



The Effect of Neck Massage Using Olive Oil on Headache Pain Intensity in Hypertensive Patients: A Case Study

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ABSTRACT

Introduction: Hypertension is a major global health problem and often accompanied by subjective complaints such as headache and neck stiffness, which may reduce patients' quality of life. Non-pharmacological nursing interventions are needed to complement pharmacological therapy in managing pain among hypertensive patients. One alternative intervention is neck massage using olive oil, which promotes muscle relaxation and improves local blood circulation.

Objective: This study aimed to describe the effectiveness of neck massage using olive oil in reducing headache intensity in patients with hypertension.

Method: This research employed a descriptive case study design involving two hypertensive patients who experienced headache in the working area of Kahuripan Primary Health Center, Tasikmalaya. The intervention consisted of neck massage using olive oil for 10 minutes once daily over three consecutive days. Pain intensity was measured before and after each session using the Numeric Rating Scale (NRS). Data were analyzed descriptively by comparing pain scores before and after the intervention.

Result: Both respondents experienced a consistent decrease in headache intensity following the intervention. The first respondent showed a total reduction of four points (from 6 to 2), while the second respondent showed a reduction of three points (from 5 to 2) over three days of treatment.

Conclusion: Neck massage using olive oil was effective in reducing headache intensity among hypertensive patients. This intervention can be recommended as a complementary non-pharmacological nursing therapy to improve patient comfort alongside standard pharmacological management.

Keywords: hypertension, headache, neck massage, olive oil, non-pharmacological therapy

Introduction

Hypertension, commonly known as high blood pressure, is one of the global health challenges affecting millions of people worldwide (Sinaga et al., 2024). Prevalensi penyakit ini terus meningkat dari tahun ke tahun. World Health Organization (WHO) in 2025, reported that

more than one billion people worldwide suffer from hypertension. It is estimated that 1.4 billion adults aged 30–79 years globally were affected by hypertension in 2024, representing approximately 33% of the population in this age group.

The high incidence of hypertension contributes to an increased risk of cardiovascular diseases, stroke, and kidney failure (Lemone et al., 2016). In Indonesia, the prevalence of hypertension remains high and is one of the leading causes of visits to primary healthcare facilities (Badan Pusat Statistik, 2025; Kemenkes RI, 2025).

Based on the 2023 Indonesian Health Survey (SKI), the prevalence of hypertension diagnosed by physicians and based on blood pressure measurements among individuals aged ≥ 18 years in West Java was 34.4%, with the highest prevalence recorded in Central Kalimantan at 40.7% and the lowest in Papua Highlands at 19.9% (Badan Kebijakan Pembangunan Kesehatan Kementerian Kesehatan RI, 2023). Meanwhile, according to Open Data Jabar in 2021, the number of hypertension cases in West Java was reported at 12.4%. Furthermore, Open Data of Tasikmalaya City in 2023 reported that 49.9% of patients visiting Kahuripan Primary Health Center were diagnosed with hypertension.

Patients with hypertension often experience subjective complaints such as headache, heaviness in the neck area, dizziness, and fatigue. Headache in hypertensive patients is associated with increased intracranial pressure due to decreased cerebral blood flow, vasoconstriction of blood vessels, and tension in the neck and nape muscles. These conditions cause discomfort and may reduce patients' quality of life if not managed comprehensively (Sinaga et al., 2024).

Hypertension management is generally conducted through pharmacological therapy using antihypertensive medications (Lemone et al., 2016). However, the use of non-pharmacological therapies as complementary interventions is highly needed to enhance treatment effectiveness and reduce dependence on medication (Lattanzio & Weir, 2020). Non-pharmacological interventions that can be performed by nurses include relaxation techniques, deep breathing exercises, warm compresses, and massage therapy (Setiadi et al., 2024).

Neck massage is a massage technique that focuses on the posterior neck and shoulder areas. This intervention can improve blood circulation, relax muscles, and reduce pain stimulation. To facilitate the massage, lubricants such as olive oil are commonly used. Olive oil contains vitamin E, which helps moisturize the skin, and polyphenols, which have anti-inflammatory properties that can penetrate the skin pores, thereby reducing pain and promoting relaxation (Yoganita et al., 2019).

