervention to reduce anxiety is lavender aromatherapy, which provides a relaxation effect. This study aimed to determine the effect of lavender aromatherapy on anxiety levels in non-hemorrhagic stroke patients. The study used a quantitative approach with a quasi-experimental one-group pretest-posttest design. The sample consisted of 36 non-hemorrhagic stroke patients in the working area of Mranggen 2 Community Health Center, selected using purposive sampling. Data were collected using the Hamilton Anxiety Rating Scale (HARS) questionnaire and analyzed through univariate and bivariate analysis using the Wilcoxon test. The results showed that before receiving lavender aromatherapy, most respondents experienced moderate anxiety (22 respondents; 61.1%). After the intervention, most respondents experienced mild anxiety (21 respondents; 58.3%). The Wilcoxon test showed a significance value of 0.000 ($p < 0.05$), indicating that lavender aromatherapy significantly reduced anxiety levels in non-hemorrhagic stroke patients. Lavender aromatherapy can be used as an effective complementary therapy to manage anxiety among stroke patients.

Keywords: Anxiety; Lavender Aromatherapy; Non-Hemorrhagic Stroke; Quasi-Experimental; Relaxation Therapy.

1. Introduction

Non-Hemorrhagic Stroke is a disorder of brain tissue perfusion caused by occlusion (blockage), embolism and bleeding (pathology in the brain itself, not due to external factors) which results in permanent or temporary disorders (Ratnasari, 2020). *Non-Hemorrhagic Stroke* is a neurological deficit that has a sudden onset, lasts more than 24 hours, and is caused by cerebrovascular disease. *Non-Hemorrhagic Stroke* An ischemic stroke occurs when blood flow to part of the brain is disrupted. This is due to a blockage in a blood vessel, a thrombus or embolus, or a ruptured blood vessel. The clinical presentation depends on the location of the injury and the area of the brain perfused by that blood vessel. To treat ischemic brain injury, patients must be evaluated quickly. Ischemic brain injury occurs when the arterial blockage lasts longer than 2 to 3 hours (Morton, Patricia Gonce, 2020).

According to *World Health Organization* (2018) as many as 20.5 million souls in the world Already suffered a stroke since year 2020. Of the total said 5.5 million soul has die world. It is estimated amount *Non- Hemorrhagic Stroke* happen 85% from amount stroke which exists . Disease blood tall or *Non- Hemorrhagic Stroke* donate 17.5 million case stroke in The world. The highest prevalence of stroke in the world is China, with a prevalence of 69.6%, intracerebral hemorrhage 23.8% and 15.8%, subarachnoid hemorrhage 4.4% and 4.4%, and unspecified type 2.1% and 2.0%, with hypertension 88%, smoking 48%, and alcohol use 44% (Wang et al., 2020). In 2020, the highest number of cases occurred in East Asia, with 48% of stroke cases, and Southeast Asia with 49% of stroke cases (Zhao, 2021).

According to Basic Health Research (2018), the prevalence of *non-hemorrhagic stroke* in the population at the age ≥ 15 years in Indonesia increase to 10.9 %. The highest area is in East Kalimantan Province at 14.7%, second place is occupied by the Regency of Special Yogyakarta (DIY) is the province with the highest prevalence of *non-hemorrhagic stroke sufferers* , number three is North Sulawesi with 13.8%, number four is Riau Islands with 12.7% and in

Received: February 15, 2026

Revised: April 20, 2026

Accepted: June 28, 2026

Published: July 30, 2026

Curr. Ver.: July 30, 2026



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fifth place is South Kalimantan with 12.5% of the total population in Indonesia (Ministry of Health, 2018).

In 2018, non-hemorrhagic stroke cases in Semarang showed a significant increase. According to data from the Central Java Health Office, the prevalence of non-hemorrhagic stroke throughout Central Java reached 18,284 cases, an increase of 0.05% compared to the previous year. In the city of Semarang alone, there were 800 new cases of *non-hemorrhagic stroke recorded* in 2018 (Ministry of Health, 2022). Prevalence of *Non-Hemorrhagic Stroke* (permil) in the population aged over 15 years and above based on data according to characteristics in 2018, the highest occurred in the age of 75 years at 50.2% and the lowest in the age of 15-24 years at 0.6%, men 11.0%, women 10.9%, urban communities 12.6%, rural communities 8.8%.

