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Research Article

**The Influence of Jasmine  
Aromatherapy on the Sleep  
Quality of Stroke Patients at Bogor  
Hospital in 2023**

**Anastasia Dian Parlina<sup>1\*</sup>, Agus Purnama<sup>2</sup>,  
Sulsadi<sup>3</sup>**

<sup>1</sup>Faculty of Health Sciences, Universitas Indonesia  
Maju, Indonesia

\*Email Corespondent: anastdian@gmail.com



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Conflict of interest statement: In this study, the researchers ensure that there are no conflicts of interest either individually or on behalf of any organization, so there were no significant issues or obstacles encountered during the research process.

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**Abstract**

**Introduction:** Stroke results in ongoing cognitive impairments that lead to increased blood pressure, heart attacks, and psychological issues such as depression and sleep quality disorders. The impact of untreated sleep quality disorders can hinder the rehabilitation or recovery process. The sleep quality issues experienced by stroke patients can be addressed through both pharmacological and non-pharmacological therapies, including the use of complementary therapy such as jasmine aromatherapy.

**Objective:** To determine the effect of jasmine aromatherapy on the sleep quality of stroke patients.

**Method:** This research design uses a quasi-experiment with two groups pre and post-test. The instrument used is an observation sheet.

**Results:** Research was conducted on 36 samples in the intervention group that were given jasmine aromatherapy. The effect size was 2,36 and in the control group, the p-value was found to be 0,058 with an effect size of 0,491.

**Conclusion:** From the results of the research that has been carried out, it can be concluded that there is an effect of administering jasmine aromatherapy on sleep quality in stroke patients.

**Keywords:** aromatherapy, sleep quality, stroke

**Introduction**

Stroke is the second leading cause of death worldwide after heart disease.<sup>1</sup> Damage from a stroke can manifest as loss of strength, paralysis, and other physical impairments. Additionally, it can lead to mental health issues such as depression and poor sleep quality, as well as physical health problems like hypertension and heart attacks. Changes that occur in stroke patients include limb disabilities that can result in physical mobility impairments

leading to disturbances in control, movement, sensory impairments, language impairments, sleep disturbances, and emotional disturbances.<sup>2</sup> Stroke patients often report daytime sleepiness as a result of these issues, disrupting their sleep patterns and, ultimately, their sleep quality.<sup>3</sup> Patients with a history of stroke are more likely to experience these sleep problems compared to individuals without a history of stroke.

Management of sleep disorders or insomnia can be done with pharmacological therapy, but this can lead to side effects. Therefore, therapy that does not produce side effects is needed. Aromatherapy with essential oils is a simple alternative treatment that has the potential to relieve stress and improve sleep quality.<sup>4</sup> Anxiety, tension, and poor sleep quality can be addressed with the use of aromatherapy, according to research.<sup>5</sup> There are various types of *aromatherapy* such as bergamot, peppermint, lemon, rose, marjoram, and lavender. However, the aromatherapy here that can improve sleep quality is jasmine aromatherapy.<sup>6</sup> Alemeh Sultan found that jasmine essential oil aromatherapy can improve overall sleep, quality with an effect size intervention = 0.24, P = 0.001.<sup>7</sup> Another study, as stated by *Her & Cho* (2021) involving 1657 participants and based on the results of 30 research articles, objectively identified data that can be utilized using aromatherapy. The effect of aromatherapy on improving sleep quality is statistically significant, with sub-analysis results indicating a substantial effect size in inpatients and the elderly.<sup>5</sup> Similarly, research by Hirokawa et al (2012) on lavender aromatherapy improved sleepiness upon waking after the intervention.<sup>8</sup> The Pittsburgh Sleep Quality Index (PSQI) survey was administered to both groups of participants. The study found that administering aromatherapy oil before sleep for 30 days improved sleep quality. Hany Alfrina demonstrated that aromatherapy oil significantly improved the sleep quality of ischemic stroke patients at a military hospital in Malang.<sup>9</sup> The asymptotic value of this study is 0.000 (<0.05). Patients with a history of stroke are more likely to experience these sleep problems compared to individuals without a history of stroke.

This study aims to determine the effect of jasmine aromatherapy on the sleep quality of stroke patients, thereby helping them in their recovery. By inhaling aromatherapy the patient becomes relaxed and can rest.

## Method

This research uses an experimental design with a non-equivalent control group quasi-experimental approach or a non-randomized control group pretest-posttest design. It involved 36 respondents from several hospitals in the city of Bogor. Sampling was conducted using a dependent t-test based on the initial screening results for hemorrhagic stroke. The study lasted for one month, specifically in December 2023. The variables in this research include aromatherapy, and respondent characteristics data such as age, gender, education, and occupation. Aromatherapy serves as the independent variable, while sleep quality is the dependent variable. The population of this study comprised hemorrhagic stroke patients, with the sample being those experiencing sleep quality disturbances in hospitals. The sampling technique used in this research was Purposive Sampling, tailored to inclusion criteria: patients with hemorrhagic stroke, not undergoing other complementary therapies, without olfactory problems, willing to participate, and not consuming caffeine, alcohol, or sedative medications. The sample size for this study was determined to be 36 respondents, the sample was hemorrhagic stroke patients, ensuring representativeness by calculating the minimum sample size using the G Power program (version 3.1.9.4).<sup>10</sup>