Several studies have demonstrated that neck massage is effective in reducing headache intensity in patients with hypertension. For instance, a study by Dhari (2022) found a significant effect of neck massage using olive oil on hypertensive patients experiencing headaches. The results indicated that after four days of neck massage with olive oil, there was a noticeable reduction in headache intensity. However, the implementation of this intervention in nursing practice at primary healthcare services remains limited.

Objective

This study aimed to describe the effectiveness of implementing neck massage using olive oil in reducing headache pain among patients with hypertension.

Method

Design and setting

This study employed a descriptive case study design involving hypertensive patients who experienced headaches and received neck massage intervention using olive oil. The study was conducted in the working area of Kahuripan Primary Health Center, Tasikmalaya City.

Population and sampling

The study population consisted of patients diagnosed with hypertension who experienced headaches. The sample was selected using a purposive sampling technique with the following inclusion criteria: hypertensive patients with blood pressure $\geq 140/90$ mmHg, experiencing headache with a minimum pain scale of 4 based on the Numeric Rating Scale (NRS), and willing to participate in all intervention procedures. The number of subjects in this case study was two patients.

Instrument and measurement

The instruments used included nursing assessment sheets, the Standard Operating Procedure (SOP) for neck massage, and the Numeric Rating Scale (NRS) to measure pain intensity. Pain was assessed before and after each massage session using the NRS (scale 0–10).

Data collection and analysis

The intervention consisted of a 10-minute neck massage using olive oil applied to the posterior neck and shoulder areas, conducted once daily for three consecutive days at the same time each day. Data collection techniques included observation sheets and interviews using a time-series method, in which the intervention was administered for three consecutive days and pain intensity was measured before and after each session daily.

Data were collected through observation and interviews. Pain intensity was measured before and after the neck massage intervention each day for three consecutive days. The data were analyzed descriptively by comparing changes in pain scores before and after the intervention for each patient.

Result

The authors visited Kahuripan Primary Health Center to submit the research permit and ethical approval documents. After receiving the official approval letter from the health center, the ethical clearance, and obtaining respondents who met the predetermined criteria, data collection was initiated. The respondents visited the health center for routine treatment, during which the authors conducted nursing assessments. The results of the assessment of respondents' characteristics were as follows:

Table 1. Respondent Characteristics

No	Karakteristik	Responden 1	Responden 2
1	Gender	Female	Female
2	Age	53 years old	74 years old
3	Work	Housewife	Housewife

No	Karakteristik	Responden 1	Responden 2
4	Family History of Disease	Hypertension	There isn't any
5	Suffering from hypertension for a long time	4 years	7 years

The characteristics of both respondents are presented in Table 1. Both respondents were female, aged 53 and 74 years, and were housewives. The first respondent had a family history of hypertension and had suffered from hypertension for four years, whereas the second respondent had no family history of hypertension and had experienced hypertension for seven years.

Both respondents worked as housewives. Relatively monotonous daily activities and the possible lack of structured physical activity may serve as risk factors for the development of hypertension, particularly when not balanced with a healthy lifestyle.

Overall, the respondents' characteristics indicate that advanced age, female gender, and the duration of hypertension play important roles in their clinical conditions and support the importance of non-pharmacological nursing interventions to improve patient comfort.

The description of pain scale changes before and after neck massage using olive oil for three consecutive days is presented in Table 2.

Table 2. Changes in Pain Scale Before and After Neck Massage Using Olive Oil

Respondent	Day	Pain Scale		Information
		Sebelum	Sesudah	
Respondent 1	Day 1	6	4	4 point difference
	Day 2	5	3	
	Day 3	4	2	
Respondent 2	Day 1	5	4	3 point difference
	Day 2	4	2	
	Day 3	3	2	

Based on Table 2, a decrease in headache pain intensity was observed in both respondents after the neck massage intervention using olive oil for three consecutive days.

In the first respondent, the pain scale before the intervention on the first day was 6 and decreased to 4 after the treatment. On the second day, the pain scale decreased from 5 to 3, and on the third day from 4 to 2. Overall, the first respondent experienced a total reduction of four points from the beginning to the end of the intervention.

In the second respondent, the initial pain scale on the first day was 5 and decreased to 4 after the intervention. On the second day, the pain scale decreased from 4 to 2, and on the third day from 3 to 2. Overall, the second respondent experienced a total reduction of three points.

These results indicate that the consistent application of neck massage using olive oil effectively reduced headache intensity in both respondents throughout the intervention period.