If left untreated, stroke can have physical impacts, including impaired memory and memory loss, a reduced quality of life for the sufferer, their family, and those around them, a more drastic decline in quality of life, physical disability, and even rapid death. Psychological impacts on stroke patients include social disruption, including locking themselves in their rooms or refusing to interact with others. Psychological impacts include emotional instability, anger, depression, and anxiety (Adi, 2020).

Anxiety disorders are one of the most common mental disorders. and related to the burden of disease high, sufficient level of damage large, high utilization of health services, and health care costs This can result in a significant economic burden on the community. Most stroke patients experience medical, social, economic, and psychological problems (anxiety, worry, stress, irritability, and inability to accept their illness). If not properly managed, the resulting anxiety, stress, and psychological disorders will lead to further problems that will worsen the stroke (Sukanto, 2020). stroke suffer from reaction stress post-traumatic. Around 60% case anxiety disorders on patient stroke will end on afraid will fall, Which has associated with decline function physique Which becomes worse if the patient has a history of falling (Andri, 2021).

According to research conducted by Murdiman, (2020), the aim was to determine the level of anxiety in stroke patients and the results showed that the level anxiety patient stroke is at on level anxiety heavy. However, research according to Rahmawati (2022), Which conducted to determine the level of anxiety in *non-hemorrhagic stroke patients* And obtained results that level his anxiety is at on level currently.

Anxiety experienced by patients and families is usually related to threats to their lives and the various changes that *caregivers will experience*. Anxiety is a state in which a person experiences restlessness, worry, or anxiety in response to unclear and nonspecific threats and is associated with feelings of uncertainty and helplessness. Theoretically, anxiety can be managed with pharmacological and nonpharmacological therapies. Pharmacological therapy uses antidepressants in the *Selective Serotonin Re-uptake Inhibitor* (SSRI) and Serotonin and *Norepinephrine Reuptake Inhibitors* (SNRI). Nonpharmacological therapies include therapeutic communication, psychopharmaceuticals, psychotherapy, psychoreligious therapy, distraction techniques, and aromatherapy relaxation (Fatmawati, 2020).

Utilizing aromatherapy as a non-pharmacological healing therapy. Aromatherapy is a therapeutic practice using essential oils to improve physical and psychological well-being. Each essential oil has unique pharmacological effects, such as antibacterial, antiviral, diuretic, vasodilator, sedative, and adrenal stimulating. When essential oils are inhaled, the molecules enter the nasal cavity and stimulate the limbic system in the brain, which is associated with memory and emotion (Ana, 2018).

One aromatherapy option that can be used to reduce anxiety levels is lavender. Lavender aromatherapy is considered to reduce negative feelings in the body such as anxiety, depression, sadness, and other emotions. Most oils contain *linalool*, making up approximately 30-60% of the total oil weight, a compound known to have a relaxing effect (Nuraini, 2020).

Aromatherapy can be used in several ways, including inhalation, bathing, massage, and compresses. Of these methods, inhalation is the easiest to apply. Lavender oil, containing *linalool*, is one of the most widely used aromatherapy treatments, often through inhalation. Five drops of lavender are placed on a cotton ball and then inhaled by the patient, and this intervention is carried out in less than 15 minutes. The positive impact of aromatherapy on reducing anxiety levels is more pronounced when administered directly (inhaled) because the nose has direct contact with the parts of the brain responsible for stimulating the effects of aromatherapy (Dila, 2021).

Based on the results of a *pre-survey* conducted by researchers in the Mranggen 2 Community Health Center area over the past three months, there has been an increase in stroke patients. In April 2024, 32 stroke cases were recorded, in May 2024, 38 stroke cases were recorded, and the peak was in June 2024, with 40 cases. Researchers used the HARS (*Hamilton Anxiety Rating Scale*) sheet from 10 *non-hemorrhagic stroke patients*. Seven of them complained of anxiety, and this anxiety was felt more often at night . (Mranggen 2 Community Health Center medical records).