This study used two groups, namely the control group and the intervention group. The control group means patients who were not given aromatherapy and the intervention group is the group that was given aromatherapy. The first stage is the sleep quality

screening process using the Pittsburgh Sleep Quality Index (PSQI). The second stage involves intervention implementation and data collection. The researcher then implements the intervention and observes, and records the results according to the established instrument. Jasmine aromatherapy is given by dripping it onto a tissue which is then inhaled and placed next to the pillow. This is done continuously for three days before going to bed. The research implementation lasts for one month. The instrument used in this study utilizes pre and post-test questionnaires regarding sleep quality in hemorrhagic stroke patients using the Pittsburgh Sleep Quality Index (PSQI). If the total score is  $\leq 5$ , it indicates good sleep quality, while a total score of  $> 5$  indicates poor sleep quality.

Data analysis in this study employs univariate and bivariate analysis. The statistical analysis application used in this research is JAMOVI 2.2.5, an open-source application that can be freely downloaded through the official website. Univariate analysis utilizes descriptive analysis, while bivariate analysis employs dependent t-tests to observe mean differences before and after treatment in two groups. This study has passed the research ethics protocol conducted by the Research Ethics Commission of Universitas Indonesia Maju with the number: No.7417/Sket/Ka-Dept/RE/UIMA/XI/2023. All protocols, including Standard Operating Procedures (SOP), have been reviewed and revised according to feedback from the local Research Ethics Commission. Participation in the research is voluntary, and there is no coercion. Researchers use informed consent as evidence of the respondent's participation in the research process.

## Results

The data analyzed in this study include respondent characteristics, which encompass age, gender, education, and occupation among hemorrhagic stroke patients.

**Table 1.** Respondent Characteristics Based on Age, Education, Occupation, and Gender (n=36)

Characteristics	Category	Mean (SD)/ n (%)
Age, Mean (SD)	Age	58,9 (10,8)
Education, n (%)	No School	1 (2,8)
	Elementary School	7 (19,4)
	Junior High School	9 (25,0)
	Senior High School	11 (30,6)
	Bachelor's Degree	8 (22,2)
Occupation, n (%)	Employed	17 (47,2)
	Unemployed	19 (52,8)
Gender, n (%)	Male	16 (44,4)
	Female	20 (55,6)

Table 1 shows that out of 36 respondents, the highest average age of respondents is 58.9 (10.8%). At the level of education, High School education shows the most dominant result, with 11 (30.6%) respondents. The data also indicates that many respondents are unemployed (retired), totaling 19 (52.8%). Based on respondent data, females are more dominant, comprising 20 (55.6%).

**Table 2.** Description of Sleep Quality Before and After in Intervention and Control Groups

Group	Pre	Post
	Mean (SD)	Mean (SD)
Control	7,44 (2,97)	6,50 (2,60)
Intervention	10,28 (2,22)	3,89 (1,49)

Based on Table 2, in the intervention group, the pre-score for sleep quality is 10.28 with a standard deviation of 2.22, and the mean score post-intervention is 3.89 with a standard deviation of 1.49. Meanwhile, in the control group, the pre-score for sleep quality is 7.44 with a standard deviation of 2.97, and the mean score post-intervention is 6.50 with a standard deviation of 2.60.

**Table 3.** Description of Sleep Quality in Intervention and Control Groups

	Pre			Post			P-Value	Effect size
	N	Mean	SD	N	Mean	SD		
Control	18	7,44	2,97	18	6,50	2,60	0,058	0,491
Intervention	18	10,28	2,22	18	3,89	1,49	<0,001	2,36

Based on Table 3, the analysis results from the intervention group to determine the effect of jasmine aromatherapy using the Wilcoxon-W test obtained a result of  $P 0.001 < 0.005$ , meaning  $H_0$  is rejected and  $H_a$  is accepted, indicating an effect before and after the administration of jasmine aromatherapy in the intervention group with an effect size of 2.36, indicating a strong effect. Meanwhile, the analysis results in the control group, which was not given jasmine aromatherapy, showed a P-value of  $0.058 < 0.05$ , indicating an effect on the change in sleep quality scores in the control group with an effect size of 0.491.

**Table 4.** Comparison of Sleep Quality Between Intervention and Control Groups

Intervention		Control		P-value	Effect size
N	Mean (SD)	N	Mean (SD)		
18	3.89 (1.49)	18	6.50 (2.60)	0.001	0.620

Based on Table 4, the analysis yielded a p-value of  $0.001 < 0.005$ , indicating a difference in sleep quality before and after receiving jasmine aromatherapy. The effect size is 0.620, which is considered a moderate effect. The control group has an average score of 6.50 with a standard deviation of 2.60, while the intervention group has an average score of 3.89 with a standard deviation of 1.49.