Discussion

Based on the respondents' characteristic data, advanced age, female gender, and the duration of hypertension play important roles in the respondents' clinical conditions and support the importance of non-pharmacological nursing interventions to improve patient comfort.

The respondents' characteristics indicate that age and disease history significantly influence the clinical profile of hypertensive patients. Advanced age, particularly over 60 years, is associated with an increased risk of hypertension due to reduced vascular elasticity and increased arterial stiffness, which may clinically affect the occurrence of headaches. Studies have shown that structural vascular changes occurring during the aging process worsen blood pressure regulation and cerebral perfusion, which serve as one of the mechanisms contributing to pain in elderly hypertensive patients.

In addition, a family history of hypertension is an important genetic predisposing factor that can increase an individual's risk of developing hypertension. Epidemiological literature indicates that individuals with a family history of hypertension are more likely to experience hypertension compared to those without such a history, which also influences the manifestation of symptoms, including headaches.

The duration of hypertension is also a significant factor. Long-term hypertension leads to hemodynamic and neurovascular changes, causing patients to experience pain complaints more frequently and with greater intensity. Poorly controlled blood pressure over a prolonged period is associated with a decline in patients' quality of life due to persistent symptoms such as prolonged headaches if not managed comprehensively.

These characteristics are relevant in nursing practice because initial patient assessment should include demographic factors and health history in order to develop effective interventions. Non-pharmacological interventions such as relaxation techniques, deep breathing exercises, warm compresses, and massage integrated into nursing care can help reduce headache intensity in addition to standard pharmacological management.

The case study conducted by the authors found that Respondent 1 complained of headache, a heavy sensation in the neck area, and fatigue, while Respondent 2 complained of headache and fatigue. Based on the assessment results, the nursing diagnosis identified in both respondents was acute pain related to physiological injury agents, as evidenced by headache.

Headache experienced by patients with hypertension is one of the neurological manifestations commonly reported, particularly when there is a significant or sudden increase in blood pressure. Although the relationship between chronic hypertension and headache remains complex and multifactorial.

As a result, when blood pressure rises suddenly to very high levels, the ability of cerebral blood vessels to compensate decreases, leading to cerebral perfusion dysfunction that may

trigger headache (Arca & Helker Singh, 2019). In addition, a sharp increase in blood pressure can elevate blood volume within the intracranial space and increase intracranial pressure (ICP). Increased ICP exerts pressure on sensory structures in the brain, including blood vessels and pain-sensitive nerve endings. This condition can trigger sharp and severe headache sensations (Colombari et al., 2025).

Hypertension is often associated with muscle tension in the neck, nape, and pericranial areas, particularly in patients experiencing stress, anxiety, and physical discomfort. This muscle tension can provoke pain responses characteristic of tension-type headache (TTH), which is commonly described as a feeling of pressure or heaviness in the back of the head and surrounding areas (Sari et al., 2025; Smeltzer & Bare, 2015).

The study results indicate that the consistent application of neck massage using olive oil for three consecutive days resulted in a reduction in headache intensity in both respondents. This was evidenced by a decrease in pain scores before and after the intervention on each day of measurement. The first respondent experienced a total pain score reduction of four points (from an initial score of 6 to 2), while the second respondent experienced a total reduction of three points (from an initial score of 5 to 2). The decrease in pain scores in both respondents demonstrates that neck massage using olive oil had a positive effect in alleviating headache among patients with hypertension.

The effectiveness of massage in reducing headache can be explained by the physiological mechanisms of massage described in nursing literature. Massage works by applying mechanical pressure to soft tissues such as muscles, fascia, and blood vessels in the neck and shoulder areas, resulting in increased local blood circulation and relaxation of tense muscles. This increased blood flow helps reduce muscle tension, which is often a triggering factor for headache, particularly in patients with high blood pressure who frequently experience tension in the neck and nape regions.

Several studies have shown that back massage or massage applied to the neck area can reduce headache intensity in patients with hypertension. A study conducted at Pampang Primary Health Center reported that back massage intervention contributed to a decrease in headache intensity among hypertensive patients, as indicated by pain scores before and after the treatment (Damayanti et al., 2025). In addition, the application of slow stroke back massage therapy has also been proven to reduce headache intensity in elderly patients with hypertension through mechanisms of muscle relaxation and increased parasympathetic activity, which ultimately contribute to improved comfort and reduced pain perception (Adriyanto et al., 2025).