2. RESEARCH METHODS

Study This use design quantitative with *Quasy experimental* design *one group* pretest & posttest. Sample study totaling 36 non- hemorrhagic stroke patients in the region Mranggen 2 Community Health Center on April 2023 with purposive sampling technique . Criteria inclusion study This covering patient willing become respondents , are in the area Mranggen 2 Health Center and m suffering *Non-Hemorrhagic Stroke (SNH)*. *Exclusion criteria for patients* suffering from *hemorrhagic stroke* , *non-haemorrhagic stroke* with complications and did not follow the research process to completion. Data collected use questionnaire *Hamilton Anxiety Rating Scale* (HARS) for measure level anxiety . Data analysis was carried out in a way univariate And bivariate use test *Wilcoxon* .

3. RESULTS AND DISCUSSION

Characteristic Data Patient

Table 1. Characteristics Non- Hemorrhagic Stroke Patients in the region Community Health Center Mranggen 2 April 2025.

Characteristics	Frequency (f)	Percentage (%)
Age		
Mature early (18-40 years)	0	0
Mature middle (41-60 years)	29	80.6
Adult late (> 60 years)	7	19.4
Type Sex		
Man	22	61.1
Woman	14	38.9
Total	36	100

Table 1 shows that part large (80.6 %) hemorrhagic stroke patients including in category age mature middle (41-60 years), whereas based on type sex known part large (61.1%) male .

Anxiety Level Non- Hemorrhagic Stroke (SNH) Patients Before Giving Lavender Aromatherapy

Table 2. Anxiety Level SNH Patients Before Giving Lavender Aromatherapy April 2025.

Anxiety (<i>pre test</i>)	Frequency (f)	Percentage (%)
No Worried	2	5.6
Anxiety Light	9	25
Anxiety Currently	22	61.1
Anxiety Heavy	3	8.3
Total	36	100

Table 2 shows that majority respondents namely 22 people (61.1 %) experienced anxiety currently.

Description of Anxiety Level Non- Hemorrhagic Stroke (SNH) Patients After Giving Lavender Aromatherapy

Table 3. Anxiety Level SNH Patients After Giving Lavender Aromatherapy in the region April 2025.

Anxiety (<i>post test</i>)	Frequency (f)	Percentage (%)
No Worried	4	11.1
Anxiety Light	21	58.3
Anxiety Currently	10	27.8
Anxiety Heavy	1	2.8
Total	36	100

Table 3 shows that majority respondents namely 21 people (58.3 %) experienced anxiety light.

Influence Lavender Aromatherapy for Anxiety in Non-Hemorrhagic Stroke Patients

Table 4. Influence Lavender Aromatherapy for Anxiety in SNH Patients in April 2025.

	Group	N	Mean Rank	Sum of Rank	q value
Anxiety	Negative rank	33	18.76	619.00	0,000
	Positive rank	2	5.50	11.00	
	Ties	1			
	Total	36			

Table 4 shows singnification $p\text{-value } 0.000 \leq 0.05$ so can concluded there is significant relationship between support family with level anxiety pre- operative patients . Because the rho result is 0.756 then categorized level closeness very strong with direction connection negative .

4. Discussion

Characteristics Patient

Results study show that part large (80.6 %) hemorrhagic stroke patients including in category age mature middle (41-60 years). These results are in line with Arif's (2020) research, where the majority of *non-hemorrhagic stroke patients were in late old age (36%), early old age (35%), and a small proportion of non-hemorrhagic stroke patients were elderly (19%)*.

A person experiences decreased blood vessel elasticity, especially the endothelium, which thickens the intima, narrowing the blood vessel lumen and reducing cerebral blood flow (Oktaviani, 2021). Advanced age, with all its accompanying physiological changes and health conditions, is a major risk factor for stroke. With age, blood vessels tend to harden and develop atherosclerotic plaque, which can block blood flow to the brain. The prevalence of hypertension also increases with age, and high blood pressure can damage blood vessels, increasing the risk of stroke. Diabetes, which is more common in older adults, also contributes to this risk by increasing the likelihood of blood vessel blockages (Suirakka, 2021).