## Discussion

### Description of Characteristics: Age, Education, Occupation, and Gender

The table above presents the research findings, revealing that 36 individuals, with an average age ranging from 61 to 70 years, participated in this survey. This indicates that the likelihood of stroke increases with age. There is a strong relationship between age and stroke. With advancing age, there is a decrease in sleep efficiency from the age of 50 onwards, with a significant decrease in sleep efficiency of 3% every 10 years, indicating that increasing age is associated with changes in sleep quality, especially in terms of the number and duration of sleep disturbances.<sup>11</sup> In stroke, it can be concluded that age is one

of the factors, as there are physiological changes associated with age-related decreases in the elasticity of blood vessels in the brain.

Occupation is something that individuals do for a specific purpose. Most respondents have stopped working and retired. This is related to paralysis of the body parts which makes it difficult for us to move and carry out daily activities. There is a correlation between a person's job position and their financial condition, as well as several diseases that tend to be hereditary in families and impact household income. The frequency of stroke-related deaths is closely related to occupation and family income. Stroke-related deaths generally increase in patients with low social status.<sup>11</sup> Unemployed patients have a higher risk of experiencing a stroke. They tend to be relaxed, inactive, and stressed compared to the general population. It can be concluded that unemployed patients are more likely to suffer from strokes because they tend to have a more relaxed lifestyle, irregular eating habits, lack of exercise, high blood pressure risk factors, and higher stress levels than those who are employed.<sup>11</sup>

This study revealed that high school education indicates the most dominant data among respondents experiencing sleep quality disturbances. It is known that higher education levels can help reduce anxiety. People with higher education levels have better coping skills in dealing with their illness. This research is consistent with the study conducted by Sulana (2020), which stated that the majority of respondents had a high level of education. Education is an indicator of socioeconomic status, and education can also broaden public knowledge to improve health behaviors and outcomes.<sup>12</sup>

From the research, it is evident that if broken down by gender, the majority of respondents are female. This finding contradicts previous research showing higher stroke rates in men aged 30–80 years.<sup>13</sup> Men engaging in risky behaviors such as smoking, lack of exercise, poor dietary patterns, and excessive alcohol consumption are major contributors to this increase.<sup>14</sup> According to many studies, strokes occur more frequently in men than in women. However, both men and women have an equal risk of stroke after menopause.<sup>15</sup> Although men have a higher risk of stroke, women have estrogen that keeps the immune system strong until menopause.<sup>11</sup> Stroke can occur in anyone, regardless of gender, but men are more likely to have a stroke due to several factors, including smoking and high levels of stress, as well as risky lifestyle choices. Based on the researcher's study and previous research, the researcher's assumption explains that sleep quality in stroke patients affects the slow recovery process of motor and cognitive functions in patients. Researchers also believe that poor sleep quality slows down healing.

### **The Effect of Jasmine Aromatherapy on Sleep Quality in the Intervention and Control Groups**

In the stroke patient study, the intervention group had poor sleep quality before aromatherapy administration. The sleep quality of the intervention group decreased after aromatherapy administration. Similar decreases in sleep quality also occurred in the control group without aromatherapy administration. Researchers found that the intervention group experienced effects before and after receiving jasmine aromatherapy. They also found that the intervention group differed from the control group, with the intervention group showing more significant differences in average values. Linalool and linalyl acetate, two components of jasmine flower aromatherapy, are calming agents that can help alleviate sleep difficulties. Inhaling the aroma will activate olfactory nerve receptors, which then send signals to the limbic system, where the receptors trigger the production of serotonin, a feel-good hormone that can even regulate the onset of sleep. The relationship between patient characteristics and hypertension with the incidence of hemorrhagic stroke.<sup>5</sup>

Researchers assume that when we drop a few drops of aromatherapy oil on a tissue and place it next to the pillow used for sleeping, it can affect comfort during sleep and overall rest time. The description of sleep quality before and after in the control group showed a mean score of 7.44 with a standard deviation of 2.97, and the mean score after receiving jasmine aromatherapy was 6.50 with a standard deviation of 2.60. The research results indicate a decrease in sleep quality before and after in the intervention group.

### **Implications and Limitations**

The findings of this study suggest that patients with hemorrhagic stroke who have poor sleep quality can be given aromatherapy to maximize rehabilitation therapy and restore the sleep quality of patients. The limitation of this study is the small number of respondents sampled; it is hoped that future researchers will sample more extensively. This research can serve as a reference and be used by the public to consider aromatherapy intervention as a beneficial intervention for stroke patient recovery.

### **Conclusion**

The administration of Jasmine aromatherapy is highly significant in improving sleep quality, especially in hemorrhagic stroke patients. This research can serve as a reference, particularly for complementary care, and serve as evidence-based nursing interventions that can be performed on patients. Future research is recommended to use larger samples with a research design that utilizes randomized sampling systems and even larger samples to minimize biases and maximize the results of the research conducted.

### **Conflict of Interest Declaration**

In this study, the researchers ensure that there are no conflicts of interest either individually or on behalf of any organization, so there were no significant issues or obstacles encountered during the research process.

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