Olive oil as a massage medium provides an additional contribution to these therapeutic effects. The anti-inflammatory and antioxidant properties contained in olive oil can help reduce soft tissue inflammation and provide a warming and soothing sensation, thereby enhancing the relaxation effect produced by the massage itself. Although specific literature regarding the use of olive oil in massage therapy for hypertension is still limited, oils with similar properties have been widely used in nursing practice as massage media to improve the effectiveness of massage interventions. The use of oil-based media such as olive oil also

facilitates smooth massage movements and reduces skin irritation during the application of mechanical pressure (Nasiri et al., 2022; Isdianto et al., 2025).

In addition to physiological mechanisms, psychological aspects also play a role in patients' perception of pain intensity changes. Massage not only provides mechanical effects on body tissues but also promotes psychological relaxation, reduces anxiety, and enhances comfort perception, all of which contribute to lower pain perception in patients with hypertension. Studies on non-pharmacological relaxation techniques have shown that such approaches are effective in reducing pain and improving patient comfort, including among individuals with high blood pressure (Wijaya & Purwanti, 2024).

Thus, the observed reduction in pain scores in both respondents is consistent with findings from other studies indicating that massage, as part of non-pharmacological interventions, can be an effective option for alleviating headache in hypertensive patients. The combination of mechanical effects (muscle relaxation and increased local circulation), psychological benefits (reduced anxiety), and the anti-inflammatory properties of olive oil as a massage medium supports the reduction in pain intensity experienced by the respondents.

This study has several limitations that should be considered when interpreting the results. First, the very limited number of respondents, consisting of only two individuals, restricts the generalizability of the findings to the broader hypertensive population. Second, the case study design without a control group makes it difficult to determine whether the observed reduction in pain was solely attributable to the neck massage intervention using olive oil, as other factors such as antihypertensive medication use or patients' psychological conditions may have influenced pain intensity.

Third, pain measurement using the numeric pain scale is subjective in nature and heavily dependent on each respondent's perception of pain. Fourth, the relatively short intervention duration of only three days does not allow for the assessment of the long-term effects of neck massage using olive oil on headache in hypertensive patients.

Therefore, future studies are recommended to employ experimental designs with larger sample sizes, longer intervention periods, and control of confounding factors to obtain stronger and more generalizable results.

Conclusion

The application of neck massage using olive oil was proven to be effective in reducing headache intensity among patients with hypertension. The intervention conducted over three consecutive days demonstrated a consistent decrease in pain scale scores in both respondents, with a total reduction of four points in the first respondent and three points in the second respondent. This reduction in pain indicates that neck massage using olive oil provides muscle relaxation in the neck and nape areas, improves local blood circulation, and enhances patient comfort.

This intervention can be recommended as a non-pharmacological therapy in nursing care to help alleviate headache in hypertensive patients as a complement to standard pharmacological treatment. However, further studies with larger sample sizes and

experimental research designs are needed to strengthen the evidence regarding the effectiveness of this intervention.

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Author Contribution

Wayunah, as the lead author, was responsible for the planning and design of the case study, determining the concept of the neck massage intervention using olive oil, supervising the implementation of the research, and writing as well as revising the final manuscript.

Syaefunnuril Anwar H, as the first co-author, contributed to field data collection, implementation of nursing interventions for the respondents, and recording the results of pain scale measurements before and after the intervention.

Fadhila Maulidina, as the second co-author, was involved in nursing assessments, documentation of nursing care, processing research data, and drafting the results and discussion sections of the manuscript.

Vina Yulianti, as the third co-author, contributed to the search and collection of scientific references, preparation of the literature review, and adjustment of citations and references according to journal guidelines.

Dwi Widyawati, as the fourth co-author, was responsible for data analysis and interpretation of the research findings.

Agi Ginanjar, as the fifth co-author, assisted in the editing of scientific language and ensured the manuscript's conformity with the journal template.

All authors have read and approved the final manuscript submitted for publication

Ethical Clearance

This case study received ethical approval from the relevant institution and was conducted in accordance with research ethics principles. Prior to the study, the authors obtained an ethical clearance certificate from the Ethics Committee of Bakti Tunas Husada University with certificate number 236-01/E.01/KEPK-BTH/VII/2024.

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