According to researchers, the aging process naturally brings physiological changes to blood vessels, such as hardening and the buildup of atherosclerotic plaque, which can lead to blockages in blood flow to the brain. Common health conditions in older adults, including hypertension, diabetes, and heart rhythm disorders such as atrial fibrillation, also contribute to an increased risk of stroke.

Results study show that part A large proportion (61.1 %) are men. In general, epidemiological data indicate that stroke incidence tends to be higher in men than in women. However, differences in risk factors and individual characteristics complicate this view. Women may have unique risks, such as the use of hormonal contraceptives and postmenopausal hormone therapy, while men may be more affected by certain factors (Howard, 2019).

Awareness of these differences is crucial for developing appropriate prevention strategies. Stroke prevention in both sexes involves managing risk factors such as high blood pressure, diabetes, and a healthy lifestyle. While data shows general trends, each individual's risk is unique, and a personalized approach to prevention planning is crucial. Consulting with a healthcare professional can help assess personal risk and develop an appropriate prevention plan (Laili, 2022).

These results align with Arif's (2020) research, which found that 63% of *non-hemorrhagic stroke patients* were female, while 37% were male. Another study by Dini (2021) found that, in terms of gender, stroke incidence in the elderly was higher in men (29 people (55.8%) and women (23 people (44.2%)).

According to researchers, stroke risk in women involves a number of factors, including biology, lifestyle, and underlying health conditions. Hypertension, or high blood pressure, remains a major risk factor, damaging blood vessels and increasing the chance of blockage of blood flow to the brain. Use of hormonal contraceptive pills, especially in women who smoke and are over 35, and postmenopausal hormone therapy, particularly combinations of estrogen and progestin, can also increase the risk of blood clot formation that can lead to stroke.

Anxiety Level Hemorrhagic Stroke Patients Before Giving Lavender Aromatherapy

Results study show that majority respondents namely 22 people (61.1 %) experienced anxiety currently before giving lavender aromatherapy. Hemorrhagic stroke patients who experience worried edang can caused by after experiencing hemorrhagic stroke, the patient experience tension emotional to condition health issues faced such as pain, action medical and situation House pain that is not comfortable.

Hemorrhagic stroke patients experience change life post stroke attack, because own high dependency in others, experiencing disturbance mobility and risky experience complications If No can manage hemorrhagic stroke with good. This is become a stressor to anxiety experienced by Hemorrhagic stroke patients . This is in accordance with Stuart's opinion (2013, in Budi, 2020) which states that precipitating factors are all the tensions in life that can trigger the emergence of anxiety. One of the factors precipitation is a threat to physical integrity tension that threatens physical integrity. atmosphere and optimistic, full feeling hope and calm inner (Islamiyyah, 2022).

Anxiety Level Hemorrhagic Stroke Patients After Giving Lavender Aromatherapy

Results study show that majority respondents namely 21 people (58.3 %) experienced anxiety light after giving lavender aromatherapy. Hemorrhagic stroke patients who experience decline anxiety from currently become light after given lavender aromatherapy because lavender contains substance linalool chemistry and linalyl acetate which has sedative effects and anxiolytic (anti- anxiety) so that affect neurotransmitters in the brain such as GABA (gamma aminobutic acid) which helps lower anxiety . This is in accordance with opinion Widiyono et al. (2022) who stated that the main ingredients in lavender are *linalool* and *linalyl acetate*. *Linalool* is the main active ingredient, known for its relaxation properties, which can reduce anxiety and pain.

Influence Lavender Aromatherapy for Anxiety in Non-Hemorrhagic Stroke Patients

Results *Wilcoxon* test obtained *p value* of $0.000 < \alpha (0.05)$, this means that there is an effect of lavender aromatherapy on reducing lavender aromatherapy in *non-hemorrhagic stroke* patients. at the Mranggen 2 Community Health Center UPTD. Providing lavender aromatherapy to non-hemorrhagic stroke patients is an approach that combines lavender essential oil with the aim of reducing the level of anxiety they may be experiencing. Lavender aromatherapy involves the use of lavender essential oil, which contains compounds such as linalool and linalyl acetate. This essential oil, when used correctly, can provide a number of benefits for non-hemorrhagic stroke patients (Wulandari, 2022). The distinctive aroma of lavender is known to stimulate the brain's limbic system, which is central to regulating emotions and stress responses. By stimulating the limbic system, lavender aromatherapy can create feelings of calm and relaxation in patients. This helps reduce the level of anxiety that may arise from the stroke experience and changes in their health condition (Ernawati, 2021). Furthermore, lavender aroma also has muscle relaxant properties. Stroke patients often experience muscle tension, which can be a source of physical and emotional discomfort. Lavender aromatherapy can help relieve this physical tension, provide a feeling of comfort, and reduce the physical symptoms that often accompany anxiety (Andri, 2021).

Using lavender aromatherapy before bed can also help improve sleep quality. Good sleep is crucial for managing anxiety and recovering in stroke patients, and lavender can help create a more comfortable and relaxing sleep environment (Heri, 2021).

Giving lavender aromatherapy to non-hemorrhagic stroke patients aims to create an environment that supports feelings of well-being. calm, physical relaxation, and better sleep, all of which can help reduce the level of anxiety they may be experiencing. It is important to note that the use of lavender aromatherapy should be done with caution, and patients and medical staff should always be aware of the possibility of allergic reactions or individual sensitivities to lavender essential oil (Florin, 2023).

The research results obtained are in line with the results of Ramadhani's (2020) research on "The Effect of Lavender Aromatherapy on Reducing Anxiety in Caregivers of Stroke Patients in the Sempaja Health Center Work Area" obtained an asymp. Sig (2-tailed) value ($0.000 < 0.005$) so it can be concluded that there is a significant influence in providing lavender aromatherapy on reducing anxiety in caregivers of stroke patients in the Sempaja Health Center work area. Other research results show similar results, the results of Sri's research (2021), showed that the results of the statistical test with Wilcoxon obtained a *p-value* of $0.00 (<0.05)$.

According to researchers, lavender has become a topic of discussion in the mental health world due to its ability to reduce symptoms of anxiety. The key components of lavender, such as linalool and linalyl acetate, have a calming effect on the body and mind. One way lavender helps reduce anxiety is through aromatherapy, where the scent of lavender stimulates the

brain's limbic system, which is associated with emotions and stress, creating a feeling of relaxation. Lavender also has properties that relieve physical tension with a muscle relaxant effect, helping to reduce the physical symptoms that often accompany anxiety. Additionally, lavender is used to improve sleep quality by reducing anxiety before bed, which can help reduce overall anxiety. Using lavender in various forms, such as essential oils, aromatherapy, or aromatherapy massage, can be an effective option for those seeking a natural alternative to managing anxiety.

5. CONCLUSION

Characteristics respondents known part large (80.6%) hemorrhagic stroke patients including in category age mature middle (41-60 years), whereas based on type sex known part large (61.1%) male. Anxiety level before giving lavender aromatherapy is known majority respondents namely 22 people (61.1 %) experienced anxiety currently. Anxiety level after giving lavender aromatherapy is known majority respondents, namely 21 people (58.3 %) experienced anxiety light. There is the effect of lavender aromatherapy on reducing anxiety levels in non- hemorrhagic stroke patients at the Mranggen 2 Community Health Center UPTD with a p value of 0.000.

REFERENCE

- Adi. (2020). *Practical guide to aromatherapy for beginners*. Gramedia Pustaka Utama.
- Agustin, et al. (2020). *National Journal Nursing University Muhammadiyah Surakarta*.
- Ana. (2018). *Alternative and complementary therapies in nursing*. In Media.
- Andri. (2021). The effect of anti-stroke exercise on reducing blood pressure in non-hemorrhagic stroke patients in Jatirunggo Village, Pringapus District, Semarang Regency.
- Andri. (2021). The effect of rosemary (*Rosmarinus officinalis*) essential oil aromatherapy on short-term memory in adult women. *Journal of Nursing Science*.
- Astuti, W., Rahayu, H. S. E., & Wijayanti, K. (2019). The effect of bitter orange aromatherapy on pain and anxiety in the active phase of stage 1. In *Proceedings of the National & International Seminar*.
- Dila. (2021). *Textbook of medical physiology* (11th ed.). EGC.
- Donsu, J. D. T. (2019). *Nursing psychology* (1st ed.). Pustaka Baru Press.
- Fatmawati. (2019). Comparison of the effectiveness of yoga physical activity with lavender aromatherapy massage on reducing blood pressure in elderly services. *Prima Health Journal*, 11(2), 83–92. <https://doi.org/10.32807/jkp.v11i2.1>
- Hongratanaworakit, T. (2018). Stimulating effect of aromatherapy massage with jasmine oil. *Natural Product Communications*, 5, 157–162. <https://doi.org/10.1177/1934578X1000500136>
- Khoirullisa, I. (2019). *The influence of Citrus aurantium aromatherapy with slow deep breathing during pre-operation caesarean section to anxiety with spinal anesthesia in Hospital PKU Muhammadiyah Bantul* (Doctoral dissertation, Poltekkes Kementerian Kesehatan Yogyakarta).
- Khotimah, N., Handayani, R. N., & Susanto, A. (2021). Nursing care for physical mobility impairments in Mrs. S with non-hemorrhagic stroke in the Orchid Room, Dr. R. Goeteng Taroenadibrata Purbalingga Regional Hospital. *Journal of Anesthesiology Nursing Studies, Applied Undergraduate Program*.
- Mirazanah, I., Carolin, B. T., & Dinengsih, S. (2021). The effect of lavender aromatherapy on anxiety in women during childbirth. *Journal Midwifery Malahayati*, 7(4). <http://ejurnalmalahayati.ac.id/index.php/kebidanan>
- Morton, P. G. (2019). *Critical care nursing*. EGC.
- Murdiman. (2019). *AZ aromatherapy for health, fitness, and beauty*. Lily Publisher.
- Notoatmodjo, S. (2018). *Health research methodology*. Rineka Cipta.
- Nuraini. (2019). *Solution approach as a nursing action effort to reduce anxiety, stress, and depression*. CV. Trans Info Media.
- Pola, M., Tidak, N., Amalia, J. K., & Yudhono, D. T. (2022). Nursing care for non-hemorrhagic stroke patients with Harapan Bangsa University, Central Java, Indonesia. [Nama jurnal tidak tersedia], 2, 108–112. <https://doi.org/10.36086/jkm.v2i2.1225>
- Rahmawati. (2022). *The effect of jasmine oil aromatherapy (Jasminum sambac) on accuracy and alertness in adult men*.
- Ramadhani, S. (2022). *The effect of cognitive behavioral therapy on state anxiety levels in nursing students during clinical practice* (Doctoral dissertation, Poltekkes Kemenkes Yogyakarta).
- Ratnasari, Kasmawati, Musdalipa, & Azwar. (2018). The effectiveness of laughter therapy in lowering blood pressure in non-hemorrhagic stroke patients in the working area of the Jagong Health Center, Pangkajene District, Pangkep Regency. *BIMIKI*, 6(1), 34–48.

- Riskesdas. (2018). *Hasil utama Riset Kesehatan Dasar (Riskesdas)*. Kementerian Kesehatan Republik Indonesia.
- Saputri. (2020). *Textbook of medical physiology* (11th ed.). EGC.
- Sarosa. (2018). Stroke classification based on pathological abnormalities with learning vector quantization. *EECCIS Journal*.
- Setyawan, A., & Oktavianto, E. (2020). The effectiveness of lavender aromatherapy on anxiety levels facing OSCE in nursing students. *Jurnal Berkala Kesehatan*, 6(1), 9. <https://doi.org/10.20527/jbk.v6i1.8356>
- Setyoadi, & Kushariyadi. (2018). *Nursing modality therapy for psychogeriatric clients*. Salemba Medika.
- Suciptayani. (2018). *Overview of nursing care for non-hemorrhagic stroke patients with self-care deficit in Oleg Ward, Mangusada Badung Regional Hospital in 2018* (Diploma thesis, Department of Nursing).
- Sukamto. (2020). *Aromatherapy: A friend for expectant mothers*. Dian Rakyat.
- World Health Organization. (2018). *Measure your blood pressure, reduce your risk*. World Health Organization.